

University of Rajasthan Jaipur

SYLLABUS


M.Sc. PHYSICS (Annual Scheme)

M.Sc. (Previous) Examination 2023

M.Sc. (Final) Examination 2024

Rg/Jain

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Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur

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NOTICE

The Ordinance governing the examinations in the Faculties of Arts, Fine Arts, Social Sciences, Science, Commerce and Law are contained in a separate booklet. The students are advised to refer to the same.

- 2. Changes in Statutes/Ordinances/Rules/Regulations/Syllabus and Books may, from time to time, be made by amendment or re-making and a candidate shall, except in so far as the University determines otherwise comply with any change that applies to years he has not completed at the time of change.
- 3. All court cases shall be subject to the jurisdiction of the Rajasthan University head quarter at Jaipur only and not any other place.

University of Rajasthan, Jaipur
Published by Shiv Book Depot, Jaipur
for University of Rajasthan
Printed by Harish Printers, Jaipur

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SCHEME OF EXAMINATION
(Annual Scheme)

Each Theory Paper	3 hrs. duration	100 Marks
Dissertation / Thesis/ Survey Report/Field Work, if any.		100 Marks

- 2. The number of papers and the maximum marks for each paper / Practical shall be shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in theory part as well as in the Practical part (Wherever prescribed) of a subject/paper separately.
- 3. A candidate for a pass at each of the Previous and the Final Examination shall be required to obtain (i) atleast 36% marks in the aggregate of all the papers prescribed for the examination and (ii) atleast 36% marks in practical (s) wherever prescribed at the examination, provided that if a candidate fails to secure atleast 25% marks in each individual paper at the examination, and also in the test dissertation/Survey report/Field Work, wherever prescribed, he shall be deemed to have failed at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination. No division will be awarded at the Previous Examination. Division shall be awarded at the end of the Final Examination on the combined marks obtained at the Previous and the Final Examinations taken together, as noted below:

First Division 60%	} of the aggregate marks taken together of the Previous and the Final Examinations.
Second Division 45%	

All the rest will be declared to have passed the examination.

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4. If a candidate Clears any Paper (s) / Practical (s) / Dissertation prescribed at the Previous and/or Final examination after a continuous period of three years, then for the purpose of working out his division the minimum pass marks only viz. 25% (36% in the case of practical) shall be taken into account in respect of such Paper (s) / Practical (s) / Dissertation as are cleared after the expiry of the aforesaid period of three years : provided that in case where a candidate requires more than 25% marks in order to reach the minimum aggregate as many marks out of those actually secure by him will be taken into account as would enable him to make up the deficiency in the requisite minimum aggregate.
5. The Thesis/ Dissertation/ Survey Report/ Field Work shall typewritten and submitted in triplicate so as to reach the office of the Registrar atleast 3 weeks before the commencement of the theory examination. Only such candidates shall be permitted to offer Dissertation/ Field Work/ Survey Report/ Thesis (If provided in the scheme of Examination) in lieu of a paper as have secured atleast 55% marks in the aggregate of all the paper prescribed for the previous examination in the case of annual scheme irrespective of the number of paper in which a candidate actually appeared at the examination.

N.B.—Non-Collegiate candidates are not eligible to offer dissertation as per provisions of O.170-A.

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Syllabus : M. Sc. Physics /

M. Sc PHYSICS PREVIOUS

Paper-I	: Classical Mechanics and Mathematical Method in Physics	Max. Marks 100 Time 3 hrs.
Paper-II	: Classical Electrodynamics	Max. Marks 100 Time 3 hrs.
Paper-III	: Quantum Mechanics, Atomic and Molecular Physics	Max. Marks 100 Time 3 hrs.
Paper-IV	: Electronics, Numerical Methods and Computer Programming	Max. Marks 100 Time 3 hrs.

PAPER - I : CLASSICAL MECHANICS AND MATHEMATICAL METHODS IN PHYSICS

Max. Marks 100

Duration 3 hrs.

Note : In all Ten questions are to be set, Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. Holonomic and nonholonomic constraints: D'Alembert's Principle. Generalized Coordinates, Lagrangian, Lagrange's equation and its applications. Velocity dependent potential in Lagrangian formulation. Generalized momentum, Legendre transformation, Hamiltonian, Hamilton's Canonical equation.

2. Calculus of variations and its application to simple problems. Hamilton's variational principle, Derivation of Lagrange's and Hamilton. Canonical equation from Hamilton's variational principle. Extension of Hamilton's Principle for nonconservative and nonholonomic systems, Method of Lagrange's multipliers. Conservation Principle and Noether's theorem. Conservation of energy, linear momentum and angular momentum as a consequence of homogeneity of time and space and isotropy of space respectively.

3. Canonical transformation, integral invariants of Poincare Lagrange's and Poisson brackets as canonical invariants. Equation of motion in Poisson bracket formulation, Infinitesimal contact transformation and generators of symmetry, Liouville's theorem, Hamilton Jacobi equation and its application.

4. Action angle, variable adiabatic invariance of action variables. Kepler problem, action-angle variables, Rabi oscillation.

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Section B

5. Coordinate transformation in N -dimensional space: Contravariant and covariant tensor, Jacobian, Relative tensor, pseudo tensors (Example: change density, angular momentum) Algebra of tensors, Metric tensor, Associated tensors, Riemannian space (Example: Euclidean space and 4-D Minkowski space), Christoffel symbols, transformation of Christoffel symbols, Covariant differentiation, Ricci's theorem, Divergence, Curl and Laplacian in tensor form, Stress and Strain tensors, Hook's law in tensor form, Lorentz Covariance of Maxwell equation, Klein-Gordon and Dirac equation, Test of covariance of Schrodinger equation.

6. Group of transformations. (Example: symmetry transformation of square, Generators of a finite group, Normal subgroup, Direct product of groups, Isomorphism and Homomorphism, Representation theory of finite groups, Invariant subspace and reducible representations, irreducible representation, Crystallographic point groups, Irreducible representation of C_{2v} , Translation group and the reciprocal lattice.

7. Fourier Transforms: Development of the Fourier integral from the Fourier Series, Fourier and inverse Fourier transforms: Simple applications: Finite wave train, Wave train with gaussian amplitude, Fourier transform of derivatives, solution of wave equation as an application, Convolution theorem, intensity in terms of spectral density for quasi-monochromatic EM waves, Momentum representation, Application to hydrogen atom and harmonic oscillator problems, Application of Fourier transform to diffraction theory: Diffraction pattern of one and two slits.

8. Laplace transforms, and their properties, Laplace transform of derivatives and integrals, derivatives and integral of Laplace transform, Laplace transform of periodic functions, inverse Laplace transform, Convolution theorem, Impulsive Function, Application of Laplace transform in solving linear differential equations with constant coefficient with variable coefficient and linear partial differential equation.

Reference Books:

1. Goldstein—Classical Mechanics.
2. Landau and Lifshitz—Classical Mechanics.
3. A. Raychoudhary—Classical Mechanics.
4. Mathematical Methods for Physicists: George Arfken (Academic Press).
5. Applied Mathematics for Engineers and Physicists: L. A. Pipes (McGraw-Hill).
6. Mathematical Methods—Potter and Goldberg (Prentice Hall of India).
7. Elements of Group Theory for Physicists: A. W. Joshi

PEPER - II : CLASSICAL ELECTRODYNAMICS

Max. Marks 100

Duration 3 hrs.

Note: In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. Electrostatics: Electric field: Gauss law, Differential form of Gauss law, Another equation of electrostatics and the scalar potential, surface distribution of charges and dipoles and discontinuities in the electric field and potential, Poisson and Laplace equations, Green's Theorem, Uniqueness of the solution with Dirichlet or Neumann Boundary conditions, Formal solution of Electrostatic Boundary value problem with Green's Function, Electrostatic potential energy and energy density, capacitance.

Boundary-Value Problems in Electrostatics: Methods of Images, Point charge in the presence of a grounded conducting sphere, point charge in the presence of a charge insulated conducting sphere, Point charge near a conducting sphere at fixed potential, conducting sphere in a uniform electric field by method of images, Green function for the sphere, General solution for the potential, Conducting sphere with Hemispheres at different potential, orthogonal functions and expansion

2. Multipoles, Electrostatics of Macroscopic Media Dielectrics: Multiple expansion, multipole expansion of the energy of a charge distribution in an external field, Elementary treatment of electrostatics with permeable media, Boundary value problems with dielectrics, Molar polarizability, and electric susceptibility, Models for molecular polarizability, Electro-static energy in dielectric media.

3. Magnetostatics: Introduction and definition, Biot and Savart law, the differential equation of magnetostatics and Ampere's law, Vector potential and Magnetic induction for a circular current loop, Magnetic fields of a localized current distribution, Magnetic moment, Force and torque on and energy of a localized current distribution in an external magnetic induction) Macroscopic equations, Boundary conditions on D and H , Methods of solving Boundary-value problems in magnetostatics, Uniformly magnetized sphere, Magnetized sphere in an external field, Permanent magnets, Magnetic spherical shell of permeable material in an uniform field

4. Transverse electromagnetic waves

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Derivation of the equations of Macroscopic Electromagnetism, Poynting's theorem and conservations of energy and momentum for a system of charged particles and EM fields. Conservation laws for macroscopic media. Electromagnetic field tensor. Transformation of four potentials and four currents. Tensor description of Maxwell's equation.

Section B

5. Plane Electromagnetic Waves and Wave Equation : Plane wave in a nonconducting medium. Frequency dispersion characteristics of dielectrics, conductors and plasmas, waves in a conducting or dissipative medium, super position of waves in one dimension, group velocity, causality connection between D and E Kramers-Kronig relation.

6. Magnetohydrodynamics and Plasma Physics : Introduction and definitions. MHD equations Magnetic diffusion viscosity and pressure, Pinch effect, instabilities in a pinched plasma column. Magnetohydrodynamic waves, Plasma oscillations, short wave length limit of plasma oscillations and Debye shielding distance

7. Covariant Form of Electrodynamics Equations : Mathematical properties of the space-time special relativity, Invariance of electric charge covariance of electrodynamics, Transformation of electromagnetic fields.

Radiation by moving charges : Liénard-wiechert Potentials for a point charge. Total power radiated by an accelerated charge : Larmor's formula and its relativistic generalization, Angular distribution of radiation emitted by an accelerated charge, Radiation emitted by a charge in arbitrary extremely relativistic motion. Distribution in frequency and angle of energy radiated by accelerated charges. Thomson scattering and radiation, scattering by quasifree charges, coherent and incoherent scattering, Cherenkov radiation.

8. Radiation damping, self fields of a particle, scattering and absorption of radiation by a bound system : Introductory considerations, Radiative reaction force from conservation of energy, Abraham Lorentz evaluation of the self force, difficulties with Abraham Lorentz model, Integro-differential equation of motion including radiation damping, Line Breadth and level shift of an oscillator, Scattering and absorption of radiation by an oscillator. Energy transfer to a harmonically bound charge.

Reference Books:

1. J.D. Jackson—Classical Electrodynamics
2. Panofsky and Phillips Classical Electricity and Magnetism
3. Introduction to Electrodynamics—Griffiths
4. Landau and Lifshitz—Classical Electrodynamics

PAPER - III : QUANTUM MECHANICS, ATOMIC AND MOLECULAR PHYSICS

Max. Marks 100

Duration 3 hrs.

Note : In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. (a) States, Amplitudes and Operators: States of a quantum mechanical system, representation of quantum - mechanical states, properties of quantum mechanical amplitude, operators and change of state, a complete set of basis states, products of linear operators, language of quantum mechanics, postulates, essential definitions and commutation relations.

1. (b) Observable and description of system: Process of measurement, expectation values, time dependence of quantum mechanical amplitude, observables with no classical analogue, spin, dependence of quantum-mechanical amplitude on position, the wave function, super-position of amplitudes, identical particles.

2. Hamiltonian matrix and the time evolution of Quantum mechanical States : Hermiticity of the Hamiltonian matrix, Time independent perturbation of an arbitrary system, simple matrix examples of time independent perturbation, energy given states of a two state-system, diagonalizing of energy matrix, time independent perturbation of two state system the perturbative solution: Weak field and strong field cases, general description of two state system. Pauli matrices, Ammonia molecule as an example of two state system.

3. Transition Between Stationary States: Transitions in a two state system, time dependent perturbations- The Golden rule, phase space, emission and absorption of radiation, induced dipole transition and spontaneous emission of radiation, energy width of a quasi stationary state.

The Co-ordinate Representation: Compatible observables, quantum conditions and uncertainty relation, Co-ordinate representation of operators, position, momentum and angular momentum, time dependence of expectation values, the Ehrenfest's theorem, the time evolution of wave function, the Schrödinger equation, energy quantization, periodic potential as an example

4. Symmetries and Angular momentum : (a) Commuting observables and constants of motion, symmetry and conservation laws, invariance under

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representations of the angular momentum operators and their eigenstates, coordinate representations of the orbital angular momentum operators and their eigenstate (spherical harmonics), composition of angular momentum, Clebsch-Gordan coefficients tensor operators and Wigner Eckart theorem, commutation relations of J_x, J_y, J_z with reduced spherical tensor operator, matrix elements of vector operators, time reversal invariance and vanishing of static electric dipole moment of a stationary state.

Section B

5. Hydrogen Atom : Gross structure energy spectrum, probability distribution of radial and angular ($l=1, 2$) wave functions (no derivation), effect of spin, relativistic correction to energy levels and fine structure, magnetic dipole interaction and hyperfine structure, the Lamb shift (only a qualitative description).

6. Interaction with External Fields : Non degenerate first order stationary perturbation method, atom in a weak uniform external electric field and first and second order Stark effect, calculation of the polarizability of the ground state of H-atom and of an isotropic harmonic oscillator, Degenerate stationary perturbation theory. Linear Stark effect for H-atom levels, inclusion of spin-orbit and weak magnetic field, Zeeman effect, strong magnetic field and calculation of interaction energy.

7. Systems with Identical Particles: Indistinguishability and exchange symmetry, many particle wave functions and Pauli's exclusion principle, spectroscopic terms for atoms.

The Helium atom, Variational method and its use in the calculation of ground state and excited state energy, Helium atom, The Hydrogen molecule, Heitler-London method for H_2 molecule, WKB method for one dimensional problem, application to bound states (Bohr-Sommerfeld quantization) and the barrier penetration (alpha decay, problems).

8. Spectroscopy (qualitative) : General features of the spectra of one and two electron system-singlet, doublet and triplet characters of emission spectra, general features of Alkali spectra, rotation and vibration band spectrum of a molecule, P, Q and R branches, Raman spectra for rotational and vibrational transitions, comparison with infra red spectra, general features of electronic spectra, Frank and Condon's principle.

Reference Books :

1. Ashok Das and A.C. Melissinos, Quantum Mechanics- A modern Approach (Gordon and Breach Science Publishers).
2. P.A.M. Dirac, Quantum Mechanics.
3. E. Merzbaker, Quantum Mechanics, Second Edition.

4. L.P. Landau and E.M. Lifshitz, Quantum Mechanics-Non relativistic theory (Pergamon Press)
5. A. Ghatak and S. Lokanathan, Quantum Mechanics: Theory and Applications, Third Edition (Mac Millan India Ltd.)
6. G. K. Woodgate, Elementary Atomic Structure, Second Edition Clarendon Press, Oxford.
7. T.A. Littlefield- Atomic and Molecular Physics.
8. Eisnberg and Rasmuk- Quantum Physics of Atoms, Molecules, Solids and Nuclear Particles.
9. White - Atomic Spectra.
10. Herzberg - Molecular Spectra.

PAPER - IV : ELECTRONICS, NUMERICAL METHOD AND COMPUTER PROGRAMMING

Max. Marks 100

Duration 3 hrs.

Note :

1. In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.
2. Simple calculator is allowed in the examination hall.

Section A

1. Operational Amplifiers : Differential amplifier - circuit configurations - dual input, balanced output differential amplifier. DC analysis - AC analysis, inverting and non inverting inputs, CMRR - constant current bias level translator.

Block diagram of a typical Op-Amp-analysis. Open loop configuration, inverting and non-inverting amplifiers. Op-amp with negative feedback - voltage series feed back - effect of feed back on closed loop gain, input resistance, output resistance, bandwidth and output offset voltage - voltage follower.

Practical op-amp-input offset voltage - input bias current - input offset current, total output offset voltage, CMRR frequency response. DC and AC amplifier, summing, scaling and averaging amplifiers, instrumentation amplifier, integrator and differentiator.

2. Oscillators and Wave Shaping Circuits: Oscillator Principle- Oscillator types, Frequency stability, response. The Phase shift oscillator, Wein bridge Oscillator, LC tunable oscillators, Multivibrators- Monostable and Astable, Comparators, Square wave and Triangle wave generators, Clamping and Clipping.

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Syllabus : M. Sc. Physics / 12

3. Digital Electronics : Combinational Logic : The transistor as a switch element: Realisation of OR, AND, NOT, NOR and NAND gates, Exclusive OR gate, Boolean algebra - Demorgan's theorems Adder, Subtractor, Comparator, Decoder/ Demultiplexer Data selector/multiplexer - Encoder. .

Sequential Logic: Flip - Flops : one - bit memory, The RS Flip-flop, JK Flip- Flop, JK master slave Flip - Flops, T Flip - Flop, D Flip - Flop, Shift registers - synchronous and asynchronous counters- cascade counters, Binary counter, Decade counter.

Basic concepts about fabrication and characteristics of integrated circuits.

4. Microprocessors : Introduction to microcomputers : memory - input/output - Interfacing devices 8085, CPU - Architecture - BUS timings - Demultiplexing the address bus generating control signals - Instruction set - addressing modes - Illustrative programmes - writing assembly language programmes looping, counting and indexing - counters and timing delays - stack and subroutine.

Section B

5. Errors in numerical analysis: Source of error, Round off error, Computer Arithmetic, Error Analysis, Condition and stability, Approximation, Functional and Error analysis, the method of Undetermined Coefficients.

Use of interpolation formula, Iterated interpolation, Inverse interpolation, Hermite interpolation and Spline interpolation, Solution of Linear equations : Direct and Iterative methods, Calculation of eigen values and eigen vectors for symmetric matrices.

6. Solution of Nonlinear equation: Bisection method, Newton's method, modified Newton's method, method of iteration, Newton's method and method of iteration for a system of equations Newton's method for the case of complex roots.

Integration of a function: Trapezoidal and Simpson's rules, Gaussian quadrature formula, Singular integrals, Double integration.

7. Integration of Ordinary differential equation : Predictor - corrector methods, Runge-Kutta method, Simultaneous and Higher order equations.

Numerical Integration and Differentiation of Data, Least-Squares Approximations, Fast Fourier Transform.

Some elementary information about Computer: CPU, Memory, Input Output devices, Super, Mini and Micro systems, MS-DOS operating system, High Level Language

8. Fortran 77 : Variables, Expressions, Jumping, Branching and Looping statements, Input/ Output statement, Statement for handling Input/ Output Files, Subroutine, External Function, special statements: COMMON, ENTRY, FORMAT, PAUSE, EQUIVALENCE. Programming of simple problems involving use of interpolation differentiation, integration, matrix inversion and least square analysis.

Reference Books :

1. Ryder—Electronic Fundamentals and applications.
2. Millman and Toub—Pulse, Digital and Switching wave forms.
3. Millman and Halkias—Integrated Electronics.
4. Ryder—network Lines and Fields.
5. Bapat—Electronics Devices and Circuits.
6. A Ralston and P. Rabinowitz, A First Course in Numerical analysis Mc Graw Hill (1985)
7. S.S. Sastry, Introductory Methods of Numerical Analysis, Prentice-hall of India (1979).
8. Ram Kumar, Programming with Fortran 77, McGraw-Hill (1986).
9. "Electronic Devices and circuit theory" by Robert Boylested and Louis Nashelsky PHI, New Delhi, 1100 001, 1991
10. "OP Amps & Linear integrated circuits," by Ramakant A. Gayakwad PHI, Second Edition, 1991.
11. "Digital principles and Applications" by A.P. Malvino and Donald P. Leach, Tata McGraw - Hill company, New Delhi, 1993.
12. "Microprocessor Architecture, Programming and applications with 8085/8086 by Ramech S. Gaonkar, Wiley - Eastern Ltd., 1987.

LIST OF EXPERIMENTS FOR M.Sc PREVIOUS

Scheme :

The examination will be conducted for two days, 6 hrs. each day. The distribution of the marks will be as Follows :

	Marks
Two experiments	120
Viva	40
Record	40
Total	200
Minimum Pass Marks	72

List of Experiments (any eight):

1. To design a single stage amplifier of a given voltage gain and lower cut off frequencies.
2. To determine the

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3. To design a RC coupled two stage amplifier of a given gain and the cut off frequencies.
4. To study Hartley oscillator.
5. To Study Transistor bias Stability.
6. To design a Multivibrator of given frequency and study its wave shape
7. To study the characteristics of FET and use it to design an relaxation oscillator and measure its frequency.
8. To study the characteristics of an operational amplifier.
9. To study the characteristics of a UJT and use it to design a relaxation oscillator and measure its frequency.
10. To study the addition, integration and differentiation properties of an operational amplifier.
11. Determine Plack constant using solar Cell.
12. To determine Plack constant and work function by a photo-cell.
13. To study regulated power supply using (A) Zener diode only (b) Zener diode with a series transistor (c) Zener diode with a shunt transistor
14. To verify Fresnel's formula.
15. To study the percentage regulation and variation of Ripple factor, with load for a full wave rectifier.
16. To study analog to digital and digital to analog conversion.
17. To study a driven mechanical oscillator.
18. To verify Hartmann's formula using constant deviation spectrograph.
19. To find e/m of electron using Zeeman effect.
20. To find Dissociation energy to I.
21. Study of CH Bands.
22. Salt Analysis/Raman effect (Atomic).
23. Design and study of pass filters.
24. Michelson Interferometer.
25. Fabry perot Interferometer.
26. Determination of velocity of Ultrasonic waves.
27. Study of Elliptically polarised light by Babinet Compensator.
28. Verification of Cauchy's Dispersion relation

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M. Sc PHYSICS FINAL

Paper-V	: Advanced Quantum Mechanics and Introductory Quantum Field	Max Marks 100 Time 3 hrs
Paper-VI	: Nuclear Physics	Max Marks 100 Time 2 hrs.
Paper-VII	: Statistical and Solid State Physics	Max Marks 100 Time 3 hrs.
Paper-VIII	: (A) Microwave Electronics	Max Marks 100 Time 3 hrs.
OR		
Paper-VIII	: (B) Plasma Physics	Max Marks 100 Time 3 hrs.

PAPER - V : ADVANCED QUANTUM MECHANICS AND INTRODUCTORY QUANTUM FIELD THEORY

Max. Marks 100

Duration 3 hrs.

Note : In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. Scattering (non-relativistic) : Differential and total scattering cross section; transformation from CM frame to Lab frame, solution of scattering problem by the method of partial wave analysis, expansion of a plane wave into a spherical wave and scattering amplitude, the optical theorem, Applications - scattering from a delta potential, square well potential and the hard sphere scattering of identical particles, energy dependence and resonance scattering. Breit-Wigner formula, quasi stationary states.

The Lippman-Schwinger equation and the Green's function approach for scattering problem, Born approximation and its validity for scattering problem, Coulomb scattering problem under first Born approximation in elastic scattering.

2. Relativistic Formulation and Dirac Equation : Attempt for relativistic formulation of quantum theory. The Klein-Gordon equation, Probability density and probability current density, solution of free particle K.G. equation in momentum representation, interpretation of negative probability density and negative energy solutions.

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Dirac equation, orthogonality and completeness relations for Dirac spinors, interpretation of negative energy solution and hole theory.

3. Symmetries of Dirac Equation : Lorentz covariance of Dirac equation, proof of covariance and derivation of Lorentz boost and rotation matrices for Dirac spinors, Projection operators involving four momentum and spin, Parity (P), charge conjugation (C), time reversal (T) and CPT operators for Dirac spinors, Bilinear covariants, and their transformations behaviour under Lorentz transformation, P.C.T. and CPT, expectation values of co-ordinate and velocity involving only positive energy solutions and the associated problems, inclusion of negative energy solution, Zitter bewegung, Klein paradox.

4. The Quantum Theory of Radiation : Classical radiation field, transversality condition, Fourier decomposition and radiation oscillators, Quantization of radiation oscillator, creation, annihilation and number operators, photon states, photon as a quantum mechanical excitations of the radiation field, fluctuations and the uncertainty relation, validity of the classical description, matrix element for emission and absorption, spontaneous emission in the dipole approximation, Rayleigh scattering, Thomson scattering and the Raman effect, Radiation damping and Resonance fluorescence.

Section B

5. Scalar and vector fields : Classical Lagrangian field theory, Euler-Lagrange's equation, Lagrangian density for electromagnetic field, Occupation number representation for simple harmonic oscillator, linear array of coupled oscillators, second quantization of identical bosons, second quantization of the real Klein Gordan field and complex Klein-Gordan field, the meson propagator.

6. The occupation number representation for fermions, second quantization of the Dirac field, the fermion propagator, the e.m. interaction and gauge invariance, covariant quantization of the free electromagnetic field, the photon propagator.

7. S-matrix, the S-matrix expansion, Wick's theorem, Diagrammatic representation in configuration space, the momentum representation, Feynman diagrams of basic processes, Feynman rules of QED.

8. Applications of S-matrix formalism: the Coulomb scattering, Bhabha scattering, Moller scattering, Compton scattering and pair production.

Reference Books :

1. Ashok Das and A.C. Millisones : Quantum Mechanics - A Modern Approach (Garden and Breach Science Publishers).
2. E. Merzbaker : Quantum Mechanics, Second Edition (John Wiley and sons)

3. Bjorken and Drell : Relativistic Quantum Mechanics (McGraw Hill)
4. J.J Sakur : Advanced Quantum Mechanics (John Wiley)
5. F. Mandal & G. Shaw, Quantum Field Theory (John Wiley)
6. J.M. Ziman, Elements of Advance Quantum Theory. (Cambridge University Press).

PEPER - VI : NUCLEAR PHYSICS

Max. Marks 100

Duration 3 hrs.

Note : In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. Two Nucleon system and Nuclear Forces : General nature of the force between nucleons, saturation of nuclear forces, charge independence and spin dependence, General forms of two nucleon interaction, central, noncentral and velocity dependent potentials, Analysis of the ground state ($3S_1$) of deuteron using a square well potential, range-depth relationship, excited states of deuteron. Discussion of the ground state of deuteron under noncentral force, calculation of the electric quadrupole and magnetic dipole moments and the D-state admixture.

2. Nucleon-Nucleon Scattering and Potentials : Partial wave analysis of the neutron-proton scattering at low energy assuming central potential with square well shape, concept of the scattering length, coherent scattering of neutrons by protons in (ortho and para) hydrogen molecule; conclusions of these analyses regarding scattering lengths, range and depth of the potential; the effective range theory (in neutron-proton scattering) and the shape independence of nuclear potential; A qualitative discussion of proton-proton scattering at low energy; General features of two-body scattering at high energy Effect of exchange forces: Phenomenological Hamada-Johnston hard core potential and Reid hard core and soft core potentials; Main features of the One boson Exchange Potentials (OBEP) no derivation.

3. Interaction of radiation and charged particle with matter (No derivation) : Law of absorption and attenuation coefficient; Photoelectric effect, Compton scattering, pair production; Klein-Nishina cross sections for polarized and unpolarized radiation, angular distribution of scattered photon and electrons, Energy loss of charged particles due to ionization, Bremsstrahlung, energy target and projectile dependence of all three processes, Range-energy curves, Staggling.

4. Experimental Techniques : Gas filled counters, Scintillation

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Geiger, Gerenkov counters; Solid state detectors; Surface barrier detectors; Electronic circuits used with typical nuclear detectors; Multiwire proportion chambers; Nuclear emulsions, techniques of measurement and analysis of tracks. Proton synchrotron; Linear accelerations; Acceleration of heavy ions.

Section B

5. **Nuclear shell model** : Single particle and collective motions in nuclei. Assumptions and justification of the shell model, average shell potential, spin-orbit coupling; single particle wave functions and level sequence; magic numbers; shell model predictions for ground state parity; angular momentum, magnetic dipole and electric quadrupole moments; and their comparison with experimental data; configuration mixing; single particle transition probability within the shell model; selection rules; approximate estimates for the magnetic dipole moment and Weisskopf units; Nuclear isomerism.

6. **Collective nuclear models** : Collective variable to describe the vibrational modes of nuclear motion; Parametrization of nuclear surface; A brief description of the collective model Hamiltonian (in the quadratic approximation); Vibrational modes of a spherical nucleus, Collective modes of a deformed even-even nucleus and moments of inertia; Collective spectra of the electromagnetic transition in even nuclei and comparison with experimental data. Nilsson model for the single particle states in deformed nuclei.

7. **Nuclear gamma and beta decay** : Electric and magnetic multipole transitions; gamma decay probabilities in nuclear system (no derivations) The Fermi theory of beta decay, probability, Selection rules; Internal conversion and zero-point energy.

8. **General characteristics of weak interaction, nuclear beta decay and neutrino** : Neutrino energy spectrum and Fermi-Kurie plot; Fermi theory of beta decay; parity conserved selection rules Fermi and Gamow-Teller) for allowed transitions; f -values; General interaction Hamiltonian for beta decay with parity conserving and non conserving terms; Forbidden transitions; Experimental verification of parity violation; The V-A interaction and experimental evidence

9. **Nuclear Reactions**: Theories of Nuclear Reactions; Partial wave analysis of reaction; Cross section; Compound nucleus formation and breakup; Resonance scattering and reaction- Breit-Wigner dispersion formula for s-wave; σ_{tot} and σ_{el} cross section; statistical theory of nuclear reactions, transmission probability and cross section for specific reactions; The optical model; Compound and direct reactions and their simple theoretical description (Butler theory); Compound and wave Born approximation.

Reference Books

1. J.M Blatt and V.E. Weisskopf : Theoretical Nuclear Physics
2. Statistical theory of nuclear reactions, Exaperation probability and cross section for specific reaction.
3. L.R.B Elton : Introductory Nuclear Theory, ELBS Pub. London, 1959
4. B.K. Agrawl : Nuclear Physics, Lokbharti Pub. Allahabad.1989
5. M.K. Pal : Nuclear Structure, Affiliated East-West Press.1982).
6. R.R. Roy and B.P. Nigam, Nuclear Physics, Willey-Easter, 1979
7. M.A. Preston & R.K Bhaduri-Structure of the Nucleus, Addison Wesley, 1975
8. R.M. Singru : Introductory Experimental Nuclear Physics
9. England - Techniques on Nuclear Structure (Vol. i)
10. R.D. Evans - The Atomic Nucleus (McGraw - Hills, 1955)
11. H. Enge - Introduction to Nuclear Physics, Addition-Wesley, 1970
12. W.E. Burchant - Elements of Nuclear Physics, ELBS, Longman, 1988
13. B.L. Cohen - Concept of Nuclear Physics Tata Mc-Graw Hills, 1988
14. E. Segre - Nuclei, Particles Benjamin, 1977
15. I. Kaplan - Nuclear Physics, Addison Wesley, 1963
16. D. Hallidy - Introductory Nuclear Physics, Wiley, 1955.
17. Harvey - Introduction of Nuclear Physics and Chemistry

PEPER-VII : STATISTICAL AND SOLID STATE PHYSICS

Max. Marks 100

Duration 3 hrs.

Note : In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. **Basic Principles, Canonical and Grand Canonical ensembles**: Concept of statistical distribution, phase space, density of states, Liouville's theorem, systems and ensemble, entropy in statistical mechanics Connection between thermodynamic and statistical quantities micro canonical ensemble, ~~equation of state~~, specific heat and entropy of a perfect gas, using micro Canonical ensemble.

Canonical ensemble, thermodynamic functions for the canonical ensemble, calculation of mean values, energy fluctuation in a gas, ~~canonical ensemble~~, thermodynamic functions for the grand canonical ensemble, density fluctuations

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translational, rotational and vibrational contributions to the partition function of a diatomic gas. Specific heat of a diatomic gas, ortho and para hydrogen.

Identical particles and symmetry requirement, difficulties with Maxwell-Boltzmann statistics, quantum distribution functions, Bose-Einstein and Fermi-Dirac statistics, Boson statistics and Planck's formula, Bose Einstein condensation, liquid He⁴ as a Boson system, quantization of harmonic oscillator and creation and annihilation of Phonon operators, quantization of fermion operators.

3. Theory of Metals : Fermi-Dirac distribution function, density of states, temperature dependence of Fermi energy, specific heat, use of Fermi-Dirac statistics in the calculation of thermal conductivity and electrical conductivity, Wiedemann-Franz ratio, susceptibility, width of conduction band, Drude theory of light absorption in metals.

4. Band Theory : Bloch theorem, Kronig-Penny model, effective mass of electrons, Wigner-Seitz approximation, NFE model, tight binding method and calculation of density for a band in simple cubic lattice, pseudo-potential method.

Section B

5. Lattice Vibrations and Thermal Properties : Interrelations between elastic constants C_{11} , C_{12} and C_{44} , wave propagation and experimental determination of elastic constant of cubic crystal, vibrations of linear mono and diatomic lattices, Determination of phonon dispersion by inelastic scattering of neutrons.

6. Semiconductors : law of mass action, calculation of impurity conductivity, ellipsoidal energy surfaces in Si and Ge, Hall effect, recombination mechanism, optical transitions and Shockley-Read theory, excitons, photoconductivity, photo-luminescence.

Point, line, planar and bulk defects, colour centres, F-centre and aggregate centres in alkali halides.

7. Magnetism : Larmor diamagnetism, Paramagnetism, Curie law, spin and Quantum theories, Susceptibility of rare earth and transition metals, Ferromagnetism, Domain theory, Weiss molecular field and exchange, spin waves, dispersion relation and its experimental determination by inelastic neutron scattering, heat capacity, Nuclear Magnetic resonance: Conditions of resonance, Bloch equations, NMR-experiment and characteristics of an absorption line.

Given and AC and DC, Josephson tunnelings.

(b) Cooper pairs and derivation of BCS Hamiltonian, results of BCS theory (no derivation).

Reference Books :

1. Huang : Statistical Mechanics
2. Reif : Fundamentals of Statistical and Thermodynamical Physics
3. Rice : Statistical mechanics and Thermal Physics
4. Kittel : Elementary statistical Mechanics
5. Kittel : Introduction to Solid State Physics
6. Palicson: Solid State Physics
7. Levy : Solid State Physics
8. Mckelvy : Solid State and Semi-conductor Physics.

PEPER - VIII : (A) MICROWAVE ELECTRONICS

Max. Marks : 90

Duration 3 hrs

Note : In all Ten questions are to be set. Five from each section. Candidates are required to attempt five questions in all, taking at least two questions from each section.

Section A

1. Introduction to microwaves and its frequency spectrum, Application of microwaves.

Wave guides : (a) Rectangular wave guides: Wave Equation & its solutions, TE&TM modes. Dominant mode and choice of wave guide Dimensions Methods of excitation of wave guide.

(b) Circular wave guide-wave equation & its solutions TE, TM & TEM modes.

(c) Attenuation - Cause of attenuation in wave guides, wall current & derivation of attenuation constant, Q of the wave guide.

2. (a) Resonators : Resonant Modes of rectangular and cylindrical cavity resonators, Q of the cavity resonators, Excitation techniques, Introduction to Microstrip and Dielectric resonators, Frequency meter.

(b) Ferrites : Microwave propagation in ferrites, Faraday rotation Devices employing Faraday rotation (isolator, Circulator). Introduction to single crystal ferrite resonators, YIG tuned solid state resonators.

3. Microwave tubes: Space charge

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Electric & Magnetic field of oscillations. Modes of oscillation & operating characteristics.

Traveling wave tubes : O & M type travelling wave tubes.

Gyrotrons: Constructions of different Gyrotrons. Field - Particle interaction in Gyrotron.

4. Microwave Measurement :

a) Microwave Detectors: Power, Frequency, Attenuation, Impedance Using smith chart, VSWR, Reflectometer, Directivity, coupling using direction coupler.

b) Complex permittivity of material & its measurement: definition of complex of Solids, liquids and powders using shift of minima method.

Section B

(a) Avalanche Transit Time Device: Read Diode, Negative resistance of an avalanching p-n Junction diode IMPATT and TRAPATT Oscillator.

(b) Transferred Electron Device: Gunn effect, two valley model. High field Domains, Different Modes for Microwave generation.

(c) Passive Devices: Termination (Short circuit and matched terminations) Attenuator, phase changers, E&H plane Tees, Hybrid Junctions. Directional coupler.

2. Parametric Amplifier: Varactor. Equation of Capacitance in Linearly graded & abrupt p-n junction, Manely Rowe relations, parametric upconverter and Negative resistance parametric amplifier, use of circulator, Noise in parametric amplifiers.

3. Microwave Antennas: Introduction to antenna parameters, Magnetic Currents, Electric and magnetic current sheet, Field of Huggen's source, Radiation from a slot antenna, open end of a wave guide and Electromagnetic Horns. Parabolic reflectors, Lens antennas.

Radiation fields of Microstrip wave guide, Microstrip wave guide, Microstrip antenna calculations, Microstrip design formulas.

4. Microwave Communication: (a) LOS microwave systems, Derivation of LOS communication range, OTH microwave systems. Derivation of field strength of tropospheric waves. Transmission interference and signal damping, Duct propagation.

5. Satellite Communication : Satellite frequencies allocation, Synchronous satellites, Satellite orbits, Satellite location with

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Reference Books:

1. Electromagnetic waves & Radiating Systems : Jordan & Balmain.
2. Theory and application of microwaves by A.B. Brownwell & R.E. Beam (McGraw Hill)
3. Introduction to microwave theory by Atwater (McGraw Hill).
4. Principles of microwave circuit by G.C. Montgomery (McGraw Hill)
5. Microwave Circuits & Passive Devices by M.L. Sisodia and G.S. Raghuvanshi (New Age International, New Delhi)
6. Foundations of microwave engineering by R.E. Collin. (McGraw Hill).
7. Microwave Semiconductor Devices and their Circuit applications by H.A. Watson
8. Microwave by M.L. Sisodia and Vijay Laxmi Gupta. New Age, New Delhi.
9. Antenna Theory, Part-I by R.E. Collin & F.J. Zucker (McGraw Hill, New York)
10. Microstrip Antennas by Bahl & Bhartiya (Artech House, Massachusetts)
11. Antenna Theory Analysis by C.A. Balanis Harper & Row, Pub. & Inc. New York.
12. Antenna Theory Analysis by E.A. Wo^lter (J. Wiley & Sons)
13. Antenna Theory & Design by RS Elliott (LPHI Ltd. New Delhi)
14. Microwave electronics by R.F. Sooboo (Addisen Westey public. company).
15. Microwave Active Devices, Vacuum tubes by M.L. Sisodia new Age International New Delhi.
16. Semiconductors & Electronics device by A. Barle vs (PHI, India).
17. Solid State physical electronics by A. Vanderziel, (PHI, India).
18. Hand book of microwave measurement Vol-II by M. Sucher & J. Fox (Polytechnic Press, New York).
19. Microwave devices & circuits by S. Y.Liao (PHI, India).
20. Microwave Principles by H.J. Reich (CBS).
21. Simple microwave technique for measuring the dielectric parameters of solids & their powder by J.M. Gandhi, I.S. Yadav, I. of applied physics Vol. 30, pp-427-431, 1992.

PEPER - VIII (B) : PLASMA PHYSICS

Max. Marks 100

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Section A

1. Basic properties and occurrence. Definition of plasma. Criteria for plasma behaviour. Plasma oscillation. Quasineutrality and Debye shielding. The plasma parameter. natural occurrence of plasmas. Astrophysical plasmas. Plasma in Magnetosphere and ionosphere. introduction to various theoretical approaches: Kinetic, Multi-Fluid and single fluid.

2. Charged particle motion and drifts: Guiding centre motion of a charges particle. Motion in (i) uniform electric and magnetic fields (ii) gravitational and magnetic fields. Motion in non-uniform magnetic field (i) Grad B perpendicular to B, Grad B drift and curvature drift (ii) Grad B parallel to B and principle of magnetic mirror. Motion in non-uniform electric field for small larmour radius. Time varying electric field and polarization drift. Time varying magnetic field adiabatic invariance of magnetic moment.

3. Diffusion and resistivity: Collision and diffusion parameters. Decay of a plasma by diffusion. ambipolar diffusion. Diffusion across a magnetic field. Collision in fully ionized plasma. Plasma resistivity. Diffusion in partially ionized plasmas. Solution of Diffusion equation, plasma production and recombination. Thermal ionization, saha equation. Brief discussion of methods of plasma production. Steady state glow discharge, microwave discharge and induction discharge. Double plasma machine. elementary plasma diagnostics. electrostatic and magnetic probes.

4. MHD power generation. basic principle and working of MHD generator. Conductivity of gaseous working fluid. Basic fluid equations. Generalized Ohm's law. Faraday and Hall generators. performance characteristics and electrical efficiency of Faraday and Hall Generators.

Section B

1. Waves in plasma: electron plasma waves. Ion Waves. Electromagnetic electron oscillations perpendicular to B, upper hybrid oscillations. Electromagnetic waves perpendicular to B, ion cyclotron waves, Lower hybrid oscillations. Electromagnetic waves in field free plasma. Electromagnetic waves parallel to B. Cut offs and resonances. Electromagnetic waves parallel to B in a magnetic field. Hydromagnetic waves. Magnetosonic waves.

2. Equilibrium and Stability: Hydromagnetic equilibrium. Introduction of magnetic field into a plasma. Classification of instabilities. The Rayleigh instability. Kinetic treatment of plasma oscillations and Landau damping. physical explanation.

3. Non-linear effects: The Sagdeev potential. Derivation of KdV equation for ion acoustic waves. Soliton solution in one dimension. Elementary aspects of the ponderomotive force and magnetic instability. Quasilinear

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4. Controlled thermonuclear fusion: Potentials and problems of controlled thermonuclear fusion. Ignition temperature and Lawson criteria. Magnetic confinement. Simple discussion of Tokamak, stellarators, multipoles and Z-pinch. Idea about inertial confinement and laser fusion. Methods of plasma heating and problems of fusion.

References:

1. F.F. Chen: An Introduction to Plasma Physics (Plenum Press) 1974.
2. Boley: Plasmas: Laboratory and Cosmic.
3. W.B. Kunkel: Plasma Physics in theory and Application.
3. J. A. Bittencourt: Fundamentals of Plasma Physics (Pergamon Press) 1986.
4. Huddleston & Leonord: Plasma Diagnostic Techniques.
5. R.C. Davidson: Methods in Non-linear Plasma theory, 1972.
6. Holt and Haske: Foundations of Plasma.

LIST OF EXPERIMENTS FOR MSc FINAL

Scheme:

The examination will be conducted for two days, 6 hrs. each day. The distribution of the marks will be as Follows:

Two experiments	Marks
Viva	120
Record	40
	<u>40</u>
	Total <u>200</u>
	Minimum Pass Marks <u>72</u>

LIST OF EXPERIMENTS (any eighteen)

1. To determine half-life of a radio isotope using GM counter.
2. To study absorption of particles and determine range using at least two sources.
3. To study characteristics of a GM counter and to study decay of radioactive decay.
4. To study spectrum of β particles using Geiger counter.
5. To calibrate a scintillation spectrometer and determine energy of rays from an unknown source.

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formula.

8. To study temperature variation of resistivity for a semi-conductor and to obtain band gap using four probe method.
9. To study hall effect and to determine hall coefficient.
10. To study the variation of rigidity of a given specimen as a function of the temperature.
11. To study the dynamics of a lattice using electrical analog.
12. To study ESR and determine g-factor for a given spectrum.
13. To determine ultrasonic velocity and to obtain compressibility for a given liquid.
14. Study the characteristics of a given Klystron and calculate the mode number, E.T.S. and transit time.
15. Study the simulated L.C.R. transmission line (audio frequency) and to find out the value for Z_0 experimentally from the graph.
16. Study the radiation pattern of a given Pyramidal horn by plotting it on a Polar graph paper. Find the half power beamwidth and calculate its gain.
17. Find the dielectric constant of a given solid (Teflon) for three different lengths by using slotted section.
18. Find the dielectric constant of a given liquid (organic) using slotted section of K-band.
19. Verification of Bragg's law using microwaves..
20. Determination of Dielectric Constant of a liquid by lecher wire.
21. Study of a Heat Capacity of Solids.
22. Study of lattice dispersion.

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SYLLABUS

M.Sc. Chemistry (Annual Scheme)

M.Sc. (Previous) Examination 2023

M.Sc. (Final) Examination 2024

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M.Sc. Chemistry
(Two Year Course)

Note : In each question paper 10 questions will be set. Candidates have to answer 5 questions selecting at least one question from each unit.

M.Sc. I Year (Previous)

Paper	Course No.	Course	Exam Duration (Hours)	Max Marks	Min Marks
Paper-I	CH-401	Inorganic Chemistry	03	100	36
Paper-II	CH-402	Organic Chemistry	03	100	36
Paper-III	CH-403	Physical Chemistry	03	100	36
Paper-IV	CH-404	Spectroscopy and Diffraction Methods	03	50	18
Paper-V	CH-405	Green and Sustainable Chemistry	03	50	18
Paper-VI	CH-406	Analytical Techniques	03	50	18
Practical	CH-407		14	200	72
			Total Marks	650	

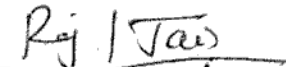
M.Sc. II Year (Final)

Paper	Course No.	Course	Exam Duration Hours	Max Marks	Min Marks
Paper-I	CH-501	Applications of Spectroscopy, Photochemistry and Solid State Chemistry	03	100	36
Paper-II	CH-502	Bioinorganic Chemistry Bioorganic Chemistry Biophysical Chemistry	03	75	27
Paper-III	CH-503	Environmental Chemistry	03	50	18
Paper-IV	CH-504	Elective Paper	03	50	18
Paper-V	CH-505	Elective Paper	03	50	18
Paper-VI	CH-506	Elective Paper	03	50	18
Paper-VII	CH-507	Elective Paper	03	50	18
Seminar	CH-508			25	9
Practical	CH-509		14	200	72
			Total Marks	650	
M.Sc. I Year (Previous) & II Year (Final)			Grand Total	1300	

The following alternative groups of elective papers are approved for M.Sc. II Year course.

College / department having more than 30 seats has to offer minimum two elective groups.

Group-I	CH-504	Organotransition Metal Chemistry
	CH-505	Bioinorganic and Supramolecular Chemistry
	CH-506	Photoinorganic Chemistry
	CH-507	Polymers
Group-II	CH-504	Organic Synthesis-I
	CH-505	Organic Synthesis-II
	CH-506	Heterocyclic Chemistry
	CH-507	Chemistry of Natural Products
Group-III	CH-504	Analytical Chemistry
	CH-505	Physical Organic Chemistry
	CH-506	Chemical Dynamics
	CH-507	Electrochemistry


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M.Sc. I YEAR (PREVIOUS)

Paper I : CH - 401 Inorganic Chemistry
(4 hrs. or 6 periods / week)

Exam Duration : 3 hrs.

Max. Marks: 100

Unit-I

Symmetry and Group Theory in Chemistry

Symmetry elements and symmetry operation, definition of group, subgroup, relation between orders of a finite group and its subgroup. Conjugacy relation and classes. Point symmetry group. Schonflies symbols, representations of groups by metrics (representation for the C_n , C_{nv} , D_{nh} , etc., groups to be worked out explicitly). Character of a representation. The great orthogonality theorem (without proof) and its importance. Character tables and their uses; spectroscopic derivation of character table for C_{2v} and C_{3v} point group. Symmetry aspects of molecular vibrations of H_2O molecule.

Unit-II

Stereochemistry and Bonding in Main Group Element Compounds

VSEPR, Walsh diagram [tri-atomic (AH_2 type) and penta-atomic (CH_3I) molecules]. $d\pi-p\pi$ bond. Bent rule and energetics of hybridization, some simple reactions of covalently bonded molecules.

Metal-Ligand bonding : Limitations of crystal field theory. Molecular orbital theory: octahedral, tetrahedral and square planar complexes and π -bonding complexes.

Metal Clusters : Higher boranes, carboranes, metalboranes and metallocarboranes, compounds with metal-metal multiple bonds.

Unit-III

Electronic Spectra and Magnetic Properties of Transition Metal Complexes

Spectroscopic ground states, correlation. Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), calculations of Dq , B and β parameters, charge transfer spectra, spectroscopic method of assignment of absolute configuration in optically active metal chelates and their stereochemical information, anomalous magnetic moments, magnetic exchange coupling and spin crossover.

Unit-IV

Reaction Mechanism of Transition Metal Complexes

Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, acid hydrolysis, factors affecting acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favour of conjugate mechanism, anation reactions, reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes, trans effect, mechanism of the substitution reaction. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

Unit-V

Nuclear and Radiochemistry:

Laws of radioactive decay; Detection of radiations; Geiger-Nuttall rule; GM tubes and their characteristics; Ionization chamber, Proportional counters, Scintillation counters; Solid state detectors; Calibration of counting equipments; Determination of absolute disintegration rates.

Activation analysis: Principles; Various methods of activation; Methodology; Advantages, limitations and applications.

Books Suggested:

1. Chemical Applications of Group Theory. F. A. Cotton.

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2. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
3. Inorganic Chemistry, J.E. Huheey, Harper & Row.
4. Chemistry of the Elements. N.N. Greenwood and A. Earnshaw, Pergamon.
5. Inorganic Electronic Spectroscopy, A.B.P. Lever, Elsevier.
6. Magnetochemistry, R.I. Carlin, Springer Verlag.
7. Comprehensive Coordination Chemistry, Eds. G. Wilkinson, R.D. Gillars and J.A. McCleverty, Pergamon.
8. Nuclear and Radiochemistry; G. Friedlander, J. W. Kennedy, E. S. Macias and J. M. Miller; 3rdEdn., Wiley: NY, 1981.
9. Essentials of Nuclear Chemistry, H. J. Arnikar; 4thEdn., New Age International: N Delhi, India, 2011.
10. Nuclear and Radiochemistry: Fundamental and Applications, 2 Vols., Jens-Volker Kratz and Karl Heinrich Lieser; 3rdEdn., John Wiley & Sons: UK, 2013.

Paper II : CH -402 Organic Chemistry
(4 hrs. or 6 periods / week)

Exam Duration : 3 hrs.

Max. Marks : 100

Unit-I

Nature of Bonding in Organic Molecules

Delocalized chemical bonding - conjugation, cross conjugation, resonance, hyperconjugation, bonding in fullerenes, tautomerism.

Aromaticity in benzenoid and non-benzenoid compounds, alternant and non-alternant hydrocarbons. Huckel's rule, energy level of π -molecular orbitals. Annulenes, anti-aromaticity, homo-aromaticity. PMO approach.

Stereochemistry

Conformational analysis of cycloalkanes, decalins, effect of conformation on reactivity, conformation of sugars, strain due to unavoidable crowding. Elements of symmetry, chirality, molecules with more than one chiral centre, threo and erythro isomers, methods of resolution, optical purity. Enantiotopic and diastereotopic atoms, groups and faces. Stereospecific and stereoselective synthesis. Asymmetric synthesis. Optical activity in the absence of chiral carbon (biphenyls, allenes and spiranes), chirality due to helical shape. Stereochemistry of the compounds containing nitrogen, sulphur and phosphorus.

Unit-II

Reaction Mechanism : Structure and Reactivity

Types of mechanisms, types of reactions, thermodynamic and kinetic requirements, kinetic and thermodynamic control, Hammond's postulate, Curtin-Hammett principle. Potential energy diagrams, transition states and intermediates. Methods of determining mechanisms, isotope effects. Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes and nitrenes.

Effect of structure on reactivity, resonance and field effects, steric effect, quantitative treatment. The Hammett equation and linear free energy relationship, substituent and reaction constants, Taft equation.

Aliphatic Nucleophilic Substitution

The S_N2 , S_N1 , mixed S_N1-S_N2 and SET mechanisms.

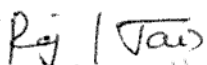
The neighbouring group mechanism, neighbouring group participation by π and σ bonds, anchimeric assistance. Classical and nonclassical carbocations, phenonium ions, norbornyl system, common carbocation rearrangements. The S_Ni mechanism. Nucleophilic substitution at the allylic, aliphatic trigonal and a vinylic carbon.

Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium, phase transfer catalysis and ultrasound. Ambident nucleophile, regioselectivity.

Unit-III

Aliphatic Electrophilic Substitution

Bimolecular mechanisms - S_E2 and S_Ei . The S_E1 mechanism - electrophilic substitution accompanied by double bond shifts. Effect of substrates, leaving group and the solvent polarity on the reactivity.


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Aromatic Electrophilic Substitution

The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, ipso attack, orientation in other ring systems. Quantitative treatment of reactivity in substrates and electrophiles. Diazonium coupling, Vilsmeier reaction, Gattermann-Koch reaction.

Aromatic Nucleophilic Substitution

The S_NAr , S_N1 , benzyne and $S_{RN}1$ mechanisms. Reactivity - effect of substrate structure, leaving group and attacking nucleophile. The von Richter, Sommelet-Hauser and Smiles rearrangements.

Free Radical Reactions

Types of free radical reactions, free radical substitution mechanism, mechanism at an aromatic substrate, neighbouring group assistance. Reactivity for aliphatic and aromatic substrates at a bridgehead. Reactivity in the attacking radicals. The effect of solvents on reactivity. Allylic halogenation (NBS), coupling of alkynes and arylation of aromatic compounds by diazonium salts. Sandmeyer reaction. Free radical rearrangement. Hunsdiecker reaction.

Unit-IV

Addition to Carbon-Carbon Multiple Bonds

Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals. Regio- and chemoselectivity. Orientation and reactivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic rings. Hydroboration. Michael reaction. Sharpless asymmetric epoxidation.

Addition to Carbon-Hetero Multiple Bonds

Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters and nitriles. Addition of Grignard reagents, organozinc and organolithium reagents to carbonyl and unsaturated carbonyl compounds. Wittig reaction.

Mechanism of condensation reactions involving enolates - Aldol, Knoevenagel, Claisen, Mannich, Benzoin, Perkin and Stobbe reactions. Hydrolysis of esters and amides, ammonolysis of esters.

Elimination Reactions

The E2, E1 and E1cB mechanisms and their spectrum. Orientation of the double bond. Reactivity - effects of substrate structures, attacking base, the leaving group and the medium. Mechanism and orientation in pyrolytic elimination.

Unit-V

Pericyclic Reactions

Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3-butadiene, 1,3,5-hexatriene and allyl system. Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions - conrotatory and disrotatory motions. $4n$, $4n+2$ and allyl systems. Cycloadditions - antarafacial and suprafacial additions. $4n$ and $4n+2$ systems, $2+2$ addition of ketenes. 1,3-dipolar cycloadditions and chelotropic reactions.

Sigmatropic rearrangements - Suprafacial and antarafacial shifts of H, sigmatropic shifts involving carbon moieties. 3,3- and 5,5-sigmatropic rearrangements. Claisen, Cope and aza-Cope rearrangements. Fluxional tautomerism. Ene reaction.

Books Suggested

1. Advanced Organic Chemistry – Reactions, Mechanism and Structure. Jerry March, John Wiley.
2. Advanced Organic Chemistry, F.A. Carey and R.J. Sundberg. Plenum.
3. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes. Longman.
4. Structure and Mechanism in Organic Chemistry. C.K. Ingold. Cornell University Press.
5. Organic Chemistry. R.T. Morrison and R.N. Boyd. Prentice-Hall.
6. Modern Organic Reactions. H.O. House, Benjamin.
7. Principles of Organic Synthesis. R.C. Norman and J.M. Coxon. Blackie Academic & Professional.
8. Pericyclic Reactions, S.M. Mukherji. Macmillan, India.
9. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
10. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
11. Stereochemistry of Organic Compounds, P.S. Kalsi. New Age International

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Paper III : CH-403 Physical Chemistry
(4 hrs. or 6 periods / week)

Exam Duration : 3 hrs.

Max. Marks : 100

Unit-I

Quantum Chemistry

Introduction to Exact Quantum Mechanical Results : The Schrodinger equation and the postulates of quantum mechanics. Discussion of the solutions of the Schrodinger equation to some model systems viz., particle in a box, the harmonic oscillator, the rigid rotor, the hydrogen atom.

Approximate Methods : The variation theorem, linear variation principle. Perturbation theory (up to second order and non-degenerate). Applications of variation method and perturbation theory to Helium atom.

Angular Momentum : Ordinary angular momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular momentum, operator using ladder operators, addition of angular momenta, tunneling, spin, antisymmetry and Pauli's exclusion principle.

Molecular Orbital Theory: Huckel theory of conjugated systems, bond and charge density calculations. Applications to ethylene, butadiene, cyclopropenyl radical, cyclobutadiene etc. Introduction to extended Huckel theory.

Unit-II

Thermodynamics

Classical Thermodynamics: Brief resume of concepts of laws of thermodynamics, free energy, chemical potential and entropies. Partial molar properties, partial molar free energy, partial molar volume and partial molar heat content and their significances. Determinations of these quantities. Concept of fugacity and determination of fugacity.

Non-ideal systems: Excess functions for non-ideal solutions. Activity, activity coefficient, Debye Huckel theory for activity coefficient of electrolytic solutions; determination of activity and activity coefficients, ionic strength. Application of phase rule to three component systems, second order phase transitions.

Statistical Thermodynamics: Concept of distribution, thermodynamic probability and most probable distribution. Ensemble averaging, postulates of ensemble averaging. Canonical, grand canonical and micro canonical ensembles, corresponding distribution laws (using Lagrange's method of undetermined multipliers). Partition functions- Translation, rotational, vibrational and electronic partition functions, calculation of thermodynamic properties in terms of partition functions Application of partition functions.

Heat capacity behaviour of solids-chemical equilibria and equilibrium constant in terms of partition functions, Fermi-Dirac statistics, distribution law and applications to metal. Bose-Einstein statistics, distribution Law and application to helium.

Unit-III

Chemical Dynamics

Methods of determining rate laws, collision theory of reaction rates, steric factor, activated complex theory, Arrhenius equation and the activated complex theory; ionic reactions, kinetic salt effects, steady state kinetics, kinetic and thermodynamic control of reactions, treatment of unimolecular reactions.

Dynamic chain reactions (hydrogen-bromine reaction, pyrolysis of acetaldehyde, decomposition of ethane), photochemical reactions (hydrogen-bromine and hydrogen-chlorine) and homogeneous catalysis, kinetics of enzyme reactions, Michaelis-Menten and Lineweaver-Burk plots, general features of fast reactions, study of fast reactions by flow method, relaxation method, flash photolysis and the nuclear magnetic resonance method, dynamics of unimolecular reactions (Lindemann Hinshelwood and Rice-Ramsperger-Kassel- Marcus [RRKM] theories of unimolecular reactions).

Unit-IV

Surface Chemistry

Adsorption : Surface tension, capillary action, pressure difference across curved surface (Laplace equation), vapour pressure of droplets (Kelvin equation). Gibbs adsorption isotherm, estimation of surface area (BET equation), surface films on liquids (Electro-kinetic phenomenon).

Micelles : Surface active agents, classification of surface active agents, micellization. hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of surfactants, counter ion binding to micelles,

thermodynamics of micellization-phase separation and mass action models, solubilization, micro emulsion, reverse micelles.

Macromolecules

Polymer - definition, types of polymers, electrically conducting, fire resistant, liquid crystal polymers, kinetics of polymerization, mechanism of polymerization.

Molecular mass, number and mass average molecular mass, molecular mass determination (osmometry, viscometry, diffusion and light scattering methods), sedimentation, chain configuration of macromolecules, calculation of average dimension of various chain structures.

Unit-V

Electrochemistry

Electrochemistry of solutions. Debye-Huckel-Onsager treatment and its extension, ion solvent interactions. Debye-Huckel-Jerum mode. Thermodynamics of electrified interface equations. Derivation of electro capillarity, Lippmann equations (surface excess), methods of determination. Structure of electrified interfaces. Guoy-Chapman, Stern, Graham Devanathan-Mottwatts, Tobin, Bockris, Devanathan models, Overpotentials, exchange current density, derivation of Butler-Volmer equation, Tafel plot.

Quantum aspects of charge transfer at electrodes-solution interfaces, quantization of charge transfer, tunneling. Polarography theory, Ilkovic equation, half wave potential and its significance.

Books Suggested

1. Physical Chemistry. P.W. Atkins, ELBS.
2. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.
3. Quantum Chemistry. Ira N. Levine, Prentice Hall.
4. Coulson's Valence. R. McWeeny, ELBS.
5. Chemical Kinetics. K.J. Laidler, McGraw-Hill.
6. Kinetics and Mechanism of Chemical Transformation. J. Rajaraman and J. Kuriacose. McMillan.
7. Micelles, Theoretical and Applied Aspects, V. Moroi, Plenum.
8. Modern Electrochemistry Vol. I and Vol. II, J.O'M. Bockris and A.K.N. Reddy, Plenum.
9. Introduction to Polymer Science, V.R. Gowarikar, N.V. Vishwanathan and J. Sridhar, Wiley Eastern.

Paper IV: CH - 404 Spectroscopy and Diffraction Methods

(2 hrs. or 3 periods / week)

Exam Duration : 3 hrs.

Max. Marks :50

Unit-I

Unifying Principles

Electromagnetic radiation, interaction of electromagnetic radiation with matter - absorption, emission, transmission, reflection, refraction, dispersion, polarisation and scattering. Uncertainty relation and natural line width and natural line broadening, transition probability, results of the time dependent perturbation theory, transition moment, selection rules, intensity of spectral lines.

Microwave Spectroscopy Classification of molecules, rigid rotor model, effect of isotopic substitution on the transition frequencies, intensities, non-rigid rotor, Stark effect, nuclear and electron spin interaction and effect of external field. Applications.

Unit-II

Vibrational Spectroscopy

Infrared Spectroscopy: Review of linear harmonic oscillator, vibrational energies of diatomic molecules, zero point energy, force constant and bond strengths; anharmonicity, Morse potential energy diagram, vibration-rotation spectroscopy. PQR branches. Breakdown of Oppenheimer approximation, Selection rules, group frequencies, overtones, hot bands, far IR region, metal-ligand vibrations, normal co-ordinate analysis.

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Raman Spectroscopy: Classical and quantum theories of Raman effect. Pure rotational, vibrational and vibrational-rotational Raman spectra, selection rules, mutual exclusion principle. Resonance Raman spectroscopy, coherent antistokes Raman spectroscopy (CARS).

Unit-III

Electronic Spectroscopy

Atomic Spectroscopy: Energies of atomic orbitals, vector representation of momenta and vector coupling, spectra of hydrogen atom and alkali metal atoms.

Molecular Spectroscopy: Energy levels, molecular orbitals, vibronic transitions, vibrational progressions and geometry of the excited states. Franck-Condon principle, electronic spectra of polyatomic molecules Emission spectra; radiative and non-radiative decay, internal conversion, spectra of transition metal complexes, charge-transfer spectra.

Photoelectron Spectroscopy: Basic principles; photo-electric effect, ionization process. Koopman's theorem. Photoelectron spectra of simple molecules, ESCA, chemical information from ESCA. Auger electron spectroscopy - basic idea.

Unit-IV

Magnetic Resonance Spectroscopy

Nuclear Magnetic Resonance Spectroscopy :General introduction, Nuclear spin, nuclear resonance. *Proton NMR spectroscopy:* shielding mechanism, chemical shift and its measurements, factors influencing chemical shift, deshielding. Chemical shift values and correlation for protons bonded to carbon (aliphatic, olefinic, aldehydic and aromatic) and other nuclei (alcohols, phenols, enols, carboxylic acids, amines, amides & mercapto). Spin-spin interactions, coupling constant ' J ', factors influencing coupling constant. Complex spin-spin interaction between two, three, four and five nuclei (ABX, AMX, ABC, A_2B_2 , etc.). Spin decoupling, chemical exchange, effect of deuteration. Simplification of complex spectra: nuclear magnetic double resonance, NMR shift reagents, solvent effects. NMR of Paramagnetic substances in solution, the contact and pseudocontact shifts, factors affecting nuclear relaxation. Nuclear Overhauser effect (NOE).

Electron Spin Resonance Spectroscopy:Basic principles, zero field splitting and Kramer's degeneracy, Isotropic and anisotropic Hyperfine coupling, spin-orbit coupling and significance of g -tensors, factors affecting the ' g ' value, application to transition metal complexes; spin Hamiltonian, spin densities and McConnell relationship, applications: spin polarization for atoms and transition metal ions.

Unit-V

X-ray Diffraction :Bragg's condition, Miller indices, Laue Method, Bragg's method. Debye Scherrer method of X-ray structural analysis of crystals, index reflections, identification of unit cells from systematic absences in diffraction pattern. Structure of simple lattices and X-ray intensities, structure factor and its relation to intensity and electron density, phase problem. Description of the procedure for an X-ray structure analysis, absolute configuration of molecules.

Electron Diffraction :Scattering intensity vs. scattering angle, Wierl equation, measurement technique, elucidation of structure of simple gas phase molecules. Low energy electron diffraction and structure of surfaces.

Neutron Diffraction :Scattering of neutrons by solids, measurements techniques. Elucidation of structure of magnetically ordered unit cell.

Books suggested

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Applied Electron Spectroscopy for Chemical Analysis, Ed. H Windawi & F.L. Ho, Wiley Interscience.
3. NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry, R.V. Parish, Ellis Harwood.
4. Physical Methods in Chemistry, R.S. Drago, Saunders College.
5. Introduction to Molecular Spectroscopy, G.M. Barrow, McGraw Hill.
6. Basic Principles of Spectroscopy, R. Change, McGraw Hill.
7. Theory and Application of UV Spectroscopy, H.H. Jaffe and M. Orchin, IBH-Oxford.
8. Introduction to Photoelectron Spectroscopy, P.K. Ghosh, John Wiley.
9. Introduction to Magnetic Resonance, A Carrington and A.D. MacLachlan, Harper & Row.

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UNIT - I

Introduction, principle and concepts of Green Chemistry

Need for green chemistry; Inception and evolution of green chemistry; Twelve principles of green chemistry with their explanations and examples; Designing a green synthesis using these principles; Green chemistry in day to day life.

UNIT - II

Non-traditional greener alternative approaches

Different approaches to green synthesis: (a) Uses of green reagents in organic synthesis - Dimethyl carbonate, polymer supported reagents - peracids and chromic acid; (b) Green catalysts, role of catalysis in sustainable development, homogeneous and heterogeneous catalysts; Introduction, advantages and applications of - (i) Nanocatalysts, (ii) Phase transfer catalysts, (iii) Biocatalysts, (iv) Organocatalysts, in organic synthesis.

UNIT - III

Applications of non-conventional energy sources

Introduction of microwave induced synthesis: Microwave activation, equipment, time and energy benefits, limitations. Organic transformations under microwaves - Fries rearrangement, Diels-Alder reaction, decarboxylation, saponification of ester, alkylation of reactive methylene compounds; Heterocyclic synthesis - β -Lactams, pyrrole, quinoline.

Introduction of ultrasound assisted green synthesis: Instrumentation, physical aspects, applications in organic transformations.

Electrochemical synthesis: Introduction, synthesis of sebacic acid and adiponitrile.

UNIT - IV

Environmentally Benign Solutions to Organic Solvents

Ionic liquids as green solvents: Introduction, properties and types of ionic liquids. Synthetic applications - Diels-Alder reaction, epoxidation and Heck reaction.

Aqueous phase reactions: Enhancement of selectivity, efficiency. Synthetic applications - 1,3-Dipolar Cycloadditions, Carbon-Carbon bond-forming processes and bromination reactions.

Fluorous solvents in green chemistry: Scope, definition and their synthetic applicability.

Role of supercritical carbon dioxide in green chemistry.

Ethyl lactate as a renewable green solvent: Properties and applications.

UNIT - V

Synthesis of Nanomaterials

Greener synthesis of Nanomaterials- Microwaveassisted synthesis of Quantum Dots (QD) in aqueous medium, Magnetic Nanoparticles, MW-assisted Nano Catalysis in water.

Synthesis of Nanoparticles using Bacteria, Yeast, Algae and Fungus.

SUGGESTED BOOKS AND REFERENCES:

1. P.A.G. Blackie, Organic synthesis in water, Springer.
2. P.T. Anastas, J.C. Warner, Green Chemistry, theory and practice, Oxford University Press.
3. M. Lancaster, Green Chemistry: An introductory text, Royal Society of Chemistry.
4. V. Polshettiwar, T. Asefa, G. Hutchings, Nanocatalysis: Synthesis and applications, Wiley.
5. M.A. Ryan, M. Tinnesand, Introduction to Green Chemistry, American Chemical Society.
6. P.T. Anastas, Handbook of Green Chemistry, John Wiley and Sons.
7. V.K. Ahluwalia, MKidwai, New Trends in Green Chemistry, Springer.
8. Paul T Anastas, Innovations in Green Chemistry and Green Engineering, Springer.

UNIT I

Statistics – Introduction to Chemometrics

Limitations of analytical methods, Errors and classification, Determinant, constant and indeterminate, accuracy, precision, minimization of errors, significant figures and computation rules, mean and standard deviation, distribution of random errors, variance and confidence interval, paired *t*-test, least square method, correlation and regression, linear regression.

UNIT II

Sampling in analysis

Definition, theory, basis and techniques of sampling, sampling statistics, sampling and physical state, crushing and grinding, hazards in sampling, techniques of sampling of gases, fluid, solids, and particulates, minimization of variables, transmission and storage of samples, high pressure ashing techniques (HPAT), particulate matter, its separation in gas stream, filtering and gravity separation, analysis of particulate matter like asbestos, mica, dust and aerosols etc.

Solvent extraction method in analysis Principle, classification, theory, instrumentation and applications.

UNIT III

Conductometry:

Important laws, definitions, relations, effect of dilution on conductivity, measurement of conductivity, types of conductometric titrations, its applications and limitations.

Potentiometry:

Principle, instrumentation, types of potentiometric titrations and its applications, pH measurements, determination of pH, ion selective electrodes, instrumentation and applications.

UNIT – IV

Coulometry:

Introductions, principle, experimental details of coulometry at constant current and constant potential, titrational applications.

Atomic Absorption Spectroscopy

Introduction, principle, Grotrian Diagram, Instrumentation, applications, detection limit, sensitivity and disadvantages

UNIT-V

Food Analysis

Moisture, ash, crude protein, fat, crude fiber, carbohydrates, calcium, potassium, sodium and phosphate. Food adulteration-common adulterants in food, contamination of food stuffs. Microscopic examination of foods for adulterants. Pesticide analysis in food products. Extraction and purification of sample: HPLC, Gas chromatography for organophosphates. Thin-layer chromatography for identification of chlorinated pesticides in food products.

SUGGESTED BOOKS AND REFERENCES

1. Mendham J., Denney R.C., Barnes J. D., Thomas M.J.K., Vogels' text book of quantitative chemical analysis, 6th edition, Prentice Hall, 2000.
2. Skoog Douglas A., Holler F. James, Nieman Timothy A., Principles of instrumental analysis, Saunders College Pub., 1998.
3. Day R. A and A. L. Underwood, Quantitative analysis, Prentice Hall, 1999.
4. Drago R. S., Physical methods in Chemistry, Saunders, 1999.
5. Peters D.G, J. M. Hayes and G. M. Hefige, A brief introduction to Modern chemical analysis, Philadelphia: Saunders, 1976.
6. Ebsworth E.A.V, DWA Rankin and C. Craddock, Structural methods in inorganic chemistry, ELBS.
7. Elan JAD Butter Worth, Photoelectron spectroscopy.

8. Eliel E.L, Stereochemistry of carbon compounds, Tata-McGraw-Hill
9. G.D. Christian, P.K. Dasgupta, K.A. Schug, Analytical Chemistry, Wiley, 7thedn., 2013.
10. D.A. Skoog, D.M. West and F.J. Hooler, S.R. Crouch, Fundamentals of Analytical Chemistry, 9thedn., 2014.
11. J.H. Kennedy, Analytical Chemistry – Principles, Saunders College Publishing, New York, 2ndedn., 1990.
12. L.G. Hargis, Analytical Chemistry - Principles and Techniques, Prentice Hall, 1988.
13. R.A. Day, Jr. and A.L. Underwood, Quantitative Analysis, 6thedn., Prentice Hall, 1991.
14. S.M. Khopkar, Environmental Solution, Wiley Eastern.
15. S.M. Khopkar, Basic Concepts of analysis Chemistry, New Age International, 1998.
16. Alka L. Gupta, Analytical Chemistry, Pragati Publication, 2014.
17. D C Das, Analytical Chemistry, Prentice Hall India Learning Private Limited, 2010.

CH-407: M.Sc. (Prev.) PRACTICAL

(9 hrs. / week)

Practical Exam Duration 14 hrs. (spread over 2 days)

Max. Marks : 200

INORGANIC CHEMISTRY

Qualitative Analysis of mixture containing 8 radicals including –

- a) Less common metal ions - Tl, Mo, W, Ti, Zr, Th, V, U (two metal ions in cationic/anionic forms)
- b) Insolubles - oxides, sulphates and halides.

Quantitative Analysis

- a) Separation and determination of two metal ions - Cu-Ni, Ni-Zn, Cu-Fe involving volumetric and gravimetric methods.
- b) **Chromatographic** Separation of cations and anions by
 - a) Paper Chromatography
 - b) Column Chromatography.

Preparation of selected inorganic compounds (10 out of following) and their studies by IR spectra, Handling of air and moisture sensitive compounds.

1. $[\text{VO}(\text{acac})_2]$
2. $\text{TiO}(\text{C}_9\text{H}_8\text{NO})_2 \cdot 2\text{H}_2\text{O}$
3. $\text{cis-K}[\text{Cr}(\text{C}_2\text{O}_4)_2(\text{H}_2\text{O})_2]$
4. $\text{Na}[\text{Cr}(\text{NH}_3)_2(\text{SCN})_4]$
5. $[\text{Mn}(\text{acac})_2]$
6. $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$
7. Prussian Blue, Turnbull's Blue.
8. $[\text{Co}(\text{NH}_3)_6][\text{Co}(\text{NO}_2)_6]$
9. $\text{cis-}[\text{Co}(\text{trien})(\text{NO}_2)_2]\text{Cl} \cdot \text{H}_2\text{O}$
10. $[\text{Co}(\text{Py})_2\text{Cl}_2]$
11. $[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2$
12. $[\text{Ni}(\text{dmg})_2]$
13. $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4 \cdot \text{H}_2\text{O}$

ORGANIC CHEMISTRY

Qualitative Analysis

Separation, purification and identification of compounds of binary mixture of one liquid and one solid using distillation, chemical tests. IR spectra to be used for functional group identification.

Organic Synthesis (at least six to be carried out)

a) One step Preparations :

1. Acetylation : Acetylation of cholesterol

2. Oxidation : Adipic acid by chromic acid oxidation of cyclohexanol / cyclohexene.
3. Aldol condensation : Dibenzal acetone from benzaldehyde.

b) Two step Preparations

1. Aniline → Sym. Tribromoaniline → Sym. Tribromobenzene
2. Benzoin → Benzil → Dibenzyl
3. Aniline → Dibenzaminobenzene → p-Aminoazobenzene
4. Nitrobenzene → m-Dinitrobenzene → m-Nitroaniline
5. Phthalic anhydride → Fluorescein → Eosin

The products may be characterised by Spectral Techniques.

Quantitative Analysis (At least 2 to be performed)

1. Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method.
2. Estimation of amines / phenols using bromate bromide solution or acetylation method.
3. Determination of Iodine number and Saponification value of an oil sample.
4. Determination of DO, COD and BOD of water sample.

PHYSICAL CHEMISTRY

A list of minimum 20 experiments to be selected covering all headings given below. At least two typical experiments are to be selected from each heading.

Phase Equilibria

- (i) Determination of congruent composition and temperature of a binary system (e.g., diphenylamine-benzophenone system)
- (ii) Determination of glass transition temperature of a given salt (e.g. CaCl_2) conductometrically.
- (iii) To construct the phase diagram for three component system (e.g. chloroform - acetic acid - water).

Chemical Kinetics

- (i) Determination of the effect of (a) Change of temperature (b) Change of concentration of reactant and catalyst and (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester/ionic reactions.
- (ii) Determination of the velocity constant of hydrolysis of an ester/ ionic reaction in micellar media.
- (iii) Determination of the rate constant for the oxidation of iodide ions by hydrogen peroxide studying the kinetics as an iodine clock reaction.
- (iv) Determination of the primary salt effect on the kinetics of ionic reactions and testing of the Bronsted relationship (iodide ion is oxidized by persulphate ion).

Solutions

- (i) Determination of molecular weight of non-volatile and non-electrolyte / electrolyte by cryoscopic method and to determine the activity coefficient of an electrolyte.
- (ii) Determination of the degree of dissociation of weak electrolyte and to study the deviation from ideal behaviour that occurs with a strong electrolyte.

Conductometry

- (i) Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by sodium hydroxide conductometrically.
- (ii) Determination of solubility and solubility product of sparingly soluble salts (e.g., PbSO_4 , BaSO_4) conductometrically.
- (iii) Determination of the strength of strong and weak acids in a given mixture conductometrically.
- (iv) To study the effect of solvent on the conductance of AgNO_3 / acetic acid and to determine the degree of dissociation and equilibrium constant in different solvents and in their mixtures (DMSO, DMF, dioxane, acetone, water) and to test the validity of Debye-Huckel-Onsager theory.
- (v) Determination of the activity coefficient of zinc ions in the solution of 0.002 M zinc sulphate using Debye-Huckel's limiting law.

Potentiometry and pH metry

- (i) Determination of strengths of halides in a mixture potentiometrically.

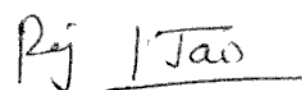
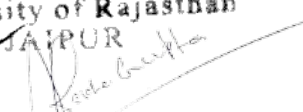
- (ii) Determination of the strength of strong and weak acids in a given mixture using a potentiometer/pH meter.
- (iii) Determination of temperature dependence of EMF of a cell.
- (iv) Determination of the formation constant of silver-ammonia complex and stoichiometry of the complex potentiometrically.
- (v) Acid-base titration in a non-aqueous media using a pH meter.
- (vi) Determination of activity and activity coefficient of electrolytes.
- (vii) Determination of the dissociation constant of acetic acid in DMSO, DMF, acetone and dioxane by titrating it with KOH.
- (viii) Determination of the dissociation constant of monobasic/dibasic acid by Albert-Serjeant method.
- (ix) Determination of thermodynamic constants. ΔG , ΔS , and ΔH for the reaction by e.m.f. method. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + 2\text{H}$

Polarimetry

- (i) Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
- (ii) Enzyme kinetics - inversion of sucrose.

Reference Books :

1. Vogel's Textbook of Quantitative Analysis, revised, J. Bassett. R.C. Denney, G.H. Jeffrey and J. Mendham, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly, Prentice Hall.
3. Experiments and Techniques in Organic Chemistry, D.P. Pasto. C. Johnson and M. Miller, Prentice Hall.
4. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C. Health.
5. Systematic Qualitative Organic Analysis, H. Middleton. Edward Arnold.
6. Handbook of Organic Analysis-Qualitative and Quantitative. H. Clar. Edward Arnold.
7. Vogel's Textbook of Practical Organic Chemistry. A.R. Tatchell. John Wiley.
8. Practical Physical Chemistry, A.M. James and F.E. Porichard, Longman.
9. Findley's Practical Physical Chemistry, B.P. Levitt, Longman.
10. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata-McGraw Hill.


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INSTRUCTIONS TO THE EXAMINERS
CH-407 : M.Sc. (Previous) Chemistry Practical

Max. Marks: 200

Min. Marks: 72

Exam Duration: 14 hrs (spread over 2 days)

Inorganic Chemistry

(i) Analysis of mixture containing 8 radicals including one radical of rare elements. 30

Or

Separation and determination of two metal ions Cu-Ni, Ni-Zn, Cu-Fe involving volumetric and gravimetric method.
(Both these exercises should be given in equal ratio by lots.)

(ii) Separation of cations and anions by paper chromatography or column chromatography. 20

Or

Preparation of one selected inorganic compound and its study by IR.

Organic Chemistry

(i) Separation, purification and identification of compounds of binary mixture (one liquid and one solid) using distillation, chemical tests. IR spectra to be used for functional group determination. 30

(ii) Perform one of the 8 organic syntheses as mentioned in the syllabus and may be characterized by spectral techniques.

Or

Perform one of the quantitative analysis given in syllabus. 20
(Both these exercises should be given in equal ratio by lots.)

Physical Chemistry

(i) One minor physical experiment. 20

(ii) One major physical experiment 30

Viva 30

Record 20

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M.Sc. II Year (Final)

Paper-I : CH-501

Applications of Spectroscopy, Photochemistry and Solid State Chemistry

(4 hrs. or 6 periods / week)

Exam Duration : 3 Hrs.

Max. Marks: 100

Unit-I

Ultraviolet and Visible Spectroscopy

Various electronic transitions (185-800 nm), Beer-Lambert law, effect of solvent on electronic transitions, ultraviolet spectra of carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes, Fieser-Woodward rules for conjugated dienes and carbonyl compounds, ultraviolet spectra of aromatic compounds. Steric effect in biphenyls.

Infrared Spectroscopy

Instrumentation and sample handling, Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, phenols and amines. Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides, acids, anhydrides, lactones, lactams and conjugated carbonyl compounds). Factors affecting the band positions and intensities, Effect of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and Fermi resonance.

Applications of Vibrational Spectroscopy: Symmetry and shapes of AB₂, AB₃, AB₄, AB₅ and AB₆, mode of bonding of ambidentate ligands, ethylenediamine and diketonato complexes, application of resonance Raman spectroscopy particularly for the study of active sites of metalloproteins.

Unit-II

Mossbauer Spectroscopy : Basic principles, spectral parameters and spectrum display. Application of the technique to the studies of (1) bonding and structures of Fe⁺² and Fe⁺³ compounds including those of intermediate spin, (2) Sn⁺² and Sn⁺⁴ compounds, nature of M-L bond, coordination number, structure and (3) detection of oxidation state and inequivalent MB atoms.

Electron Microscopy: Basic principles of Electron Microscopy: SEM, TEM, AFM; and their applications in structural analysis.

Optical Rotatory Dispersion (ORD) and Circular Dichroism (CD) Definition, deduction of absolute configuration, octant rule for ketones.

Magnetic Properties of Transition Metal Complexes Spectroscopic method of assignment of absolute configuration in optically active metal chelates and their stereochemical conformation, anomalous magnetic moments, magnetic exchange coupling and spin crossover.

Unit-III

NMR Spectroscopy : FT NMR- Fourier transform technique.

NMR active nuclei other than proton - ¹⁹F and ³¹P.

Carbon-13 NMR- General considerations, chemical shift (aliphatic, olefinic, alkyne, aromatic, heteroaromatic and carbonyl carbon), coupling constants.

Two dimension NMR spectroscopy - COSY, NOESY, DEPT, INEPT, APT and INADEQUATE techniques.

Mass Spectrometry

Introduction, ion production – EI, CI, FD and FAB, factors affecting fragmentation, ion analysis, ion abundance. Mass spectral fragmentation of organic compounds, common functional groups, molecular ion peak, metastable peak. McLafferty rearrangement. Nitrogen rule. High resolution mass spectrometry. Examples of mass spectral fragmentation of organic compounds with respect to their structure determination.

Unit-IV

Photochemical Reactions: Fate of excited molecule. **Determination of Reaction Mechanism :** Classification, rate constants and life times of reactive energy states - determination of rate constants of reactions. Effect of light intensity

on the rate of photochemical reactions. Types of photochemical reactions, photo-dissociation, gas-phase photolysis.
Photochemistry of Alkenes : Intramolecular reactions of the olefinic bond - geometrical isomerism, cyclisation reactions, rearrangement of 1,4- and 1,5-dienes. **Photochemistry of Carbonyl Compounds** : Intramolecular reactions of carbonyl compounds - saturated, cyclic and acyclic, β , γ -unsaturated and α,β -unsaturated compounds, cyclohexadienones. Intermolecular cycloaddition reactions - dimerisations and oxetane formation.
Photochemistry of Aromatic Compounds : Isomerisations, additions and substitutions.

Unit-V

Solid State Reactions : General principles, experimental procedure, co-precipitation as a precursor to solid state reactions, kinetics of solid state reactions.

Crystal Defects and Non-Stoichiometry : Perfect and imperfect crystals, intrinsic and extrinsic defects - point defects, line and plane defects, vacancies - Schottky defects and Frenkel defects. Thermodynamics of Schottky and Frenkel defect formation, colour centres, non-stoichiometry and defects.

Electronic Properties and Band Theory : Metals, insulators and semiconductors, electronic structure of solids, band theory, band structure of metals, insulators and semiconductors, Intrinsic and extrinsic semiconductors, doping semiconductors, p-n junctions, super conductors.

Organic Solids: Electrically conducting solids, organic charge transfer complex, organic metals, new superconductors.

Books Suggested

UNIT I, II and III

1. Physical Methods for Chemistry, R.S. Drago. Saunders Company
2. Structural Methods in Inorganic Chemistry. E.A.V. Ebsworth D.W.H. Rankin & S.Cradock, ELBS.
3. Infrared and Raman Spectra : Inorganic and Coordination Compounds. K. Nakamoto, Wiley.
4. Progress in Inorganic Chemistry vol. 8. ed., I.Cotton. Vol. 15. ed. S.J. Lippard. Wiley.
5. Transition Metal Chemistry ed. R.L. Carlin vol. 3 Dekker.
6. Inorganic Electronic Spectroscopy. A.P.B. Lever. Elsevier.
7. NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry R.V. Parish. Ellis Horwood.
8. Practical NMR Spectroscopy, M. L. Martin. J.J. Delpuech and G.J. Martin, Heyden.
9. Spectrometric Identification of Organic Compounds, R.M. Silverstein. G.C. Bassler and T.C. Morrill. John Wiley.
10. Introduction to NMR Spectroscopy, R.J. Abraham. J. Fisher and P. Loftus, Wiley.
11. Application of Spectroscopy of Organic Compounds. J.R. Dyer, Prentice Hall.
12. Spectroscopic Methods in Organic Chemistry D. H. Williams. I. Fleming. Tata McGraw-Hill.

UNIT IV

1. Fundamentals of Photochemistry, K.K. Rohtagi-Mukherji, Wiley-Eastern.
2. Essentials of Molecular photochemistry, A Gilbert and J. Baggott, Blackwell Scientific Publication.
3. Molecular Photochemistry. N. J. Turro, W.A. Benjamin.
4. Introductory Photochemistry. A. Cox and T. Camp, McGraw-Hill.
5. Photochemistry, R.P. Kundall and A. Gilbert. Thomson Nelson.
6. Organic Photochemistry, J. Coxon and B. Halton, Cambridge University Press.

UNIT V

1. Solid State Chemistry and its Applications, A.R West. Plenum.
2. Principles of the Solid State, H.V. Keer, Wiley Eastern.
3. Solid State Chemistry, N.B. Hannay.
4. Solid State Chemistry, D.K. Chakrabarty, New Wiley Eastern.

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Exam Duration: 3 hrs.

Max. Marks: 75

Unit-I

Metal Ions in Biological Systems: Bulk and trace metals with special reference to Na, K, Mg, Ca, Fe, Cu, Zn, Co and K^+/Na^+ pump.

Transport and Storage of Dioxygen: Haem proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanin and hemerythrin, model synthetic complexes of iron, cobalt and copper.

Electron Transfer in Biology: Structure and function of metalloproteins in electron transport processes cytochromes and iron-sulphur proteins, synthetic models.

Nitrogen fixation: Biological nitrogen fixation and its mechanism, nitrogenase. Chemical nitrogen fixation.

Unit-II

Bioorganic Chemistry : Introduction, Basic considerations. Proximity effects and molecular adaptation.

Enzymes : Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity and regulation, Nomenclature and classification, extraction and purification. Fischer's lock and key and Koshland's induced fit hypothesis, concept and identification of active site by the use of inhibitors, affinity labeling and enzyme modification by site-directed mutagenesis. reversible and irreversible inhibition.

Mechanism of Enzyme Action : Transition-state theory, orientation and steric effect, acid-base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms for chymotrypsin. ribonuclease, lysozyme and carboxypeptidase.

Types of Reactions Catalysed by Enzymes : Nucleophilic displacement on a phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endergonic processes. Transfer of sulphate, addition and elimination reactions, enolic intermediates in isomerization reactions. β -Cleavage and condensation, some isomerization and rearrangement reactions. Enzyme catalyzed carboxylation and decarboxylation.

Unit-III

Co-enzyme Chemistry : Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD^+ , $NADP^+$, FMN, FAD, lipoic acid, vitamin B_{12} . Mechanisms of reactions catalyzed by the above cofactors.

Enzyme Models: Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, crown ether, cryptates. Cyclodextrins, cyclodextrin-based enzyme models, calixarenes, ionophores, micelles, synthetic enzymes or synzymes.

Unit-IV

Bioenergetics: Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.

Statistical Mechanics in Biopolymers: Chain configuration of macromolecules, statistical distribution end to end dimensions, calculation of average dimensions for various chain structure. Polypeptide and protein structures, introduction to protein folding problem.

Biopolymer Interactions: Forces involved in biopolymer interactions. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.

Unit-V

Thermodynamics of Biopolymer Solutions: Thermodynamics of biopolymer solutions, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechanochemical system.

Cell Membrane and Transport of Ions: Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport. Nerve conduction.

Biopolymers and their molecular weights: Evaluation of size, shape, molecular weight and extent of hydration of biopolymers by various experimental techniques. Sedimentation equilibrium, hydrodynamic methods, diffusion, sedimentation velocity, viscosity, electrophoresis and rotational motions.

Books Suggested

1. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry, I. Bertini, H.B. Gray. S.J. Lippard and J.S. Valentine, University Science books.
3. Inorganic Biochemistry vols. I and II, ed. G.L. Eichhom, Elsevier.
4. Progress in Inorganic Chemistry, Vols 18 and 38 ed. J.J. Lippard, Wiley.
5. Principles of Biochemistry, A. L. Lehninger. Worth Publishers.
6. Bioorganic Chemistry : A Chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer Verlag.
7. Understanding Enzymes, Trevor Palmer, Prentice Hall.
8. Enzyme Chemistry: Impact and Applications, Ed. Collin J Suckling, Chemistry.
9. Enzyme Mechanisms, Ed. M.I. Page and A. Williams, Royal Society of Chemistry.
10. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
11. Immobilized Enzymes : An Introduction and Applications in Biotechnology, Michael I.D. Trevan, John Wiley.
12. Enzymatic Reaction Mechanisms. C, Walsh, W.H. Freeman.
13. Enzyme Structure and Mechanism. A. Fersht, W.H. Freeman.
14. Biochemistry : The Chemical Reactions of Living Cells, D.E. Metzler. Academic Press.
15. Biochemistry, L. Stryer, W.H. Freeman.
16. Biochemistry, J. David Rawn. Neil Patterson.
17. Biochemistry. Voet and Voet, John Wiley.
18. Outlines of Biochemistry, E.E. Conn and P.K. Stumpf. John Wiley.
19. Bioorganic Chemistry : A Chemical Approach to Enzyme Action. H Dugas and C. Penny, Springer-Verlag.
20. Macromolecules : Structure and Function. F Wold. Prentice Hall.

Paper-III : CH-503

Environmental Chemistry

(2 Hrs. or 3 period / week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Atmosphere: Atmospheric layers. Vertical temperature profile, heat radiation, budget of the earth atmosphere systems. Properties of troposphere, thermodynamic derivation of lapse rate. Temperature inversion. Calculations of Global mean temperature of the atmosphere. Pressure variation in atmosphere and scale height. Biogeochemical cycles of carbon, nitrogen, sulphur, phosphorus and oxygen. Residence times.

Atmospheric Chemistry: Sources of trace atmospheric constituents : nitrogen oxides, sulphur dioxide and other sulphur compounds, carbon oxides, chlorofluorocarbons and other halogen compounds, methane and other hydrocarbons.

Tropospheric Photochemistry: Mechanism of photochemical decomposition of NO_2 and formation of ozone. Formation of oxygen atoms, hydroxyl, hydroperoxy and organic radicals and hydrogen peroxide. Reactions of hydroxyl radicals with methane and other organic compounds. Reactions of OH radicals with SO_2 and NO_x . Formation of nitrate radical and its reactions. Photochemical smog, meteorological conditions and chemistry of its formation.

Unit-II

Air Pollution : Air pollutants and their classification. Aerosols - sources, size distribution and effect on visibility, climate and health.

Acid Rain : Definition, acid rain precursors and their aqueous and gas phase atmospheric oxidation reactions. Damaging effects on aquatic life, plants, buildings and health. Monitoring of SO_2 and NO_x - Acid rain control strategies.

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Stratospheric Ozone Depletion :Mechanism of ozone formation, Mechanism of catalytic ozone depletion. Discovery of Antarctic ozone hole. Instrumental methods for detection of ozone depletion gases.

Green House Effect :Terrestrial and solar radiation spectra. Major green house gases and their sources and Global warming potentials. Climate change and consequences.

Urban Air Pollution : Exhaust emissions, damaging effects of carbon monoxide. Monitoring of CO. Control strategies.

Unit-III

Aquatic Chemistry and Water Pollution :Redox chemistry in natural waters. Dissolved oxygen, biological oxygen demand, chemical oxygen demand, determination of DO, BOD and COD. Aerobic and anaerobic reactions of organic sulphur and nitrogen compounds in water, acid-base chemistry of fresh water and sea water. Aluminum, nitrate and fluoride in water. Eutrophication. Sources of water pollution. Treatment of waste water and sewage. Purification of drinking water, techniques of purification and disinfection.

Unit-IV

Environmental Toxicology

Toxic Heavy Metals - Mercury, lead, arsenic and cadmium. Causes of toxicity. Bioaccumulation, sources of heavy metals. Chemical speciation of Hg, Pb, As and Cd. Biochemical and damaging effects.

Toxic Organic Compounds - Pesticides, classification, properties and uses of organochlorine and organophosphorus pesticides, detection and damaging effects.

Polychlorinated Biphenyls – Properties, uses and environmental contamination and effects.

Polynuclear Aromatic Hydrocarbons - Sources, structures and as pollutants.

Unit-V

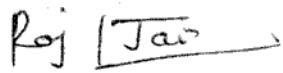
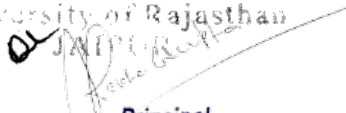
Soil and Environmental Disasters

Soil composition, micro and macronutrients. soil pollution by fertilizers, plastic and metals. Methods of remediation of soil.

Bhopal gas tragedy, Chernobyl, Three mile island, Minamata Disease, Seveso (Italy), London smog.

Books Suggested:

1. Environmental Chemistry. Colin Baird, W.H. Freeman Co. New York. 1098.
2. Chemistry of Atmospheres. R.P. Wayne. Oxford.
3. Environment Chemistry, A.K. De, Wiley Eastern, 2004.
4. Environmental Chemistry, S.E. Manahan, Lewis Publishers.
5. Introduction to Atmospheric Chemistry, P.V. Hobbs, Cambridge.


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ELECTIVE PAPERS

Group I

- CH-504 : Organotransition Metal Chemistry
- CH-505 : Bioinorganic and Supramolecular Chemistry
- CH-506 : Photoinorganic Chemistry
- CH-507 : Polymers.

Group II

- CH-504 : Organic Synthesis-I
- CH-505 : Organic Synthesis-II
- CH-506 : Heterocyclic Chemistry
- CH-507 : Chemistry of Natural Products

Group III

- CH-504 : Analytical chemistry
- CH-505 : Physical Organic Chemistry
- CH-506 : Chemical Dynamics
- CH-507 : Electrochemistry

ELECTIVE PAPER-1

(CH-504, Group-I) Organotransition Metal Chemistry

(2 Hrs. or 3 period/week)

Exam Duration : 3 hrs.

Max. Marks: 50

Unit-I

Alkyls and Aryls of Transition Metals

Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis.

Unit-II

Compounds of Transition Metal-Carbon Multiple Bonds

Alkylidenes, alkylidynes, low valent carbenes and carbynes - synthesis, nature of bond, structural characteristics, nucleophilic and electrophilic reactions on the ligands, role in organic synthesis.

Unit-III

Transition Metal π -complexes : Transition metal π -Complexes with unsaturated organic molecules, alkenes, alkynes, allyl, diene, dienyl, arene and trienyl complexes, preparations, properties, nature of bonding and structural features. Important reactions relating to nucleophilic and electrophilic attack on ligands and organic synthesis. **Transition metal compounds with bonds to hydrogen**

Unit-IV

Homogeneous Catalysis

Stoichiometric reactions for catalysis, homogeneous catalytic hydrogenation, Ziegler-Natta polymerization of olefins, catalytic reactions involving carbon monoxide such as hydrocarbonylation of olefins (oxo reaction). Oxopalladation reactions, activation of C-H bond.

Unit-V

Fluxional Organometallic Compounds

Fluxionality and dynamic equilibria in compounds such as η^2 -olefin, η^3 -allyl and dienyl complexes.

Books Suggested

1. Principles and Application of Organotransition Metal Chemistry. J.P. Collman, L.S. Hegsdus, J.R. Norton and R.G. Finke. University Science Books.
2. The Organometallic Chemistry of the Transition Metals. R.H. Crabtree. John Wiley.
3. Metallo-organic Chemistry. A.J. Pearson, Wiley
4. Organometallic Chemistry, R.C. Mehrotra and A. Singh, New Age International.

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ELECTIVE PAPER-2
(CH-505, Group-I) Bioinorganic and Supramolecular Chemistry
(2 Hrs. or 3 periods/week)

Exam Duration: 3 hrs.

Max. Marks: 50

Unit-I

Metal Storage and Transport

Ferritin transferring and siderophores

Unit-II

Calcium in Biology

Calcium in living cells, transport and regulation, molecular aspects of intramolecular processes, extracellular binding proteins.

Unit-III

Metalloenzymes

Zinc enzymes - carboxypeptidase and carbonic anhydrase. Iron enzymes - catalase, peroxidase and cytochrome P-450. Metallo enzyme-II Copper enzymes - superoxide dismutase. Molybdenum oxatransferase enzymes-xanthine oxidase. Coenzyme vitamin B12.

Unit-IV

Metal-Nucleic Acid Complexes

Metal ions and metal complex interactions. Metal complex-nucleic acids.

Metals in Medicine

Metal deficiency and disease, toxic effects of metals, metals used for diagnosis and chemotherapy with particular reference to anticancer drugs.

Unit-V

Supramolecular Chemistry-I

(A.) Molecular recognition: Molecular receptors for different types of molecules including arisonic substrates, design and synthesis of coreceptor molecules and multiple recognition.

(B.) Supramolecular reactivity and catalysis.

Supramolecular Chemistry-II

(A.) Transport processes and carrier design.

(B.) Supramolecular photochemistry. Supramolecular devices - electronic, ionic and switching devices.

Books Suggested

1. Principles of bioinorganic Chemistry. S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry. I. Bertini, H.B. Gray, S.J. Lippard and J.S. Valentine, University Science Books.
3. Inorganic Biochemistry Vols. I and II Ed. G.L. Eichhorn. Elsevier.
4. Progress in Inorganic Chemistry. Vols. 18 Ed. J.J. Lippard. Wiley
5. Supramolecular Chemistry, J.M. Lehn. VCH.

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ELECTIVE PAPER-3
(CH-506, Group-I) Photoinorganic Chemistry
(2 Hrs. or 3 period/ week)

Exam Duration: 3 hrs.

Max. Marks: 50

Unit-I

Basics of Photochemistry

Absorption, excitation, photochemical laws, quantum yield, electronically excited states-life times-measurements of the times. Flash photolysis. Energy dissipation by radiative and non-radiative processes, absorption spectra. Frank-Condon principle, photochemical stages - primary and secondary processes.

Unit-II

Properties of Excited States

Structure, dipole moment, acid-base strengths, reactivity. Photochemical kinetics - calculation of rates of radiative processes. Bimolecular deactivation - quenching.

Unit-III

Excited States of Metal Complexes

Excited states of metal complexes : comparison with organic compounds, electronically excited states of metal complexes, charge transfer spectra, charge transfer excitations.

Unit-IV

Ligand Field Photochemistry

Photosubstitution, photooxidation and photoreduction, liability and selectivity, zero vibrational levels of ground state and excited state, energy content of excited state, zero spectroscopic energy, development of the equations for redox potentials of the excited states.

Unit-V

Redox Reactions by Excited Metal Complexes

Energy transfer under conditions of weak interaction and strong interaction-exciplex formation; condition of the excited states to be useful as redox reactants, excited electron transfer, metal complexes as attractive candidates, (2,2'-bipyridine and 1,10-phenanthroline complexes), illustration of reducing and oxidising character of $[\text{Ru}(\text{bpy})_3]^{2+}$ complex, comparison with $[\text{Fe}(\text{bpy})_3]^{3+}$; role of spin-orbit coupling - life time of these complexes. Application of redox processes of electronically excited states for catalytic purposes, transformation of low energy reactants into high energy products, chemical energy into light.

Metal Complex Sensitizers

Metal complex sensitizer, electron relay, metal colloid systems, semiconductor supported metal or oxide systems, water photolysis, nitrogen fixation and carbon dioxide reduction.

Books Suggested

1. Concepts of Inorganic Photochemistry, A.W. Adamson and P.D. Fleischauer, Wiley.
2. Inorganic Photochemistry, J. Chem. Educ. vol. 60 no. 10, 1983.
3. Progress in Inorganic Chemistry, vol. 30 ed. S.J. Lippard, Wiley.
4. Coordination Chem. Revs., vol. 15, p 321, 1975; vol. 39, p 121, 1981; vol. 97, p 313, 1990.
5. Photochemistry of Coordination Compounds, V. Balzari and V. Carassiti. Academic Press.
6. Elements in Inorganic Photochemistry, G.J. Ferraudi, Wiley.

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ELECTIVE PAPER-4
(CH-507, Group-I) Polymers
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Basic concepts : Monomers, repeat units, degree of polymerization. Linear, branched and network polymers. Classification of polymers. Polymerization : condensation, addition/radical chain - ionic and co-ordination and copolymerization. Polymerization conditions and polymer reactions. Polymerization in homogeneous and heterogeneous systems. Importance of polymers.

Unit-II

Polymer Characterization

Poly dispersion - average molecular weight concept number, weight and viscosity average molecular weights. Poly dispersity and molecular weight distribution. The practical significance of molecular weight. Measurement of molecular-weights. End group, viscosity, light scattering, osmotic and ultracentrifugation methods. Analysis of polymers - chemical analysis of polymers, spectroscopic methods, X-ray diffraction study, microscopy. Thermal analysis and physical testing - tensile strength. Fatigue, impact tear resistance. Hardness and abrasion resistance.

Unit-III

Inorganic Polymers

A general survey and scope of inorganic polymers, special characteristics, classification, homo and hetero atomic polymers.

Unit-IV

Structure, Properties and Applications of

- a) Polymers based on boron - borazines, boranes and carboranes.
- b) Polymers based on silicon, silicones polymetalloxanes and polymetallosiloxanes, silazenes.

Structure, Properties and Applications of

- a) Polymers based on phosphorous - phosphazenes, polyphosphates.
- b) Polymers based on sulphur - tetrasulphurtetranitride and related compounds.

Unit-V

Structure, Properties and Applications of - (a) Metal clusters, (b) Co-ordination and metal chelate polymers.

Books Suggested:

1. Inorganic Chemistry, J.E. Huheey, Harper Row.
2. Developments in Inorganic polymer Chemistry. M.F Lappert and G. J. Leigh
3. Inorganic polymers, N.H. Ray.
4. Inorganic polymers, Graham and Stone.
5. Inorganic Rings and Cages, D.A. Armitage.
6. Textbook of Polymer Science, F.W. Billmeyer, Jr. Wiley.
7. Contemporary Polymer Chemistry, H.R. Alcock and F.W. Lambe. Prentice Hall.

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ELECTIVE PAPER-1
(CH-504, Group-II) Organic Synthesis-I
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Organometallic Reagents

Principle, preparations, properties and applications of the following in organic synthesis with mechanistic details.
Group I and II metal organic compounds. Li, Mg, Hg, Cd, Zn and Ce compounds.
Transition metals : Cu, Pd, Ni, Fe, Co, Rh, Cr, and Ti compounds.

Unit-II

Oxidation

Introduction. Different oxidative processes. Hydrocarbons – alkenes, aromatic rings, saturated C-H groups (activated and unactivated).
Alcohols, diols, aldehydes, ketones, ketals and carboxylic acids Amines, hydrazines, and sulphides.
Oxidations with ruthenium tetroxide, iodobenzene diacetate and thallium(III) nitrate.

Unit-III

Reduction

Introduction. Different reductive processes.
Alkanes, alkenes, alkynes and aromatic rings. Carbonyl compounds - aldehydes, ketones, acids and their derivatives.
Epoxides. Nitro, nitroso, azo and oxime groups. Hydrogenolysis.

Unit-IV

Rearrangements

General mechanistic considerations - nature of migration, migratory aptitude, memory effects. A detailed study of the following rearrangements: Pinacol-pinacolone, Wagner-Meerwein, Demjanov, Benzil-Benzilic acid, Favorskii, Arndt-Eistert synthesis, Neber, Beckmann, Hofmann, Curtius, Schmidt, Baeyer-Viliger, Shapiro and Schmidt reaction.

Unit-V

Metalloenes, Nonbenzenoid Aromatics and Polycyclic Aromatic Compounds

General considerations, synthesis and reactions of some representative compounds, (tropone, tropolone, Azulene, ferrocene, phenanthrene, fluorene and indene).

Books Suggested:

1. Modern Synthetic Reactions H.O. House. W.A. Benjamin.
2. Some modern Methods of Organic Synthesis. W Carruthers. Cambridge Univ. Press.
3. Advanced Organic Chemistry, Reactions Mechanisms and Structure J. March. John Wiley.
4. Principles of Organic synthesis. R.O.C Norman and J.M. Coxon. Blackie Academic & Professional.
5. Advanced Organic Chemistry Part B. F A Carey and R.J. Sundberg. Plenum Press.
6. Rodd's Chemistry of Carbon Compounds. Ed. S Coffey, Elsevier.

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ELECTIVE PAPER-2
(CH-505, Group-II) Organic Synthesis-II
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Disconnection Approach

An introduction to synthons and synthetic equivalents, disconnection approach, functional group inter-conversions, the importance of the order of events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, reversal of polarity, cyclisation reaction, amine synthesis.

Unit-II

Protecting Groups

Principle of protection of alcohol, amine, carbonyl and carboxyl groups.

One Group C-C Disconnections

Alcohols and carbonyl compounds, regioselectivity. Alkene synthesis, use of acetylenes and aliphatic nitro compounds in organic synthesis.

Unit-III

Two Group C-C Disconnections

Diels-Alder reaction, 1,3-difunctionalised compounds, α,β -unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Michael addition and Robinson annelation.

Unit-IV

Two Group C-C Disconnections

Use of 1,2-; 1,4- and 1,6-difunctionalised compounds in ring synthesis.

Unit-V

Ring Synthesis

Special methods for Saturated heterocycles, synthesis of 3-, 4-, 5- and 6-membered rings, aromatic heterocycles in organic synthesis. Use of Ketene, pericyclic reactions and photochemical reactions.

Books Suggested:

1. Designing Organic Synthesis, S. Warren, Wiley.
2. Organic Synthesis - Concept, Methods and Starting Materials, J. Fuhrhop.
3. Some Modern Methods of Organic Synthesis. W. Carruthers, Cambridge Univ. Press.
4. Modern Synthetic Reactions H O. House, W.A. Benjamin
5. Advanced Organic Chemistry : Reactions, Mechanisms and Structure, J. March, Wiley.
6. Principles of Organic Chemistry Part B. F A. Carey and R.J. Sundberg. Plenum Press.

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ELECTIVE PAPER-3
(CH-506, Group II) Heterocyclic Chemistry
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Nomenclature of Heterocycles

Replacement and systematic nomenclature (Hantzsch-Widman system) for monocyclic, fused and bridged heterocycles.

Aromatic Heterocycles

General chemical behaviour of aromatic heterocycles. classification (structural type), criteria of aromaticity (bond lengths, ring current and chemical shifts in ¹H NMR spectra. Empirical resonance energy, delocalization energy and Dewar resonance energy, diamagnetic susceptibility exaltations).
Heteroaromatic reactivity and tautomerism in aromatic heterocycles.

Unit-II

Non-aromatic Heterocycles

Strain-bond angle and torsional strains and their consequences in small ring heterocycles.

Conformation of six-membered heterocycles with reference to molecular geometry, barrier to ring inversion, pyramidal inversion and 1,3-diaxial interaction.

Stereo-electronic effects anomeric and related effects, Attractive interactions - hydrogen bonding and intermolecular nucleophilic electrophilic interactions.

Heterocyclic Synthesis

Principles of heterocyclic synthesis involving cyclization reactions and cycloaddition reactions.

Unit-III

Small Ring Heterocycles

Three-membered and four-membered heterocycles - synthesis and reactions of aziridines, oxiranes, thiiranes, azetidines, oxetanes and thietanes.

Benzo-Fused Five-Membered Heterocycles

Synthesis and reactions including medicinal applications of benzopyrroles, benzofurans and benzothiophenes.

Unit-IV

Meso-ionic Heterocycles

General classification, chemistry of some important meso-ionic heterocycles of type-A and B and their applications.

Six-Membered Heterocycles with one Heteroatom

Synthesis and reactions of pyrylium salts and pyrones and their comparison with pyridinium & thiopyrylium salts and pyridones. Synthesis and reactions of quinolizinium and benzopyrylium salts, coumarins and chromones.

Unit-V

Six Membered Heterocycles with Two or More Heteroatoms

Synthesis and reactions of diazines, triazines, tetrazines and thiazines.

Heterocyclic Systems Containing P, As, Sb and B

Introduction and nomenclature of 5- and 6-membered Heterocyclic rings systems containing phosphorus-phosphorinanes, phosphorines, phospholanes and phospholes; containing As and Sb.

Introduction and spectral characteristics of 3-, 5- and 6-membered Heterocyclic rings containing Boron.

Books Suggested:

1. Heterocyclic Chemistry Vol. 1-3. R.R. Gupta. M. Kumar and V. Gupta. Springer India.
2. The Chemistry- of Heterocycles. T Eicher and S. Hauptmann. Thieme.
3. Heterocyclic Chemistry, J.A. Joule. K. Mills and G.F Smith. Chapman and Hall.
4. Heterocyclic Chemistry, T.L. Gilchrist, Longman Scientific Technical.
5. Contemporary Heterocyclic Chemistry. G.R. Newkome and W W. Paudler. Wiley-InterScience.
6. An Introduction to the Heterocyclic Compounds. R.M. Acheson. John Wiley.
7. Comprehensive Heterocyclic Chemistry, A.R. Katritzky and C.W. Rees. eds. Pergamon Press.

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ELECTIVE PAPER 4
(CH-507, Group -II) Chemistry of Natural Products
(2Hrs. or 3 periods/week)

Max. Marks : 50

Exam Duration : 3 hrs.

Unit-I

Terpenoids and Carotenoids

Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules : Citral, Geraniol, α -Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and β -Carotene.

Unit-II

Alkaloids

Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring role of alkaloids in plants. Structure, stereochemistry, synthesis and biosynthesis of the following Ephedrine, (+)-Coniine, Nicotine, Atropine, Quinine and Morphine.

Unit-III

Steroids

Occurrence, nomenclature, basic skeleton. Diel's hydrocarbon and stereochemistry. Isolation, structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progesterone, Aldosterone. Biosynthesis of steroids.

Unit-IV

Plant Pigments

Occurrence, nomenclature and general methods of structure determination. Isolation and synthesis of Apigenin, Luteolin, Quercetin, Diadzein, Cyanidin, Hirsutidin, Biosynthesis of flavonoids : Acetate pathway and Shikimic acid pathway.

Porphyrins

Structure and synthesis of Haemoglobin and Chlorophyll.

Unit-V

Prostaglandins : Occurrence, nomenclature, classification, biogenesis and physiological effects. Corey's Synthesis of PGE_2 and $\text{PGF}_{2\alpha}$

Pyrethroids and Rotenones : Synthesis and reactions of Pyrethroids and Rotenones.

Books Suggested

1. Natural Products : Chemistry and Biological Significance, J. Mann. R.S. Davidson, J.B. Hobbs, D.V. Banthrope and J B Harbome, Longman. Essex.
2. Organic Chemistry : Vol. 2. I.L. Finar. ELBS.
3. Stereoselective Synthesis : A Practical Approach, M. Norgredi. VCH.
4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
5. Chemistry. Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M P. Gupta and A. Marston. Harwood Academic Publishers.
6. Introduction to Flavonoids, B.A. Bohm. Harwood Academic Publishers.
7. New Trends in Natural Product Chemistry, Atta-ur-Rahman and M.I. Choudhary, Harwood Academic Publishers.
8. Insecticides of Natural Origin, Sukh Dev. Harwood Academic Publishers.

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ELECTIVE PAPER-1
(CH-504, Group -III) Analytical Chemistry
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Introduction

Role of analytical chemistry. Classification of analytical methods - classical and instrumental. Types of instrumental analysis. Selecting an analytical method. Neatness and cleanliness. Laboratory operations and practices. Analytical balance. Techniques of weighing, errors. Volumetric glassware cleaning and calibration of glassware. Sample preparation - dissolution and decompositions. Gravimetric techniques. Selecting and handling of reagents. Laboratory notebooks. Safety in the analytical laboratory

Errors and Evaluation

Definition of terms in mean and median. Precision - standard deviation relative standard deviation. Accuracy - absolute error, relative error. Types of error in experimental data - determinate (systematic), indeterminate (or random) and gross. Sources of error and the effects upon the analytical results. Methods for reporting analytical data. Statistical evaluation of data-indeterminate errors. The uses of statistics.

Unit-II

Food Analysis

Moisture, ash, crude protein, fat, crude fiber, carbohydrates, calcium, potassium, sodium and phosphate. Food adulteration - common adulterants in food, contamination of food stuffs. Microscopic examination of foods for adulterants. Pesticide analysis in food products. Extraction and purification of sample HPLC. Gas chromatography for organophosphates. Thin-layer chromatography for identification of chlorinated pesticides in food products.

Unit-III

Analysis of Water Pollution

Origin of waste water, types, water pollutants and their effects. Sources of water pollution - domestic, industrial, agricultural, soil and radioactive wastes. Objectives of analysis, parameter for analysis - color, turbidity; total solids, conductivity, acidity, alkalinity, hardness, chloride, sulphate, fluoride, silica, phosphates and different forms of nitrogen. Heavy metal pollution - public health significance of cadmium, chromium, copper, lead, zinc, manganese, mercury and arsenic. General survey of instrumental technique for the analysis of heavy metals in aqueous systems. Measurement of DO, BOD and COD. Pesticides as water pollutants and analysis. Water pollution laws and standards.

Unit-IV

Analysis of Soil and Fuel

Analysis of soil : moisture pH, total nitrogen, phosphorus, silica, lime, magnesia, manganese, sulphur and alkali salts.
Fuel analysis : liquid and gas. Ultimate and proximate analysis - heating values - grading of coal. Liquid fuels - flash point, aniline point, octane number and carbon residue. Gaseous fuels - producer gas and water gas - calorific value.

Unit-V

Analysis of Body Fluids and Drugs

Clinical chemistry: Composition of blood-collection and preservation of samples. Clinical analysis. Serum electrolytes, blood glucose, blood urea nitrogen, uric acid, albumin, globulins, barbiturates, acid and alkaline phosphatases. Immunoassay: principles of radio immunoassay (RIA) and applications. The blood gas analysis, trace elements in the body.

Drug analysis: Narcotics and dangerous drugs. Classification of drugs. Screening by gas and thin-layer chromatography and spectrophotometric measurements.

Books Suggested

1. Analytical Chemistry. G.D. Christian. John Wiley.
2. Fundamentals of Analytical Chemistry. D A. Skoog. D M. Westand F.J. Hooler. W.B Saunders.
3. Analytical Chemistry - Principles. J.H. Kennedy. W.B. Saunders.
4. Analytical Chemistry - Principles and Techniques. L.G. Hargis. Prentice Hall.
5. Principles of Instrumental analysis D A. Skoog and J.L. Loary. W.B Saunders.
6. Principles of Instrumental Analysis D A. Skoog W.B. Saunders.
7. Quantitative Analysis. R.A. Day, Jr. and A.L Underwood, Prentice Hall.
8. Environmental Solution. S.M. Khopkar, Wiley Eastern.
9. Basic Concepts of Analysis Chemistry. S.M. Khopkar, Wiley Eastern.
10. Handbook of Instrumental Techniques for Analytical Chemistry, F. Settle. Prentice Hall.

ELECTIVE PAPER-2
(CH-505, Group-III) Physical Organic Chemistry
(2Hrs. or 3 periods/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Concepts in Molecular Orbital (MO) and Valence Bond (VB) Theory

Introduction to Huckel molecular orbital (MO) method as a mean to explain modern theoretical methods. Advanced techniques in PMO and FMO theory. Molecular mechanics, semi-empirical methods and ab initio and density functional methods. Scope and limitations of several computational programmes.

Quantitative MO theory - Huckel molecular orbital (HMO) method as applied to ethene, allyl and butadiene. Qualitative MO theory - ionisation potential. Electron affinities. MO energy levels. Orbital symmetry. Orbital interaction diagrams. MO of simple organic systems such as ethene, allyl, butadiene, methane and methyl group. Conjugation and hyperconjugation. Aromaticity. Valence bond (VB) configuration mixing diagrams. Relationship between VB configuration mixing and resonance theory. Reaction profiles. Potential energy diagrams. Curve-crossing model - nature of activation barrier in chemical reactions

Unit-II

Principles of Reactivity

Mechanistic significance of entropy, enthalpy and Gibb's freeenergy. Arrhenius equation. Transition state theory. Use of activation parameters, Hammond's postulate, Bell-Evans-Polanyi principle. Potential energy surface model. Marcus theory of electronic transfer. Reactivity and selectivity principles.

Kinetic Isotope Effect

Theory of isotope effects. Primary and secondary kinetic isotope effects. Heavy atom isotope effects. Tunneling effect, Solvent effects.

Unit-III

Structural Effects on Reactivity

Linear free energy relationships (LFER). The Hammett equation, substituent constants, theories of substituent effects. Interpretation of σ -values. Reaction constant ρ . Deviations from Hammett equation. Dualparameter correlations, inductive substituent constant. The Taft model, σ and R scales.

Solvation and Solvent Effects

Qualitative understanding of solvent-solute effects on reactivity. Thermodynamic measure of solvation. Effects of solvation on reaction rates and equilibria. Various empirical indexes of solvation based on physical properties, solvent-sensitive reaction rates, spectroscopic properties and scales for specific solvation. Use of solvation scales in mechanistic studies. Solvent effects from the curve-crossing model.

Unit-IV

Acids, Bases, Electrophiles, Nucleophiles and Catalysis

30

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Acid-base dissociation, Electronic and structural effects, acidity and basicity. Acidity functions and their applications. Hard and soft acids and bases. Nucleophilicity scales. Nucleofugacity. The α -effect. Ambivalent nucleophiles. Acid-base catalysis - specific and general catalysis. Bronsted catalysis. Nucleophilic and electrophilic catalysis. Catalysis by non-covalent binding-micellar catalysis.

Steric and Conformational Properties

Various type of steric strain and their influence on reactivity, steric acceleration. Molecular measurements of steric effects upon rates. Steric LFER. Conformational barrier to bond rotation - spectroscopic detection of individual conformers. Acyclic and monocyclic systems. Rotation around partial double bonds. Winstein-Holness and Curtin-Hammett principle.

Unit-V

Nucleophilic and Electrophilic Reactivity

Structural and electronic effects on S_N1 and S_N2 reactivity Solvent effect. Kinetic isotope effects. Intramolecular assistance. Electron transfer nature of S_N2 reaction. Nucleophilicity and S_N2 reactivity based on curve crossing model. Relationship between polar and electron transfer reactions. $S_{RN}1$ mechanism Electrophilic reactivity, general mechanism. Kinetics of S_E2 -Ar reaction Structural effects on rates and selectivity. Curve-crossing approach to electrophilic reactivity.

Radical and Pericyclic Reactivity

Radical stability, polar influence, solvent and steric effects. A curve crossing approach to radical addition, factors effecting barrier heights in addition, regioselectivity in radical reactions.

Reactivity, specificity and periselectivity in pericyclic reactions.

Books Suggested :

1. Molecular Mechanics. U. Burkert and N.L Alinger. ACS Monograph 177, 1982.
2. Organic Chemists. Book of Orbitals : L. Salem and W.L. Jorgensen, Academic Press.
3. Mechanism and Theory in Organic Chemistry. T.H. Lowry and K.C. Richardson. Harper and Row.
4. Introduction to Theoretical Organic Chemistry and Molecular Modeling.
5. Physical Organic Chemistry, N.S. Isaacs, ELBS/Longman.
6. The Physical Basis of Organic Chemistry : H. Maskill, Oxford University Press.

ELECTIVE PAPER - 3 (CH-506, Group-III) Chemical Dynamics (2 Hrs. or 3 period/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Atmospheric Reactions

Physical structure of the atmosphere, chemical composition of the atmosphere. Kinetics and mechanism of NO_x , ClO_x cycles and $H_2 + O_2$ reaction. Mechanism of general methane oxidation. Kinetics and mechanism of low temperature oxidation of methane. Concept of global warming.

Unit-II

Oscillatory Reactions: Autocatalysis and oscillatory reactions, Kinetics and mechanism of Belousov-Zhabotinski (B-Z) reaction.

Enzymes and Inhibitions: Kinetics of one enzyme - Two substrate systems and their experimental characteristics. Enzyme inhibitors and their experimental characteristics. Kinetics of enzyme inhibited reactions.

Micelles catalysis and inhibition : Kinetics and mechanism of micelle catalyzed reactions (1st order and second order) Various type of micelle catalyzed reactions. Micelle inhibited reactions.

Dynamics of Gas-surface reactions : Adsorption/desorption kinetics and transition state theory Dissociative adsorption and precursor state. Mechanism of Langmuir's adsorption of the oxidation of carbon monoxide to carbon dioxide. True and apparent activation energies. Industrial importance of heterogeneous catalysis.

Unit-III

Radiation Chemistry and Photochemistry

Radiation chemistry of water and aqueous solutions. Hydrogen atom and hydroxyl radical - oxidizing and reducing conditions. Kinetics and mechanism of photochemical and photosensitized reactions (One example in each case). Stern-Volmer equation and its application. Hole-concept in the presence of semi-conductor type photocatalysts. Kinetics and mechanism of electron transfer reaction in the presence of visible light. Kinetics of exchange reactions (mathematical analysis).

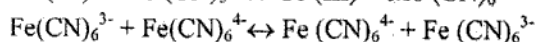
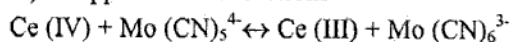
Transition State

A brief aspect of statistical mechanics and transition state theory, application in calculation of the second order rate constant for reactions with collision for (1) atom + atom (2) atom + molecule (3) molecule + molecule reactions. Static solvent effects and thermodynamics formulations. Adiabatic electron transfer reactions, energy surfaces.

Unit-IV

Substitution reactions.

Substitution reactions. Classification of ligand substitution mechanism. Anation and base catalyzed kinetics of anation reactions Aquation and acid catalyzed kinetics of aquation reactions (octahedral complexes). Inner-sphere electron transfer reactions and mechanism. Various types of inner sphere bridges, adjustment and remote attack Linkage isomerism. Chemical and resonance mechanisms. Marcus-Cross relation in outer sphere reactions (no mathematical derivation) Its application in reactions-



Bridged outer-sphere electron transfer mechanism.

Kinetics of reactions in the presence of cyclodextrins. Considering one full case study, nucleophilic and electrophilic catalysts and their mode of action.

Unit-V

Metal ion catalysis and induced phenomena

Metal ion catalyzed reactions, their kinetics and reaction mechanism in solutions. Induced reactions, their characteristics. Mechanism of - (i) Fe(II) induced oxidation of iodine by Cr(VI). (ii) As(III) induced oxidation of Mn(II) by chromate in acid solutions.

Kinetics and mechanism of induced reactions in metal complexes (octahedral complexes of Cobalt(III) only). Kinetics of hydroformylation reaction.

Books Recommended

1. Progress in Inorganic Chemistry, Vol. 30, 1967.
2. R. Lumry and R.W. Raymond, Electron Transfer Reactions, Interscience.
3. N.L. Bender, Mechanism of Homogeneous Catalysis from protein to protein, Wiley.
4. A.G. Sykes, Kinetics of Inorganic reactions, Pergamon.
5. S.W. Benson, Mechanism of Inorganic Reactions, Academic Press.
6. Physical Chemistry Vol. 2, Ed. Prof. YaGrasimov, Mir publisher.
7. Basolo and Pearson, Inorganic Reaction Mechanism, Wiley.
8. H. Taube, Electron Transfer Reactions, Oxford Press.

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ELECTIVE PAPER-4
(CH-507, Group-III) Electrochemistry
(2 Hrs. or 3 period/week)

Exam Duration : 3 hrs.

Max. Marks : 50

Unit-I

Conversion and storage of Electrochemical Energy

Present status of energy consumption: Pollution problem. History of fuel cells, Direct energy conversion by electrochemical means. Maximum intrinsic efficiency of an electrochemical converter.

Physical interpretation of the Carnot efficiency factor in electrochemical energy converters. Power output.

Electrochemical Generators (Fuel cells): Hydrogen oxygen cells, Hydrogen Air cell. Hydrocarbon air cell, alkaline fuel cell. Phosphoric and fuel cell, direct NaOH fuel cells, applications of fuel cells.

Electrochemical Energy Storage :

Properties of electrochemical energy storers: measure of battery performance. Charging and discharging of a battery, storage density, energy density.

Classical Batteries: (i) Lead Acid (ii) Nickel-Cadmium, (iii) Zinc-Manganese dioxide

Modern Batteries: (i) Zinc-Air, (ii) Nickel-Metal Hydride, (iii) Lithium Battery.

Future Electricity Storage: in (i) Hydrogen, (ii) Alkali Metals, (iii) Non aqueous solutions.

Unit-II

Corrosion and Stability of Metals :

Surface mechanism of the corrosion of the metals. Thermodynamics and the stability of metals. Potential-pH (or Pourbaix) Diagrams. Corrosion current and corrosion potential - Evans diagrams.

Measurement of corrosion rate : (i) Weight Loss Method (ii) Electrochemical Method.

Inhibiting Corrosion : Cathodic and Anodic Protection, (i) Inhibition by addition of substrates to the electrolyte environment, (ii) by changing the corroding method from external source, anodic Protection. Organic inhibitors. The Fuller Story Green inhibitors.

Passivation : Structure of Passivation films, Mechanism of Passivation. Spontaneous Passivation: Nature's method for stabilizing surfaces.

Unit-III

Bioelectrochemistry:

Bioelectrodics, Membrane Potentials, Simplistic theory, Modern theory. Electrical conductance in biological organisms. Electronic. Protonic electrochemical mechanism of nervous systems, enzymes as electrodes.

Unit-IV

Kinetics of Electrode Process: Essentials of electrode reaction current density, overpotential, Tafel Equation, Butler Volmer equation. Standard rate constant (K^0) and transfer coefficient (α), exchange current.

Irreversible Electrode processes: criteria of irreversibility, information from irreversible wave.

Methods of determining kinetic parameters for quasi-reversible and irreversible waves: Koutecky's method. Meits Israel method. Gelling's method.

Electrocatalysis: Chemical catalysts and electrochemical catalysts with special reference to purostates, porphyrin oxides of rare earths. Electro-catalysis in simple redox reactions and reaction involving adsorbed species. Influence of various parameters.


Unit- V

Potential Sweep Method: Linear sweep voltammetry, cyclic voltammetry, theory and applications. Diagnostic criteria of cyclic voltammetry.

Controlled current microelectrode techniques: comparison with controlled potentials methods, chronopotentiometry, theory and applications.

Bulk Electrolysis Methods: Controlled potential coulometry. Controlled coulometry. Electroorganic synthesis and its important applications.

Stripping analysis: Anodic and cathodic modes. Preelectrolysis and stripping steps, applications of stripping analysis.


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Book Suggested:

1. Modern Electrochemistry Vol. I, IIA, IIB JO'M Bockris and A.K.N. Reddy, Plenum Publication. New York.
2. Polarographic Techniques by L. Meites. Interscience.
3. "Fuel cells; Their electrochemistry" McGraw Hill Book Company. New York.
4. Modern Polarographic Methods by A.M. Bond and Marcel Dekker
5. Polarography and allied techniques By K. Zutshi, New Age International publication, New Delhi.
6. Electroanalytical Chemistry by Basil H. Vessor & Galen W., Wiley Interscience.
7. Topics in Pure and Applied Chemistry. Ed. S.K. Rangrajan. SAEST Publication, Karaikudi (India)

**CH-508 : M.Sc. (Final) Seminar
(1hr/week)**

Exam Duration 15 minutes/student

Max Marks 25

Seminar to be conducted in presence of External examiner.

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Exam Duration: (14 hrs in 2 days)

Max. Marks: 200

Inorganic Chemistry

Preparation: Preparation of selected inorganic compounds and their study by IR spectra. Handling of air and moisture sensitive compounds involving vacuum lines.

Selection can be made from the following:

1. Sodium amide, Inorg. Synth., 1946, 2, 128.
2. Synthesis and thermal analysis of group II metal oxalate hydrate, J. Chem. Ed., 1988, 65, 1024.
3. $[\text{PhBCl}_2]$ Dichlorophenylborane. Synthesis in vacuum line.
4. Preparation of Tin (IV) iodide, Tin (IV) chloride and Tin (II) iodide. Inorg. Synth., 1953, 4, 119.
5. Relative stability of Tin (IV) and Pb (IV). Preparation of ammonium hexachlorostannate $(\text{NH}_4)_2[\text{SnCl}_6]$; ammonium hexachloroplumbate $(\text{NH}_4)_2[\text{PbCl}_6]$.
6. Hexabis (4-nitrophenoxy) cyclotriphosphazene.
7. Synthesis of trichlorodiphenylantimony (V) hydrate, Inorg. Synth., 1985, 23, 194.
8. Sodium tetrathionate, $\text{Na}_2\text{S}_4\text{O}_6$.
9. Metal complexes of dimethylsulfoxide and their IR: $\text{CuCl}_2 \cdot \text{DMSO}$; $\text{PdCl}_2 \cdot 2\text{DMSO}$; $\text{RuCl}_2 \cdot 4\text{DMSO}$, J. Chem. Educ., 1982, 59, 57.
10. Synthesis of metal acetylacetonate: IR, Inorg. Synth., 1957, 5, 130; 1963, 1, 183.
11. Bromination of $[\text{Cr}(\text{acac})_3]$, J. Chem. Edu, 1986, 63, 90.
12. $[\text{Cu}(\text{acac})_2] \cdot \text{H}_2\text{O}$.
13. *cis*- and *trans*- $[\text{Co}(\text{en})_2\text{Cl}_2]^+$.
14. *cis*- $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$, J. Chem Soc., 1960, 4369.
15. Cr(III) complexes. $[\text{Cr}(\text{H}_2\text{O})_6]\text{NO}_3 \cdot 3\text{H}_2\text{O}$; $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$; $[\text{Cr}(\text{en})_3]\text{Cl}_3$; $[\text{Cr}(\text{acac})_3]$, Inorg, Synth., 1972, 13, 184.
16. Preparation of *N,N*-bis(salicylaldehyde)ethylenedimine, salen H_2 ; $[\text{CO}(\text{salen})]$, J. Chem. Educ., 77, 54, 443; 1973, 50, 670.
17. Preparation of Fe(II) chloride (use it as Friedel-Craft chlorination source), J. Org. Chem., 1978, 43, 2423; J. Chem. Edu., 1984, 61, 645; 1986, 63, 361.
18. Reaction of Cr(III) with a multidentate ligand; a kinetics experiment (visible spectra Cr-EDTA complex), J. A. C. S., 1953, 75, 5670.
19. Preparation of $[\text{Co}(\text{phenanthroline-5, 6-quinone})]$.
20. Preparation and use of Ferrocene, J. Chem Edu., 1966, 43, 73; 1976, 53, 730.
21. Preparation of copper glycine complex. *cis*- and *trans*- bis(glycinato)copper (II), J. Chem. Soc. Dalton, 1979, 1901; J. Chem. Edu. 1982, 59, 1052.
22. Preparation of phosphine (Ph_3P) and its transition metal complexes.
23. Any other experiment such as conversion of *p*-xylene to terephthalic acid catalyzed by CoBr_2 (homogeneous catalysis).

Spectrophotometric Determinations

- a) Manganese/Chromium/Vanadium in steel sample.
- b) Nickel/Molybdenum/Tungsten/Vanadium/Uranium by extractive spectrophotometric method.
- c) Fluoride/Nitrite/Phosphate.
- d) Iron-phenanthroline complexes: Job's method of continuous variations.
- e) Zirconium-alizarin Red-S complex: Mole-ratio method.
- f) Copper ethylenediamine complex: Slope-ratio method.

Flame Photometric Determinations

- a) Sodium and potassium when present together.
- b) Lithium/Calcium/Barium/Strontium.

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c) Cadmium and Magnesium in tap water.

Quantitative determinations of a three component mixture:

One Volumetrically and two Gravimetrically

a) Cu^{+2} , Ni^{+2} , Zn^{+2}

b) Cu^{+2} , Ni^{+2} , Mg^{+2}

Chromatographic Separations

a) Cadmium and zinc

b) Zinc and magnesium

c) Thin-layer chromatography-separation of nickel, manganese, cobalt and zinc, Determination of R_f values.

d) Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of R_f values.

Organic Chemistry

Qualitative Analysis : Separation, purification and identification of the components of three organic compounds (three solids or two liquids and one solid or two solids and one liquid), using for checking the purity of the separated compounds, chemical analysis, IR, PMR and mass spectral data.

Multi-step Synthesis of Organic Compounds : The exercises should illustrate the use of organic reagents and may involve purification of the products by chromatographic techniques.

i) Photochemical reaction:

(Benzophenone \rightarrow Benzpinacol \rightarrow Benzpinacolone)

ii) Beckmann Rearrangement: Benzanilide from benzene

(Benzene \rightarrow Benzophenone \rightarrow Benzophenone oxime \rightarrow Benzanilide)

iii) Benzilic acid rearrangement: Benzilic acid from benzoin

(Benzoin \rightarrow Benzil \rightarrow Benzilic acid).

iv) Synthesis of heterocyclic compounds

a) Skraup synthesis: Preparation of quinoline from aniline

b) Fisher Indole synthesis: Preparation of 2-phenylindole from phenylhydrazine.

v) Diazocoupling: Phthalic anhydride \rightarrow Phthalamide \rightarrow anthranilic acid \rightarrow methyl red.

Extraction of Organic Compounds from Natural Sources

a) Isolation of caffeine from tea leaves.

b) Isolation of casein from milk (the students are required to try some typical colour reactions of proteins)

c) Isolation of lactose from milk (purity of sugar should be checked by TLC and PC and R_f values reported).

d) Isolation of chlorophyll a & b from spinach / spirulina.

Paper Chromatography : Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of R_f values.

Spectroscopy: Identification of organic compounds by the analysis of their spectral data (UV, IR, ^1HMR , ^{13}CMR & MS).

Spectrophotometry (UV/VIS) Estimations

a) Amino acids

b) Proteins

c) Carbohydrates

d) Cholesterol

e) Ascorbic acid

f) Aspirin

g) Caffeine

Physical Chemistry

A list of experiments under different headings are given below. Typical experiments are to be selected from each type.

A. Thermodynamics

- (i) Determination of partial molar volume of solute (e.g. KCl) and solvent in a binary mixture.
- (ii) Determination of the temperature dependence of the solubility of a compound in two solvents having similar intramolecular interactions (benzoic acid in water and in DMSO-water mixture) and calculate the partial molar heat of solution.

B. Spectroscopy

- (i) Determination of pKa of an indicator (e.g. methyl red) in (a) aqueous and (b) micellar media.
- (ii) Determination of stoichiometry and stability constant of Ferricisothiocyanate complex ion in solution
- (iii) Determination of rate constant of alkaline bleaching of Malachite green and effect of ionic strength on the rate of reaction.

C. Polarography

- (i) Identification and estimation of metal ions such as Cd^{2+} , Pb^{2+} , Zn^{2+} and Ni^{2+} etc. polarographically.
- (ii) Study of a metal ligand complex polarographically (using Lingane's Method).

D. Chemical Kinetics

- (i) Determination of rate constant and formation constant of intermediate complex in the reaction of Ce(IV) and Hypophosphorous acid at ambient temperature.
- (ii) Determination of energy and enthalpy of activation in the reaction of KMnO_4 and benzyl alcohol in acid medium.
- (iii) Determination of energy of activation and entropy of activation from a single kinetic run.
- (iv) Kinetics of an enzyme catalyzed reaction.

Books Suggested:

1. Inorganic Experiments, J. Derek Woollins, VCH.
2. Microscale Inorganic Chemistry, Z. Szafran, R.M Pike and M.M. Singh, Wiley.
3. Practical Inorganic Chemistry, G. Marr and B. W. Rockett. Van Nostrand.
4. The Systematic Identification of Organic Compounds, R.L Shriner and D.Y. Curtin.

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INSTRUCTIONS TO THE EXAMINERS
CH-509: M.Sc. (Final) Chemistry Practical
Duration of Exam: 14 hrs. (Spread over 2 days)

Max. Marks: 200

Min. Marks 72

Inorganic Chemistry

1. Preparation of one of the selected inorganic compounds as mentioned in the syllabus and its study by IR, electronic spectra. Mossbauer, ESR and magnetic susceptibility. Handling of air and moisture sensitive compounds involving vacuum lines.

or

Quantitative determination of a three component mixture by volumetric & gravimetric methods. 25

2. Spectrophotometric determination of one of the 5 exercises given in the syllabus.

or

Flame Photometric determinations (one exercise) 15

3. Chromatographic separation of two metal ions. 10

Organic Chemistry

1. Qualitative Analysis

Separation, purification and identification of the components of a mixture of three organic compounds (three solids or two liquids and one solid, two solid and one liquid), using TLC for checking the purity of the separated compounds.

Chemical analysis, IR, ¹HMR and Mass spectral data. 30

2. Multi-step synthesis of Organic Compounds

Perform one of the multi-step synthesis of organic compounds. 20

or

Spectroscopy

Identification of Organic Compounds by the analysis of their spectral data

Physical Chemistry

From the Experiments listed in syllabus

1. Perform one Major physical experiment 30

2. Perform one Minor physical experiment 20

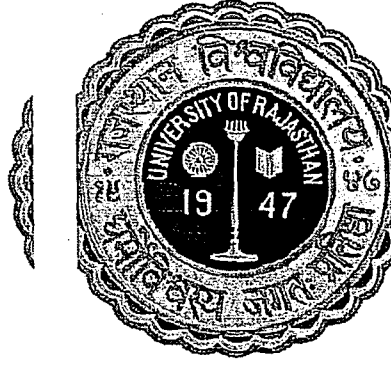
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SYLLABUS

M.Sc. BOTANY (Annual Scheme)

M.Sc. (Previous) Examination 2023

M.Sc. (Final) Examination 2024

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UNIVERSITY OF RAJASTHAN, JAIPUR
M.Sc. (BOTANY)
M.Sc. (ANNUAL PATTERN)

(M.Sc. Previous)

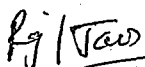
Paper I	Cell & Molecular Biology of Plants
Paper II	Cytology, Genetics & Cytogenetics
Paper III	Biology & Diversity of Lower Plants : Cryptogams
Paper IV	Taxonomy & Diversity of Seed Plants
Paper V	Plant Physiology and Metabolism
Paper VI	Microbiology and Plant Pathology


(M.Sc. Final)

Paper VII	Plant Morphology, Development Anatomy and Reproductive Biology
Paper VIII	Plant Ecology
Paper IX	Plant Resource Utilization & Conservation
Paper X	Biotechnology & Genetic Engineering of Plants & Microbes
Paper XI	Elective I
Paper XII	Elective II

Elective Papers XI & XII

Paper XI(a)	: Advanced Plant Pathology—I
Paper XII(a)	: Advanced Plant Pathology—II
	OR
Paper XI(b)	: Seed Science and Technology—I
Paper XII(b)	: Seed Science and Technology—II
	OR
Paper XI(c)	: Ecosystem Ecology
Paper XII(c)	: Environmental biology
	OR
Paper XI(d)	: Advanced Plant Physiology—I
Paper XII(d)	: Advanced Plant Physiology—II
	OR
Paper XI(e)	: Advanced Morphology and Morphogenesis—I
Paper XII(e)	: Advanced Morphology and Morphogenesis—II
	OR
Paper XI(f)	: Biosystematics of Angiosperms—I
Paper XII(f)	: Biosystematics of Angiosperms—II
	OR
Paper XI(g)	: Biotechnology—I
Paper XII(g)	: Biotechnology—II


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M.Sc. Botany

Scheme of Examination

M.Sc. (Prev.)

There will be six papers in theory, each of three hours duration, 100 marks each and two practicals carrying 150 marks each (10% marks are reserved for viva and 15% records in each examination). Each practical examination will be of 6 hours duration to be completed in one day.

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

M.Sc. (Final)

There will be six papers, four compulsory and two elective, in theory of 3 hours duration carrying 100 marks each and two practicals each as follows :

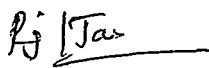
(i) Practical for compulsory papers of 200 marks of 8 hours duration to be completed in two days.


(ii) Practical for elective papers - 100 marks of 4 hours duration to be completed in one day.

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

M.Sc. Previous

- Paper-I** : Cell and Molecular Biology of Plants
Paper-II : Cytology, Genetics and Cytogenetics
Paper-III : Biology and Diversity of Lower Plants :
Cryptogams
Paper-IV : Taxonomy and Diversity of Seed Plants
Paper-V : Plant Physiology and Metabolism
Paper-VI : Microbiology and Plant Pathology


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Paper-I : Cell and Molecular Biology of Plants

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit—I

The dynamic cell : Structural organization of the plant cell, specialized plant cell types, chemical foundation, biochemical energetics.

Cell wall : Structure and functions, biogenesis, growth.

Plasma membrane : Structure, models and functions, sites for ATPases, ion carriers, channels and pumps, receptors.

Plasmodesmata : Structure, role in movement of molecules and macromolecules, comparison with gap junctions.

Unit—II

Chloroplast : Structure, genome organization, gene expression, RNA editing, nucleochloroplastic interactions.

Mitochondria : Structure, genome organization, biogenesis.

Plant vacuole : Tonoplast membrane, ATPase, transporters, as storage organelle.

Nucleus : Structure, nuclear pores, nucleosome organization, DNA structure, A, B and Z forms, replication, damage and repair, transcription, plant promoters and transcription factors, splicing, mRNA transport nucleolous, rRNA biosynthesis.

Restriction enzymes : Cleavage of DNA into specific fragments, construction of a restriction map from the fragments, restriction sites, as genetic markers, RFLP and their use in plant breeding.

Unit—III

Ribosomes : Structure, site of protein synthesis, mechanism of translation, initiation, elongation and termination, structure and role of tRNA.

Protein sorting : Targeting of proteins to organelles.

Cell shape and motility : The cytoskeleton, organization and role of microtubules and microfilaments, motor movements, implications in flagellar and other movements.

Unit—IV

Cell cycle and apoptosis : Control mechanisms, role of cyclins and cyclin-dependent kinases, retinoblastoma and E2F proteins, cytokinesis and cell plate formation, mechanisms of programmed cell death.

Other Cellular organelles : Structure and functions of microbodies, Golgi apparatus, lysosomes, endoplasmic reticulum.

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Ans-
Techniques in cell biology: Immunotechniques, in situ hybridization to locate transcripts in cell types, FISH, GISH, confocal microscopy.

Suggested Readings:

1. Lewis, B. 200. Genes VII. Oxford University Press, New York.
2. Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K and Watson, J., 1999. Molecular Biology of the Cell. Garland Publishing, Inc.. New York.
3. Wolfe, S.L. 1993. Molecular and Cellular Biology. Wadsworth Publishing USA.
4. Rest, T, *et al.* 1998. Plant Biology. Wadsworth Publishing Co., California USA.
5. Krishnamurthy, K.V. 2000. Methods in Cell Wall Cytochemistry. CRC Press, Boca Raton, Florida.
6. Buchanan, B.B., Gruissem, W., and Jones, R.L. 2000. Biochemistry and Molecular Biology of Plants, American Society of Plant Physiologists. Maryland, USA.
7. De, D.N. : 2000. Plant Cell Vacuoles : An Introduction. CSIRO Publication Collingwood, Australia.
8. Kleinsmith, L.J. and Kish, V.M. 1995. Principles of Cell and Molecular Biology. (2nd Edition). Harper Collins College Publishers, New York USA.
9. Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J. 2000. Molecular Cell Biology (4th Edition). W.H. Freeman and Co., New York, USA.

See the following Review Journals

Annual Review of Plant Physiology and Molecular Biology.

Current Advances in Plant Sciences.

Trends in Plant Sciences.

Nature Reviews : Molecular and Cell Biology.

Suggested laboratory Exercises

1. Isolation of mitochondria and the activity of its marker enzyme succinate dehydrogenase (SDH).
2. Isolation of chloroplasts and SDS-PAGE profile, of proteins to demarcate the two subunits of Rubisco.
3. Isolation of nuclei and identification of histones by SDS-PAGE
4. Isolation of plant DNA and its quantitation by spectrophotometric method.
5. Isolation of DNA. and preparation of 'cot' curve.
6. Restriction digestion of plant DNA, its separation by agarose gel electrophoresis and visualization by ethidium bromide staining.
7. Isolation of RNA and quantitation by a spectrophotometric method.

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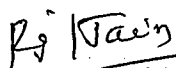
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8. Separation of plant RNA by agarose gel electrophoresis and visualization by EtBr staining.
9. Southern blot analysis using a gene specific probe.
10. Northern blot analysis using a gene specific probe.
11. Immunological techniques : Ouchterlony method, ELISA and western blotting.
12. Fluorescence staining with FDA for cell viability and cell wall staining with calcofluor.
13. Demonstration of SEM and TEM.


Note : Chemicals and kits for conducting some of the above molecular biology experiments are available in India, for example from M/s Bangalore Genei and Centre for Biotechnology (CSTR) Mall Road, Delhi.

Suggested Readings (For laboratory exercises)

1. Glick, BR. and Thompson, HS. 1993. Methods in Plant Molecular, Biology and Biotechnology. CRC Press, Boca Raton, Florida.
2. Glover, D.M. and Hames, B.D. (Eds), 1995. DNA Cloning 1: A Practical Approach, Core techniques. 2nd edition. PAS, IRL Press at Oxford University Press, Oxford.
3. Gunning, B.E.S. and Steer, MW. 1996. Plant Cell Biology : Structure and Function. Jones and Bartlett Publishers. Boston, Massachusetts.
4. Hackett, P.B., Fuchs, J.A. and Messing, J.W. 1988. An Introduction to Recombinant DNA Techniques : Basic Experiments in Gene Manipulation. The Benjamin Cummings Publishing Co. Inc., Menlo Park, California.
5. Hall, IE. and Moore, AL. 1983. Isolation of Membranes and Organelles from Plant Cells. Academic Press, London, UK.
6. Harris, N. and Oparka, KJ. 1994. Plant Cell Biology : A Practical Approach. IRL Press, at Oxford University Press Oxford. U.K.
7. Shaw C.H. (Ed), 1988. Plant Molecular Biology : A Practical Approach. IRL Press, Oxford,


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Paper-II : Cytology, Genetics and Cytogenetics

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-1

CYTOLOGY

Chromatin organization : Chromosome structure and packaging of DNA, molecular organization of centromere and telomere, nucleolus and ribosomal RNA genes, euchromatin and heterochromatin, karyotype analysis, banding patterns, karyotype, evolution, specialized types of chromosomes, polytene, lampbrush, B-chromosomes and sex chromosome, molecular basis of chromosome pairing.

Structural and numerical alterations in chromosomes : Origin, meiosis and breeding behavior of duplication, deficiency, inversion and translocation heterozygotes, Origin, occurrence, production and meiosis of haploids, aneuploids and euploids, origin and production, of autopolyploids, chromosome and chromatid segregation, allopolyploids, types, genome constitution, and analysis, evolution of major crop plants, induction and characterization of trisomics and monosomics.

Unit-II

GENETICS

Genetics of prokaryotes and eukaryotic organelles : Mapping the bacteriophage genome, phage phenotypes, genetic recombination in phage, genetic transformation, conjugation and transduction in bacteria, genetics of mitochondria and chloroplasts, cytoplasmic male sterility.

Gene Structure and expression : Genetic fine structure, cis—trans test fine structure analysis of eukaryotes, introns and their significance, RNA Splicing, regulation of gene expression in prokaryotes and eukaryotes. Panoply of operon, catabolite repression, attenuation and antitermination.

Genetic recombination and genetic mapping : Recombination independent assortment and crossing over. molecular mechanism of recombination. role of RecA and RecBCD enzymes, site-specific recombination. chromosome mapping, linkage groups, genetic markers. construction of molecular maps, correlation of genetic and physical maps. somatic cell genetics—an alternative approach to gene mapping.

Unit-III

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CYTOGENETICS

Mutations : Spontaneous and induced mutations, physical and chemical mutagens, molecular basis of gene mutation, transposable elements in prokaryotes and eukaryotes, mutation induced by transposons, site-directed mutagenesis, inherited diseases and defects in DNA repair, initiation of cancer at cellular level, protooncogenes and oncogenes.

Sex determination, sex linked inheritance, sex limited characters and sex reversal, multiple alleles.

Cytogenetics of aneuploids and structural heterozygotes : Effect of aneuploidy on phenotype in plants, transmission of monosomics and trisomics and their use in chromosome mapping in diploid and polyploid species, breeding behaviour and genetics of structural heterozygotes, complex translocation heterozygotes, translocation tester sets, Robertsonian translocations, B-A translocations.

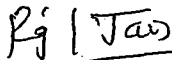
Unit—IV


Molecular cytogenetics : Nuclear DNA content, C-value paradox, cot curve and its significance, multigene families and their evolution, in situ hybridization—concept and techniques, physical mapping of genes of chromosomes, computer assisted chromosome analysis, chromosome microdissection and microcloning, flow cytometry and karyotype analysis.

Alien gene transfer through chromosome manipulations : Transfer of whole genome, examples from wheat, *Arachis* and *Brassica*, transfer of individual chromosomes and chromosome segments, methods for detecting alien chromatin, production, characterization and utility of alien addition and substitution lines, genetic basis of inbreeding and heterosis, exploitation of hybrid vigour.

Suggested Readings :

1. Albert B. Bray, D., Lewis, J., Raff, M., Robert, K. and Watson, J.D. 1989., Molecular Biology of the Cell (2nd edition), Garland Publishing Inc., New York.
2. Atherly, A.G., Girton, J.R. and McDonald, J.F. 1999. The Science of Genetics. Saunders College Publishing, Fort Worth, USA.
3. Burnham. CR. 1962. Discussions in Cytogenetics. Burgess Publishing Co. Minnesota.
4. Busch, H. and Rothblum, L. 1982. Volume X. The Cell Nucleus rDNA Part A. Academic Press.
5. Hard, D.L. and Jones, E.W. 1998. Genetics : Principles and Analysis (4th edition). Jones & Bartlett Publishers, Massachusetts. USA.
6. Khush, G.S. 1973. Cytogenetics of Aneuploids. Academic Press, New York, London.
7. Karp, G. 1999. Cell and Molecular Biology : Concepts and Experiments. John Wiley & Sons, Inc., USA.


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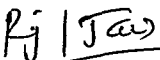
8. Lewin. B. 2000. Gene VII. Oxford University Press, New York. USA.
9. Lewis, R. 1997. Human Genetics : Concepts and Applications (2nd edition). WCB McGraw Hill, USA.
10. Malacinski, G.M. and Freifelder, D. 1998 : Essentials of Molecular Biology(3rd edition). Jones and Bartlett Publishers. Inc., London.
11. Russel, R.J. 1998. Genetics (5th edition). The Benjamin/ Cummings Publishing Company INd., USA.
12. Snustad, D.P. and Simmons, M.J. 2000. Principles of Genetics (2nd edition). John Wiley & Sons Inc., USA.


Suggested Laboratory Exercises

1. Linear differentiation of chromosomes through banding techniques, such as G-banding, C-banding and Q-banding.
2. Silver banding for staining nucleolus—organizing region, where 18S and 28srDNA are transcribed.
3. Orcein and Feulgen. Staining of the salivary gland chromosomes of Chironomas and Drosophila.
4. Characteristics and behaviour of B chromosomes using maize or any other appropriate material.
5. Working out the effect of mono- and trisomy on plant phenotype, fertility and meiotic behaviour.
6. Induction of polyploidy using colchicines, different methods of the application of Colchicines.
7. Effect of induced and spontaneous polyploidy on plant phenotype, meiosis, pollen and seed fertility and fruit set.
8. Effect of translocation heterozygosity on plant phenotype. chromosome pairing and chromosome disjunction and pollen and seed fertility.
9. Meiosis of complex translocation heterozygotes.
10. Isolation of chlorophyll mutants, following irradiation and treatment with chemical mutagens.
11. Estimation of nuclear DNA content through microdensitometry and flow cytometry.
12. Fractionation and estimation of repetitive and unique DNA sequences in nuclear DNA.

Suggested Readings :

1. Fukui, K. and Nakayama, S, 1996 : Plant Chromosomes : Laboratory Methods. CRC Press, Boca raton, Florida.
2. Sharma, AK. and Sharma, A. 1999. Plant Chromosome Analysis. Manipulation and Engineering. Hoarwood Academic Publisher. Australia.


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**Paper-III : Biology and Diversity of Lower Plants :
Cryptogams**

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Phycology : Algae in diversified habitats (terrestrial, freshwater; marine), thallus organization, cell ultrastructure, reproduction, (vegetative, asexual, sexual) criteria for classification of algae: pigments, reserve food, flagella, classification, salient features of Protochlorophyta, Chlorophyta, Charophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta : with special reference to *Microcystis*, *Hydrodictyon*, *Drapernaldiopsis*, *Cosmarium*, algal blooms, algal biofertilizers : algae as food, feed and use in industry.

Unit-II

Mycology : General characters of fungi, substrate relationship in fungi, cell ultrastructure, unicellular and multi cellular organization, cell wall composition, nutrition (saprobic, biotrophic, symbiotic), heterothallism, heterokaryosis, parasexuality, recent trends in classification. Phylogeny of fungi, general account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, deuteromycotina, with special reference to *Pilobolus*, *Morchella*, *Melampsora*, *Polyporus* & *Phoma*, fungi in industry medicine and as food, fungal diseases in plants and humans, Mycorrhizae, fungi as biocontrol agents.

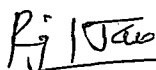
Unit-III

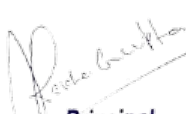
Bryophyta : Morphology, structure, reproduction and life history, distribution, classification, general account of Marchantiales, Jungermaniales, Anthocerotales, Sphagnales, Funariales and Polytrichales, with special reference to *Plagiochasma*, *Notothylus* and *Polytrichum*, economic and ecological importance.

Unit-IV

Pteridophyta : Morphology, anatomy and reproduction; classification; evolution of stele; heterospory and origin of seed habit; general account of fossil pteridophyta; introduction to Psilopsida, Lycopsida, Sphenopsida and Pteropsida; with Special reference to *Lycopodium*, *Gleichenia*, *Pteris*, *Isoetes* & *Ophioglossum*.

Suggested Reading


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Alexopoulos, C.J., Mims, C.W. and Blackwell, M. 1996. Introductory Mycology, John Wiley & Sons Inc.

Clifton, A. 1958. Introduction to the Bacteria. McGraw-Hill Book Co., New York.

Kumar, H.D.; 1988. Introductory Phycology. Affiliate East-West Press Ltd, New Delhi.

Mandahar, CL. 1978. Introduction to Plant Viruses. Chand & Co. Ltd., Delhi.

Mehrotra, R.S. and Aneja, KS. 1998. An Introduction to Mycology, New Age Intermediate Press.

Morris, I. 1986. An Introduction to the Algae. Cambridge University Press, U.K.

Parihar, NS. 1991. Bryophyta. Central Book Depot, Allahabad.

Parihar, NS. 1996. Biology & Morphology of Pteridophytes. Central Book Depot, Allahabad.

Puri, P. 1980. Bryophytes. Atma Ram & Sons, Delhi.

Rangaswamy, G. and Mahadevan, A. 1999. Diseases of Crop Plants in India (4th edition). Prentice Hall of India Pvt. Ltd., New Delhi.

Round, RE. 1986. The Biology of Algae. Cambridge University Press, Cambridge.

Spome, KK. 1991. The Morphology of Pteridophytes. B.I. Publishing Pvt. Ltd., Mumbai.

Stewart, W.N. and Rathwell, G.W. 1993. Paleobotany and the Evolution of Plants. Cambridge University Press.

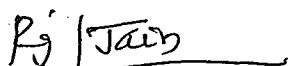
Webster, J. 1985. Introduction to Fungi. Cambridge University Press.

Suggested Laboratory Exercises


Morphological study of representative members of algae, fungi, bacteria, bryophytes and pteridophytes : *Microcystis*, *Aulosira*, *Oocystis*, *Pediastrum*, *Hydrodictyon*, *Ulva*, *Pithophora*, *Stigeoclonium*, *Draparnaldiposis*, *Closterium*, *Cosmarium*, *Chara*, *Stemonitis*, *Peronospora*, *Albugo*, *Mucor*, *Pilobolus*, *Yeast*, *Emericella*, *Chaetomium*, *Pleospora*, *Morchella*, *Melampsora*, *Phallus*, *Polyporus*, *Drechslera*, *Phoma*, *Penicillium*, *Aspergillus*, *Colletotrichum*, *Marchantia*, *Anthoceros*, *Polytrichum*, *Psilotum*, *Lycopodium*, *Selaginella*, *Equisetum*, *Gleichenia*, *Pteris*, *Ophioglossum*, *Isoetes*.

Symptomology of some diseased specimens: White rust, downy mildew, powdery mildew, rusts, smuts, ergot, groundnut leaf spot, red rot of sugarcane, Wilts, paddy blast, citrus canker, bacterial blight of paddy, angular leaf spot of cotton, tobacco mosaic, little leaf of brinjal, sesame phyllody, mango malformation.

Study of morphology, anatomy and reproductive structures of bryophytes and pteridophytes.


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Gram staining of bacteria.

Identification of fungal cultures : *Rhizopus, Mucor, Aspergillus, Penicillium, Emericella, Chaetomium, Drechslera, Curvularia, Fusarium, Phoma, Colletotrichum, Graphium.*

Sterilization methods, preparation of media and stains.

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Paper-IV : Taxonomy and Diversity of Seed Plants

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

GYMNOSPERMS

Introduction : Gymnosperms, the vessel-less and fruitless seed plants varying in the structure of their sperms, pollen grains, pollen germination and the complexity of their female gametophyte, evolution of gymnosperms. Classification of Gymnosperms and their Distribution in India.

Brief account of Pteridospermales, General Account of Cycadeoidales and Cordaitales. Structure and reproduction in Cycadales, Ginkgoales, Coniferales, Ephedrales, Welwitschiales and Gnetales.

Unit-II

TAXONOMY OF ANGIOSPERMS

1. Aims, Components, and principals of taxonomy; Alpha and Omega Taxonomy, documentation and scope.
2. Systems of Angiosperm classification: Cronquist, Dahlgren, Throne and APG-II
3. International code of Botanical Nomenclature: Principles, rules and recommendations; Taxonomic Concept: Hierarchy, species, genus, family and other categories.

Unit-III

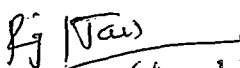
Numerical Taxonomy- Principals. concepts, operational taxonomic units (OTU), data processing and taxonomic studies, taximetric methods for study of population variation and similarity- coding, cluster analysis, cladistics, cladogram.

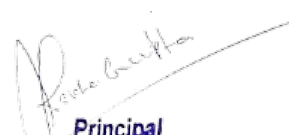
Taxonomic literature: Floras, Monographs, Icons, Library, Manuals, Index, Taxonomic keys.

Taxonomic tools and techniques: Herbarium, serological, Molecular technique, GIS and Mapping biodiversity.

Unit-IV

Taxonomic evidences: Morphology, Anatomy, Palynology, Embryology, Cytology, Phytochemistry and Genome analysis.


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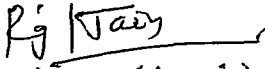

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Phylogeny of Angiosperms : Ancestors of Angiosperms, time and place of origin of Angiosperms; habit of Angiosperm, primitive living Angiosperms, interrelationship among the major groups of Angiosperms.


Suggested Readings :

1. Bhatnagar, SP. and Moitra, A. 1996. Gymnosperms. New Age International Pvt. Ltd., New Delhi.
2. Cole, A.J. 1969. Numerical Taxonomy, Academic Press, London
3. Davis, P.H. and Heywood, V.H. 1973, Principles of Angiosperms Taxonomy, Robert E. Kreiger Publ Co., New York.
4. Grant, V. 1971. Plant Speciation. Columbia University Press, New York.
5. Grant, W.E. 1984. Plant Biosystematics. Academic Press, London.
6. Harrison, H.J. 1971. New Concepts in Flowering Plant Taxonomy. Rieman Educational Book Ltd., London.
7. Heslop-Harrison, J. 1967. Plant Taxonomy, English Language Book Soc. & Edward Arnold Pub. Ltd. UK.
8. Heywood, V.H. and Moore, D.M. 1984. Current Concepts in Plant Taxonomy. Academic Press, London.
9. Jones, AD. and Wilbins, AD. 1971. Variations and Adaptations in Plant Species. Hiemand & Co. Educational Books Ltd. London
10. Jones, S.B, Jr. and Luchsinger, AH. 1986. Plant Systematics (2nd edition). McGraw-Hill Book Co., New York.
11. Nordenstam, S., El Gazaly, G, and Kassas, M. 2000, Plant Systematics for 21st Century. Portland Press Ltd., London.
12. Radford. A.H. 1986. Fundamentals of Plant Systematics. Harper & Row Publications, USA.
13. Singh, M. 1978, Embryology of Gymnosperms, Encyclopaedia of Plant Anatomy X. Gebruder Borntraeger, Berlin.
14. Solbrig, O.T. 1970. Principles and Methods of Plant Biosystematics. The MacMillan Co—collier-MacMillan Ltd. London.
15. Solbrig. O.T. and Solbrig, D.J. 1979. Population Biology and Evolution. Addison-Wesley Publishing Co. Ind USA.
16. Stebbings. G.L. 1974. Flowering Plant-Evolution Above Species Level. Edward Arnold Ltd. London.
17. Stace, C.A. 1989. Plant Taxonomy and Biosystematics (2nd edition) Edward Arnold Ltd. London.
18. Takhtajan. A.L. 1997. Diversity and Classification of Flowering Plants. Columbia University Press, New York.
19. Woodland. D.W. 1991. Contemporary Plant Systematics. Prentice Hall. New Jersey.

Suggested Laboratory Exercises :


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Gymnosperms

1. Comparative study of the anatomy of vegetative and reproductive parts of Cycas, Ginkgo; Cedrus, Abies; Picea, Cupressus, Araucaria, Cryptomeria, Taxodium; Podocarpus, Agathis, Texas, Ephedra and Gnetum.
2. Study of important fossil gymnosperms from prepared slides and specimens.

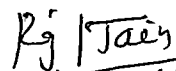
Angiosperms

3. Description of a specimen from representative, locally available families.


List of Locally Available Families :

(1) Ranunculaceae, (2) Cappariaceae, (3) Portulacaceae, (4) Caryophyllaceae, (5) Malvaceae, (6) Tiliaceae, (7) Sterculiaceae, (8) Zygophyllaceae, (9) Rhamnaceae, (10) Sapindaceae, (11) Leguminosae, (12) Combretaceae, (13) Myrtaceae, (14) Cucurbitaceae, (15) Umbelliferae-Apiaceae, (16) Rubiaceae, (17) Asteraceae, (18) Primulaceae, (19) Plumbaginaceae, (20) Asclepiadaceae, (21) Convolvulaceae, (22) Solanaceae, (23) Boraginaceae, (24) Polemoniaceae, (25) Acanthaceae, (26) Pedaliaceae, (27) Martyniaceae, (28) Bignoniaceae, (29) Libiatae, (30) Nyctaginaceae, (31) Polygonaceae, (32) Chenopodiaceae, (33) Amaranthaceae, (34) Aizoaceae, (35) Mollugmaceae, (36) Euphorbiaceae, (37) Commelinaceae, and (38) Cyperaceae.

4. Description of species based on various specimens to study intraspecific variation : a collective exercise.
5. Description of various species of a genus, location of key characters and preparation of keys at generic level.
6. Location of key characters and use of keys at family level.
7. Field trips within and around the campus, compilation of field notes and preparation of herbarium sheets of such plants, wild or cultivated as are abundant.
8. Training in using floras and herbaria for identification of specimens described in the class.
9. Demonstration of the utility of secondary metabolites in the taxonomy of some appropriate genera.
10. Comparison of different species of a genus and different genera of a family to calculate similarity coefficients and preparation of dendrograms.


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Paper-V : Plant Physiology and Metabolism

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Water relation of plants : Unique physicochemical properties of water, chemical potential, water potential, apparent free space, bulk movement of water, Soil Plant Atmosphere Continuum (SPAC) stomatal regulation of transpiration, signal transduction in guard cell.

Membrane Transport : Passive - non-mediated transport and Nernst equation, Passive-mediated transport, ATP-driven active transport, Uniport, Symport, Antiport Ion channels.

Amino acids, Proteins and Enzymes : Nod factor, root nodulation and nitrogen fixation, structure of amino acids, stereo-isomers. Amphoteric properties, synthesis of amino acids by reductive amination, GS-GOGAT system and transamination.

Structure of proteins : Primary, secondary, tertiary, quaternary and domain structure, reverse turn and Ramchandran Plot, protein stability : electrostatic forces, hydrogen bonding, disulfide bonding and hydrophobic interaction.

Enzymes : Structure and properties, substrate specificity, classification and mechanism of enzyme action.

Unit-II

Carbohydrates : Classification, structure and function of monosaccharides, Polysaccharides and glycoproteins including starch, cellulose and pectins.

Photosynthesis : Photosynthetic pigments, absorption and transformation of radiant energy, photo-oxidation, four complexes of thylakoid membranes : photosystem I, cytochrome *b-f* complex, photosystem II and coupling factors, photolysis of water and O₂ evolution, non-cyclic and cyclic transportation of electrons, Water, water cycle, proton

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gradient and photophosphorylation, Calvin cycle regulation of RUBISCO activity. control of Calvin cycle, C₄ pathway and its adaptive significance. CAM pathway, differences between C₃ and C₄ plants. glycolate pathway and photorespiration chlororespiration and CO₂ concentrating mechanism in micro-organ. ism.

Unit-III

Respiration : Anaerobic and aerobic respiration, amphibolic nature of TCA cycle, pentose phosphate pathway, glyoxylate path. way, oxidative phosphdrylation. gluconeogenesis, high energy com. pounds : their synthesis and utilisation.

Fat metabolism : Synthesis of long chain fatty acids, lipid biosynthesis, and oxidation

Secondary metabolites : Biosynthesis and function of secondary metabolites with special reference to tannins, alkaloids and ster-oids.

Unit-IV

Plant growth regulators : Auxins - chemical nature, bioassay, physiological effects and mode of action.

Gibberellins - chemical nature, bioassay, physiological effects and mode of action.

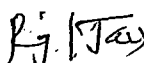
Cytokinins-chemical nature, bioassay, physiological effects and mode of action.

Abscisic acid - chemical nature, bioassay, physiological effects and mode of action.

Physiology of flowering : Photoperiodism and vernalization.

Suggested Readings :

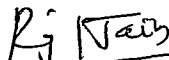
1. Buchanan, B.B., Gruissem, W. and Lones, R.L. 2000. Biochemistry and Molecular Biology of Plants, American Society of Plant Physiologists, Maryland, USA.
2. Dennis, D.T., Turpin, D.H., Lefebvre, D.D. and Layzell, D.B. (Eds) 1997. Plant Metabolism (second edition). Longman Essex, England.
3. Galston, A.W. 1989. Life Processes in Plants. Scientific American Library, Springer-Verlag, New York, USA.
4. Hooykaas, P.J.J., Hall M.A. and Libbenga, K.R. (eds) 1990. Biochemistry and Molecular Biology of Plant Hormones, Elsevier. Amsterdam. The Netherlands.
5. Hopkins, W.G. 1995. Introduction to Plant Physiology. John Wiley & Sons. Inc., New York, USA.
6. Lodish, H., Berk. A., Zipursky, S.L., Matsudaira P., Baltimore, D. and Darnell, J. 2000. Molecular Cell Biology (fourth edition). W.M. Freeman and Company, New York, USA.
7. Moore, T.C. 1989. Biochemistry and Physiology of Plant Hormones. (second edition). Springer-Verlag, New York, USA.


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8. Nobel, P.S. 1999. Physiochemical and Environmental Plant Physiology (second edition), Academic Press, San Diego, USA.
9. Salisbury, F.B. and Ross, C.W. 1992. Plant Physiology (4th edition). Wadsworth Publishing Co., California, USA.
10. Singhal, G.S. Renger, G., Sopory, S.K., Irrgang, K.D. and Govindjle 1999. Concepts in Photobiology: Photosynthesis and Photomorphogenesis. Narosa Publishing House, New Delhi.
11. Taiz, I., and Zeiger, E, 1998. Plant Physiology (2nd edition). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
12. Thomas, B. and Vince-Prue, D. (1997) Photoperiodism in Plants (second edition). Academic Press, San Diego. USA.
13. Westhoff, P. (1998) Molecular Plant Development from Gene to Plant, Oxford University Press, Oxford, UK.

Suggested Laboratory Exercises :

1. Effect of time and enzyme concentration on the rate of reaction of enzyme (e.g. acid phosphatase nitrate reductase).
2. Effect of substrate concentration on activity of any enzyme and determination of its K_m value.
3. Demonstration of the substrate inducibility of the enzyme nitrate reductase.
4. Extraction of chloroplast pigments from leaves and preparation of the absorption spectrum of chlorophylls and carotenoids.
5. To determine the chlorophyll a. chlorophyll b. ratio in C_3 and C_4 plants.
6. Isolation of intact chloroplasts and estimation of chloroplast proteins by spot protein assay.
7. to demonstrate photophosphorylation in intact chloroplasts, resolve the phosphoproteins by SDS-PAGE and perform autoradiography.
8. Extraction of seed proteins depending upon the solubility
9. Determination of succinate dehydrogenase activity, its kinetics and sensitivity to inhibitors.
10. Desalting of proteins by gel filtration chromatography employing Sephadex
11. Preparation of the standard curve of protein (BSA) and estimation of the protein content in extracts of plant material by Lowry's or Bradford's method.
12. Fractionation of proteins using gel filtration chromatography by Sephadex G100 or Sephadex G200.
13. SDS-PAGE for soluble proteins extracted from the given plant materials and comparison of their profile by staining with Coomassie Brilliant Blue or silver nitrate.


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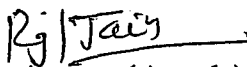
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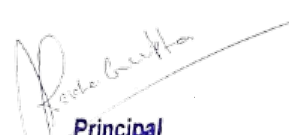

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14. Separation of isozymes of esterases, peroxidases by native polyacrylamide gel electrophoresis.
15. Radioisotope methodology, autoradiography, instrumentation (GM count and Scintillation counter) and principles involved.
16. Principles of colorimetry, spectrophotometry and fluorimetry.

Suggested Readings (for laboratory exercise)

1. bajracharya, D. 1999. Experiments in Plant Physiology : A Laboratory Manual, Narosa Publishing House, New Delhi.
2. Cooper, T.G. 1977. Tools in Biochemistry. John Willey, New York, USA.
3. Copeland, R.A. 1996. Enzymes : A Practical introduction to Structure, Mechanism and Data Analysis. VCH Publishers, New York.
4. Dennison, C. 1999. A Guide to Protein Isolation. Kluwer Academic Publishers, Dordrecht, The Netherlands.
5. Devi, P. 2000. Principles and Methods of Plant Molecular Biology. Biochemistry and Genetics. Agrobios, Jodhpur, India.
6. Dryer, K.L. and Lata, G.F. 1989. Experimental Biochemistry. Oxford University Press, New York.
7. Haines B.D. (Ed) 1998. Gel Electrophoresis of Proteins : Practical Approach, 3rd edition PAS, Oxford University Press. Oxford, UK.
8. Harborne, T.C. 1981. Phytochemical Methods : A Guide to Modern Techniques of Plant Analysis. Chapman & Hall, London.
9. Moore, TC. 1974. Research Experiences in Plant Physiology: A Laboratory Manual, Springer-Verlag, Berlin.
10. Ninfa, AJ. and Ballou, D.P. 1998 Fundamental Laboratory Approaches for Biochemistry and Biotechnology. Fitzgerald Science Press, Inc. Maryland, USA.
11. Piummer, D.T. 1998. An Introduction to Practical Biochemistry. Tata McGraw-Hill-Publishing Co. Ltd, New Delhi.
12. Scott, R.P.W. 1995. Techniques and Practice of Chromatography. Marcel Dchker, Inc. New York.
13. Wilson, K. and Goulding, K.H. (Eds), 1986. A Biologists Guide to Principles and Techniques of Practical Biochemistry. Edward Arnold, London, UK.
14. Wilson, K. and Walker, J. 1994. Practical Biochemistry : Principles and Techniques. 4th edition, Cambridge University Press Cambridge, UK.


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Paper-VI : Microbiology and Plant Pathology

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit - I

Microbiology

1. **Important landmarks in the history of microbiology archaeobacteria and eubacteria** : General account, ultrastructure, nutrition and reproduction, biology and economic importance, cyanobacteria-salient features and biological importance.

2. **Viruses** : Classification, characteristics and ultrastructure of virus, isolation and purification of viruses, chemical nature, replication, transmission of viruses, cyanophages, economic importance.

3. **Phytoplasma** : General characteristics and role in causing plant diseases.

Unit-II

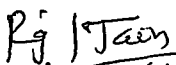
4. Scope and application of microbes in agriculture, industry, food, pollution and biological control of pests.

5. General account of immunity, allergy, properties of antigens and antibodies. Antibody structure and function, affinity and anti-body specificity. Monoclonal antibodies and their uses. Serology, types of vaccine. Preliminary account of Biofilms, biochips, biosensors and biosurfactants.


Unit-III

Plant Pathology

6. **History and scope of plant pathology** : General account of diseases caused by plant pathogens. Pathogen attack and defense mechanisms Physical, physiological, biochemical and molecular aspects.


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Plant disease management : Chemical, biological, IPM Systems. development of transgenics, biopesticides, Diagnosis of plant diseases, Preliminary account of application of Biotechnology in plant pathology.

Unit-IV

Symptomology, identification and control of following plant diseases.

Fungal diseases : Wheat (Rust, Smut), Bajra (ergot and smut).

Paddy (Paddy blast), Cotton (Wilt), Grapes (Downy mildew and powdery mildew).

Bacterial disease : Wheat (Tundu), Citrus canker.

Viral disease : Tobacco mosaic, Bhindi yellow mosaic.

Phytoplasma disease : Witch's broom of Papaya

Nematode disease : Root-knot of vegetables.

Suggested Readings

1. Alexopoulos, C.J., Minis, CW. and Blackwel, M. 1996. Introductory Mycology. John Wiley & Sons Inc.
2. Agrios, G.N. 1997. Plant Pathology. Academic Press, London.
3. Albajes, R., Gullino, M.L., Van Lenteren, J.C. and Elad, Y 2000. Integrated Pest and Disease Management in Greenhouse Crops. Kluwer Academic Publishers.
4. Bridge, R, Moore, D.R. & Scott, RR. 1998. Information Technology. Plant Pathology and Biodiversity. CAB International. U.K.
5. Clifton, A. 1958. Introduction to Bacteria. McGraw Hill Book Co. New York.
6. Mandahar, C.I. 1978. Introduction to plant viruses. Chand & Co. Ltd. Delhi.
7. Mehrotra R.S. Plant Pathology. Tata McGraw Hill.
8. Rangaswamy, G. & Mahadevan, A. 1999. Diseases of crop plants in India (4th edition) Prentice Hall of India, Pvt. New Delhi.
9. Horsfall, J.G. & A.L. Dimond. Plant Pathology Vols. I, 2 & 3. Academic press. New York. London.
10. Trivedi, P.C. 1998. Nematode Diseases in Plants. CBS Publisher & Distributor. New Delhi.

Suggested laboratory Exercises (Microbiology)

1. Calibration of microscope : determination of dimensions of microorganisms (suggested model organisms: yeast, lactobacilli, cyanobacteria).
2. Cultivation media for autotrophic and heterotrophic microorganisms (cleaning of glasswares, mineral media, complex media, solid media. sterilization) (based on topic 3).
3. Isolation of microorganisms, streaking on agar plates/pour plate method. isolation of clones, preservation (based on topics 2 and 3).

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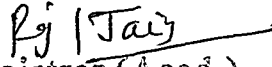
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4. Determination of growth of a microorganism (model organism : *Escherichia coli*, effects of nutrients, e.g. glucose, fructose, sucrose, principle of colorimetry/spectrocolorimeter) (based on topic 3).
5. Determination of microbial population size (suggested model organism yeast, use of haemocytometer, serial dilution technique, relationship between dilution and cell count, determination of standard error, reliability in cell counts) (based on topic 3).
6. Preparation of Winogradsky column using pond bottom mud. observations on temporal sequence of appearance of microbes (visual appearance, microscopic observations) (based on topic 7).
7. Observation on virus infected plants (symptoms) (based on topic 5).
8. Fermentation by yeast (inverted tube method, use of different substrates, e.g. glucose, fructose, cane sugar. starch) (based on topic 8).

Plant Pathology :

Diseases as per theory syllabus.


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Skeleton Paper
M.Sc. (Previous) Group-I Practical Examination
Time : 6 Hours **M.M. : 150**

Q. No.	Questions	Marks alloted
1.	(a) Perform the given molecular biology exercise.	15
	(b) Perform the given exercise of cell biology/ molecular biology.	15
2.	(a) Perform the given exercise of Genetics/Mitosis/ Meiosis	15
	(b) Perform the given exercise of Cytogenetics/ Polytene chromosome	15
3.	(i) Identify two algae from the given mixture 'A'. Draw labelled diagrams. Comment upon their significant characters and systematic.	7
	(ii) Make a suitable preparation of material 'B' so as show reproductive parts of the fungus.	7
	(iii) Make a suitable preparation of material 'C' and Draw well labelled diagrams. Identify with giving reasons.	8
	(iv) Make a suitable preparation of vegetative/ reproductive parts of the material 'D'. Draw labelled sketches. Write features of special interest and identify giving reasons.	8
4.	Identify the spots critically (6X3)	18

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5. Botanical field excursion report	5
6. Sessional marks	22
7. Viva-voce	15

Skeleton Paper

M.Sc. (Previous) Group-II Practical Examination

Time : 6 Hours

M.M. : 150

Q.No.	Questions	Marks allotted
1.	(a) Describe the material in semitechnical language. Assign it to the relevant family with reasons. Draw floral diagram.	9
	(b) Prepare an artificial key of the given plant materials (A B & C).	6
	(c) Make a suitable preparation of material 'D' (vegetative part only). Draw labelled diagram. Identify it giving reasons. Also give features of special interest. if any.	10
	(d) Make a suitable preparation of given material 'E' (reproductive part only) Draw labelled diagram. Identify it giving reasons.	6
2.	Perform the physiology experiments as assigned to you. Describe the methodology and record your observations. Exercise 'a'	20
	Exercise 'b'	10
3.	(i) Perform the microbiological exercise given to you. Draw suitable diagram describe methodology and record your observations.	10
	(ii) Prepare a suitable slide of the given microbiological exercise. Draw diagram, describe methodology and record your results.	7
	(iii) Prepare a suitable slide of the given material 'G' for histological study. Draw labelled diagram. Identify the pathogen giving reasons.	12
4.	Spots 6X3	18
5.	Herbarium	5
6.	Sessional Marks	22
7.	Viva voce	15

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M.Sc. Final

- Paper-VII : Plant Morphology, Developmental Anatomy & Reproduction Biology**
Paper-VIII : Plant Ecology
Paper-IX : Plant Resource Utilization: and Conservation
Paper-X : Biotechnology and Genetic Engineering of Plants and Microbes
Paper-XI(a) : Advanced Plant Pathology-I
Paper-XII(a) : Advanced Plant Pathology-II
Paper-XI(b) : Seed Science and Technology-I
Paper-XII(b) : Seed Science and Technology-II
Paper-XI(c) : Ecosystem Ecology
Paper-XII(c) : Environmental Biology
Paper-XI(d) : Advanced Plant Physiology-I
Paper-XII(d) : Advanced Plant Physiology-II
Paper-XI(e) : Advanced Morphology and Morphogenesis-I
Paper-XII(e) : Advanced Morphology and Morphogenesis-II
Paper-XI(f) : Biosystematics of Angiosperms-I
Paper-XI(f) : Biosystematics of Angiosperms-II
Paper-XI(g) : Biotechnology-I
Paper-XII(g) : Biotechnology-II

Paper-VII: Plant Morphology, Developmental Anatomy & Reproduction Biology

Scheme of Examination

Max. Marks 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Introduction : Unique features of plant development; differences between animal and plant development.

Seed germination and seedling growth : Metabolism of proteins and mobilization of food reserves; tropisms during seed germination and seedling growth; hormonal control of seedling growth; gene expression; use of mutants in understanding seedling development.

Shoot development : Organization of the shoot apical meristem (SAM); cytological and molecular analysis of SAM; control of cell division and cell to cell communication; primary and secondary tissue differentiation, control of tissue differentiation, especially xylem and

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phloem; secretory ducts and laticifers; wood development in relation to environmental factors.

Unit-II

Leaf growth and differentiation : Inception, phyllotaxy; control of leaf form (leaf meristem and other factors), differentiation of epidermis (with special reference to stomata and trichomes) and mesophyll, Kranz anatomy, leaf traces and leaf gaps, transfer cells.

Root development : Organization of root apical meristem (RAM), vascular tissue differentiation, lateral roots, root hairs, root-microbe interactions.

Seed Coat development: External and Internal morphology of seed, seed appendages, ontogeny of seed coat in various families, mature structure, spermoderm patterns.

Unit-III

Reproduction : Vegetative options and sexual reproduction, flower development, genetics of floral organ differentiation, homeotic mutants in Arabidopsis and Antirrhinum.

Male gametophyte : Structure of anthers; microsporogenesis, role of tapetum; pollen development and gene expression; male sterility; sperm dimorphism and hybrid seed production; pollen germination, pollen tube growth and guidance; pollen storage; pollen allergy; pollen embryos.

Female gametophyte : Ovule development; megasporogenesis; organization of the embryo sac; structure of the embryo sac cells.

Pollination, pollen-pistil interaction and fertilization: pollination mechanisms and vectors, structure of the pistil, pollen-stigma interactions, sporophytic and gametophytic self-incompatibility (cytological, biochemical and molecular aspects); double fertilization; in vitro fertilization.

Unit-IV

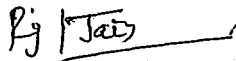
Seed development and fruit growth: Endosperm development, embryogenesis, cell lineages during late embryo development, storage proteins of endosperm and embryo.

Polyembryony, apomixis; embryo culture, dynamics of fruit growth; biochemistry and molecular biology of fruit maturation.


Latent life - dormancy: Importance and types of dormancy; seed dormancy; overcoming seed dormancy; bud dormancy.

Senescence and programmed cell death (PCD): Basic concepts, types of cell death, PCD in the life cycle of plants, metabolic changes associated with senescence and its regulation; influence of hormones and environmental factors on senescence.

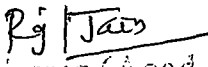
Suggested Readings



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1. Bewley J.D. and Black, M. 1994. Seeds : Physiology of Development and Germination Plenum Press. New York.
2. Burgess, J. 1985. An Introduction to Plant Cell Development. Cambridge University Press, Cambridge.
3. Fahh, A. 1982. Plant Anatomy. (3rd edition). Pergamon Press, Oxford.
4. Raven, P.H. Evert, R.F. and Eichhom, S. 1992. Biology of Plants (5th edition). Worth, New York.
5. Salisbury, F.B. and Ross, C.W. 1992. Plant Physiology (4th edition). Wadsworth Publishing, Belmont, California.
6. Steeves, T.A. and Sussex, I.M., 1989. Patterns in Plant Development (2nd edition). Cambridge University Press, Cambridge.
7. Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
8. Fosker. D.E. 1994. Plant Growth and Development. A Molecular Approach. Academic Press, San Diego.
9. Howell, S.H. 1998. Molecular Genetics of Plant Development. Cambridge University Press, Cambridge.
10. Leins, P., Tucker, S.C. and Endress, P.K. 1988. Aspects of. Floral Development. J. Cramer, Germany.
11. Lyndon, R.F. 1990. Plant Development. The Cellular Basis, Unwin Hyman, London.
12. Murphy, T.M. and Thompson, W.F., 1988. Molecular Plant Development. Prentice Hall, New Jersey.
13. Proctor, M. and Yeo. P. 1973. The Pollination of Flowers. William Collins Sons, London.
14. Raghavan, V. 1997. Molecular Embryology of Flowering Plants. Cambridge University Press, Cambridge.
15. Raghavan, V. 1999. Developmental Biology of Flowering Plants. Springer-Verlag, New York.
16. Sdgely, M. and Griffin, A.R. 1989. Sexual Reproduction to Tree Crops. Academic Press, London.
17. Shivanna, K.R. and Sawhney, V.K. (eds.) 1997. Pollen Biotechnology for Crop Production and Improvement. Cambridge University Press, Cambridge.
18. Shivanna, K.R. and Rangaswamy, N.S. 1992. Pollen Biology : A Laboratory Manual. Springer-Verlag. Berlin.
19. Shivanna, K.R. and John, B.M. 1985. The Angiosperm Pollen : Structure and Function. Wiley Eastern Ltd., New York.



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20. The Plant Cell. Special Issue on Reproductive Biology of Plants. Vol. 5(10) 1993. The American Society of Plant Physiologists, Rockville, Maryland, USA.

Suggested Laboratory/Field Exercises

1. Study of living shoot apices by distichous using aquatic plants such as *Tabernaemontana*, *albizia*.
2. Study of cytohistological zonation in the shoot apical meristem (SAM) in sectioned and double-stained permanent slides of a suitable plant. Examination of shoot apices in a mono cotyledon in both T.S. and L.S. to show the origin and arrangement of leaf primordia.
3. Study of alternate and distichous, alternate and superposed, opposite and superposed; opposite and decussate leaf arrangement. Examination of rosette plants (*Launaea*, *Mollugo*, *Raphanus*, *Hyoscyamus* etc.) and induction of bolting under natural conditions as well as by GA treatment.
4. Microscopic examination of vertical sections of leaves such as Cannabis, tobacco, Nerium, maize and wheat to understand the internal structure of leaf tissues and trichomes, glands etc. Also study the C3 and C4 leaf anatomy of plants.
5. Study of epidermal peels of leaves such as *Coccinia*, *Tradescantia*, to study the development and final structure of stomata and prepare stomatal index.
6. Study of types of stomata in plants belonging to different families.
7. Study of whole roots in monocots and dicots.
8. Examination of L.S. of root from a permanent preparation to understand the organization of root apical meristem and its derivatives, (use maize, aerial roots of *banyan* etc.)
9. Study of lateral root development.
10. Study of leguminous roots with different types of nodules.
11. Study of primary and secondary tissue differentiation in roots and shoots.
12. Study of seed coat types-*Pisum*, *Cucurbita*, Wheat.
13. Study of vascular tissues by clearing technique.
14. Study of microsporogenesis and gametogenesis in sections of anthers at different ages.
15. Examination of modes of anther dehiscence and collection of pollen grains for microscopic examination (maize, grasses, *Cannabis sativa*, *Crotolaria*, *Tradescantia*, *Brassica*, *Petunia*, *Solanum melongena*, etc.)
16. Study of wall layer anther.
17. Tests for pollen viability using stains and in vitro germination.


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18. Pollen germination using hanging drop and sitting drop cultures, suspension culture and surface culture.
19. Estimating percentage and average pollen tube length in vitro.
20. Study of ovules in cleared preparations, study of monosporic, bisporic and tetrasporic types of embryo sac development thorough examination of permanent, stained serial sections.
21. Field study of several types of flowers with different pollination mechanisms.
22. Emasculation, bagging and hand pollination to study pollen germination.
23. Study of nuclear and cellular endosperm through dissections and staining.
24. Isolation of zygotic globular, heart-shaped, torpedo stage and mature embryos from suitable seeds.
25. Polyembryony in citrus, jamun (*Syzygiumcumini*) etc. by dissections.
26. Biochemical Estimation (qualitative and quantitative) of metabolites of seeds.

Suggested Readings (for Laboratory Exercises)

1. Shivanna, K.R. and Rangaswamy, N.S. 1992. Pollen Biology: A Laboratory Manual, Springer-Verlag, Berlin-Heidelberg (and references therein).
2. Chopra, V.L. 2001. Plant Breeding : Theory and Practice. Oxford IBH Pvt. Ltd., New Delhi.
3. Chopra, V.L. 2001. Plant Breeding : Field Crops. Oxford IBH Pvt. Ltd., New Delhi.

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Paper-VIII : Plant Ecology

Scheme of Examination

Max. Marks 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Science of Ecology: Introduction of Ecology, Evolutionary ecology, ecological models;

Population: Characteristics of population, population size and exponential growth, limits of population growth, Competition and coexistence, intra-specific interactions, interspecific interactions, scramble and contest competition model, mutualism, commensalism and allelopathy, prey-predator interactions.

Vegetation organization : Concepts of community and continuum, community coefficients; interspecific associations, ordination, species diversity and pattern diversity in community, concept of habitat and ecotone, ecological niche.

Unit-II

Vegetation development : Temporal changes (cyclic and non-cyclic), mechanism of ecological succession (relay floristic and initial floristic composition), succession models (facilitation, tolerance and inhibition models), Changes in ecosystem properties during succession, concept of climax.

Ecosystem: Nature and size of ecosystem, components of an ecosystem (Producers, consumers and decomposers), Grazing (grassland) and Detritus food chain in freshwater ecosystems, food webs, ecological energetic: Solar radiation and energy intakes at the earth's surface, energy flow models, Productivity of various ecosystems of the world and global biogeochemical cycles of carbon and nitrogen.

Unit-III

Ecosystem stability : Concept (resistance and resilience), ecological perturbations (natural and anthropogenic) and their impact on plants and ecosystems, Restoration of degraded ecosystem, ecology of plant invasion, environmental impact assessment, ecosystem restoration.

Biomes and biodiversity : Major biomes of the world and impact of changing climate on biomes, Biodiversity: Concept and levels, role of biodiversity in ecosystem functions and stability, assessment (local, national and global), speciation and extinction,

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Biodiversity act of India and related international conventions, diversity indices, IUCN categories of threat, Hot spots.

Unit-IV

Conservation: Conservation (ex-situ and in situ) and management. International conservational organizations, sustainable development, nature resource management in changing environment, molecular ecology, genetic analysis of single and multiple population, conservation genetics.

Energy: Sources, Fossil fuels, Nuclear fuel, Solar energy, Fuel cells, Biomass, Hydropower, Wind Power, Geothermal, Tidal & Wave energy, Energy conservation.

Suggested Readings

1. Smith, R.L. 1996. Ecology and Field Biology, Harper Collins, New York.
2. Muller-Dombois, D. and Ellenberg, H. 1974. Aims and Methods of Vegetation Ecology, Wiley, New York.
3. Begon, M. Harper, J.L. and Townsend, C.R. 1996. Ecology, Blackwell Science, Cambridge, U.S.A.
4. Ludwig, J. and Reynolds, J.F. 1988. Statistical Ecology. John Wiley & Sons.
5. Odum, E.P. 1971. Fundamentals of Ecology, Saunders, Philadelphia.
6. Odum, E.P. 1983. Basic Ecology, Saunders, Philadelphia.
7. Barbour, M.G. Burk, J.H. and Pitts, W.D. 1987. Terrestrial Plant Ecology, Benjamin/Cummings Publication Company, California.
8. Kormondy, E.J., 1996. Concepts of ecology. Prentice-Hall of India Pvt. Ltd., New Delhi.
9. Chapman, J.L. and Reiss, M.J. 1988. Ecology; Principles and Applications. Cambridge University Press, Cambridge; U.K.
10. Molan, B. and Billharz, S. 1997. Sustainability Indicators. John Wiley & Sons, New York.
11. Heywood, V.H. and Watson, R.T. 1985. Global Biodiversity Assessment Cambridge University Press.
12. N.S. Subrahmanyam and A.V. S.S. Sambamurty. 2000. Ecology. Narosa Publishing House, Delhi.
13. S.K. Maitri. 2004. Handbook of Methods in Environmental Studies Vol. 1 & 2. ABD Publisher, Jaipur.
14. J. L. Chapman and M. J. Reiss. 1995. Ecology principles and applications. Cambridge University Press.
15. C. Faurie, C. Ferra, P. Medori and J. Devaux. 2001. Ecology Science & Practice. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

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16. G.T. Miller Jr. 2005. Essentials of Ecology. III edition, Thomas Brooks/Cole.

Suggested Laboratory Exercises

1. To determine minimum size and number of quadrats required for reliable estimate of biomass in grasslands.
2. To compare protected and unprotected grassland stands using community coefficients (similarity indices).
3. To estimate IVI of the species in a woodland using point centered quarter method.
4. To determine gross and net phytoplankton productivity by light and dark bottle method.
5. To determine soil moisture content, porosity and bulk density of soils collected from varying depths at different locations.
6. To determine the water holding capacity of soils collected from different locations.
7. To determine percent organic carbon and organic matter in the soils of crop and, grassland and forest.
8. To estimate the dissolved oxygen content in eutrophic and oligotrophic water samples by azide modification of Wrinkler's method.
9. To estimate chlorophyll content in SO, fumigated and unfumigated plants leaves.
10. To estimate rate of carbon dioxide evolution from different soils using soda lime or alkali absorption method.
11. To study environmental impact of a given developmental activity using checklist as & EIA method.


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Paper -IX : Plant Resource Utilization and Conservation
Scheme of Examination **Max. Marks 100**

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Plant Biodiversity : Concept, status in India, utilization and concerns.

Sustainable development : Basic Concepts. Origins of agriculture.

World centres of primary diversity of domesticated plants : plant introductions and secondary centres

Unit- II

Origin, evolution, botany cultivation and uses of: (i) Food, forage and fodder crops, (ii) fibre crops, (iii) medicinal and aromatic plants, and (iv) vegetable oil-yielding crops.

Unit-III

Important fire-wood and timber-yielding plants and non wood forest products (NWFPs) : such as bamboos, rattans, rawmaterials for paper making, gums, tannins, dyes, resins and fruits.

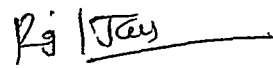
Green revolution : Benefits and adverse consequences. Innovations for meeting world food demands.

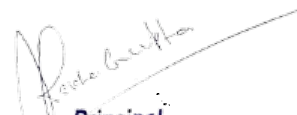
Plants used as avenue trees for shade, pollution control and aesthetics. Principals of conservations, extinctions, environmental status of plants based on International Union for Conservation of Nature.

Unit-IV

Strategies for conservation-in situ conservation : International efforts and Indian initiatives, protected areas in India- sanctuaries, national parks: biosphere reserves, wetlands, mangroves and coral reefs, conservation of Wild biodiversity.

Strategies for conservation-ex situ conservation: Principles and practices, botanical gardens, field gene banks, Seed banks, in vitro repositories, cryobanks, general account of the activities of Botanical Survey of India (BSI), National Bureau of Plant Genetic Resources (NBPGR), Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR), and the Department of Biotechnology (DBT) for conservation, non-formal conservation efforts.


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Suggested Readings

1. Anonymous 1997. National Gene Bank : Indian Heritage on Plant Genetic Resources (Booklet). National Bureau of Plant Genetic Resources, New Delhi.
2. Arora, R.K. and Nayar, E.R. 1984. Wild Relatives of Crop Plants in India. NBPGR Science Monograph No. 7.
3. Baker, H.G. 1978. Plants and Civilization (3rd ed). C.A. Wadsworth, Belmont.
4. Bole, P.V. and Vaghani, Y. 1986. Field Guide to Common Indian Trees. Oxford University Press, Mumbai.
5. Chandel, K.P.S., Shukla, G. and Sharma, N. 1996. Biodiversity in Medicinal and Aromatic Plants in India: Conservation and Utilization: National Bureau of Plant Genetic Resources, New Delhi.
6. Chrispeels, M.J. and Sadava, D. 1977. Plants, Food and People. W.H. Freeman and Co., San Francisco.
7. Cristi, B. R. (ed.) 1999. CRC Handbook of Plant Sciences and Agriculture. Vol. I. In-situ conservation. CRC Press, Boca Raton, Florida, USA.
8. Conway, G. 1999. The Doubly Green Revolution: Food for All in the 21st Century. Penguin Books.
9. Conway, G. and Barbier, E. 1990. After the Green Revolution. Earthscan Press, London.
10. Conway, G. and Barbier, E. 1994. Plant. Genes and Agriculture. Jones and Bartlett Publishers; Boston.
11. Council of Scientific and Industrial Research 1986. The Useful Plants of India. Publications and Information. Directorate, CSIR, New Delhi.
12. Council of Scientific and Industrial Research (1948-1976). The Wealth of India. A Dictionary of Indian Raw Materials and Industrial Products. New Delhi. Raw Materials I-XII, Revised Vol. I-III(1985-1992)Supplement(2000).
13. Cronquist, A. 1981 An Integrated System of Classification of Flowering Plants. Columbia University Press, New York, USA.
14. Directory of Indian Wetlands, 1993. WWF INDIA, New Delhi and AWB, Kuala Lumpur.
15. Falk, D.A., Olwel, M. and Millan C. 1996. Restoring Diversity, Island Press, Columbia, USA.
16. FAO/IBPGR 1989. Technical Guidelines for the Safe Movement of Germplasm. FAO/IBPGR, Rome.

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17. Frankel, O.H., Brown, A.H.D. and Burden, J.J. 1995. The Conservation of Plant Diversity. Cambridge University Press, Cambridge, U.K.
18. Gadgil, M. and Guha, R. 1996. Ecology and Equity: Use and Abuse of Nature in Contemporary India. Penguin, New Delhi.
19. Gaston, K.J. (Ed.) Biodiversity: a Biology of Numbers and Differences. Blackwell Science Ltd., Oxford, U.K.
20. Heywood, V. (Ed). 1995: Global Biodiversity Assessment. United Nations Environment Programme. Cambridge University Press, Cambridge. U.K.
21. Heywood, V.H, and Wyse Jackn, P.S. (Eds) 1991. Tropical Botanical Gardens. Their Role in Conservation and Development. Academic Press, San Diego.
22. Kocchar, S.L. 1998. Economic Botany of the Tropics, 2nd edition. Macmillian India Ltd., Delhi.
23. Kothari. A. 1997. Understanding Biodiversity: Life Sustainability and Equity. Orient Longman.
24. Kohli, R. Arya. K.S. Singh, P.H. and Dhillon, U.S. 1994. Tree Directory of Chandigarh. Lovdale Educational, New Delhi.
25. Nair, M.N.B. et al. (Eds.) 1988. Sustainable Management of Non-wood Forest Products. Faculty of Forestry, University Putra Malaysia. 43004 PM Serdang, Selangor, Malaysia.
26. Paroda, R.S. and Arora, R.K. 1991. Plant Genetic Resources Conservation and Management. IPGRI (Publication) South Asia Office, C/o NBPGR. Pusa Campus, New Delhi.
27. Pimentel, D. and Hall, C.W. (Eds.) 1989. Food and Natural Resources. Academic Press, London, New York.
28. Pinstrup-Anderson, P: et al. 1999. World Food Prospects : Critical Issues for the Early 21st Century. International Food Policy Research Institute. Washington, D.C., USA.
29. Plant Wealth of India 1997. Special Issue of Proceedings Indian National Science Academy B-63.
30. Plucknett, D.L. Smith, N.J.H., William, J.T. and Murti Annishetty, N. 1987. Gene Banks and Worlds Food. Princeton University Press, Princeton, New Jersey, USA.
31. Rodgrs, N.A. and Panwar, H.S. 1988. Planning a Wildlife Protected Area Network in India. Vol. I. The Report. Wildlife Institute of India, Dehradun.
32. Sahni, K.C. 2000. The Book of Indian Trees. 2nd edition. Oxford University Press, Mumbai.
33. Schery, R.W. 1972. Plants for Man. 2nd ed. Englewood Cliffs, New Jersey. Prentice Hall.

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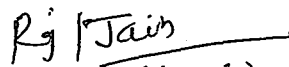
34. Sharma, O.P. 1996. Hill's Economic Botany (Late Dr. A.F. Hill, adapted by O.P. Sharma). Tata McGraw Hill Co. Ltd., New Delhi.
35. Swaminathan, M.S. and Kocchar, S.L. (Eds.) 1989. Plants and Society. Macmillan Publication Ltd., London.
36. Thakur, R.S. Puri, H.S. and Husain, A. 1989. Major Medicinal Plants of India. Central Institute of Medicinal and Anomastic Plants, CSIR, Lucknow.
37. Thomas, P, 2000. Trees: Their National History. Cambridge University Press, Cambridge.
38. Wanger, H., Hikino, H. and Farnswarth, N. 1989. Economic and Medicinal Plant Research. Vols. 1-3. Academic Press, London.
39. Water, K.S. and Gillett., H.J. 1998. 1997 IUCN Red List of Threatened Plants. IUCN, the World Conservation Union. IUCN, Gland. Switzerland. And Cambridge, U.K.


Suggested Laboratory Exercises

The Practical course is divided into three units : (1) Laboratory work, (2) Field survey and (3) Scientific visits.

Laboratory Work

1. **Food crops** : Wheat, rice, maize, chickpea (Bengali gram), potato, tapioca, sweet potato, sugarcane. Morphology, anatomy, microchemical tests for stored food materials.
2. **Forage/fodder crops** : Study of any five important crops of the locality (for example fodder sorghum, bajra, berseem, clove, guar bean, gram, Ficus sp.)
3. **Plant fibers**:
 - a. Textile fibres : cotton, jute, linen, sunn hemp, Cannabis.
 - b. Cordage fibres: coir
 - c. Fibres for stuffing : silk, cotton, or kapok
 Morphology, anatomy, microscopic study of whole fibres using appropriate staining procedures.
4. **Medicinal and aromatic plants** : Depending on the geographical location college/university select five. medicinal and aromatic plants each from a garden crop field (or from the wild only if they are abundantly available).
Papaver somniferum, Atropa belladonna, Catharanthus roseus, Adhatodaceylanica (Syn A. vasica), Allium sativum, Rauvoffia serpentina, Withaniasomnifera, Phyllanthus amarus, (P. fraternus), Andrographis paniculata, Aloe barbadens, Mentha arvensis, Rosa sp., Pogostemoncablin, Origanum vulgare, Vetiveriazizanioides, Jasminum grandiflorum, Cymbopogon sp., Pandanus odoratissimus.


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Study of live or herbarium specimens or other visual materials to become familiar with these resources.

5. Vegetable oils : Mustard, groundnut, soyabean, coconut, sunflower, castor, Morphology, microscopic structure of the oil-yielding tissues, tests for oil and iodine number.
6. Gums, resins, tannins, dyes : Perform simple tests for gums and resins. Prepare a water extract of vegetable tannins (*Acacia*, *Terminalia*, mangroves, tea. *Cassia spp.*, myrobalans) and dyes (turmeric, *Bixa orellana*, indigo, *Butea monosperma*, *Lawsoniainermis*) and perform tests to understand their chemical nature.

Field Survey

1. Firewood and timber yielding plants and NWF's:

- a. Prepare a short list of 10 most important sources of firewood and timber in your locality. Give their local names, scientific names, and families to which they belong. Mention their properties.
- b. Prepare an inventory of the bamboos and rattans of your area giving their scientific and local names and their various uses with appropriate illustrations.
- c. A survey of a part of the town or city should be carried out by the entire class in batches. Individual students will select one avenue road and locate the trees planted on a graph paper. They will identify the trees, mention their size, canopy shape, blossoming and fruiting period and their status (healthy, diseased, infested, mutilated, misused or dying) and report whether or not the conditions in which they are surviving are satisfactory. The individual reports will be combined to prepare a larger map of the area, which can be used for subsequent monitoring either by the next batch of students/ teachers / local communities/ NGOs/or civic authorities. The purpose of exercise in item C above is to make the students aware of the kinds of trees and value in urban ecosystems and ecological services.


Scientific Visits*

The students should be taken to one of the following:

- (i). A protected area (biosphere reserve, national park, or a sanctuary)
- (ii). A wet land
- (iii). A mangrove
- (iv). National Bureau of Plant Genetic Resources, New Delhi-110012 or one of its field stations.

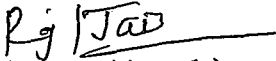

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- (v). Head Quarters of the Botanical Survey of India or one of its Regional Circles.
- (vi). A CSIR Laboratory doing research on plants and their utilization.
- (vii). An ICAR Research Institute or a field station dealing with one major crop or crops.
- (viii). A recognized botanical garden or a museum (such as those at the Forest Research Institute, Dehradun; National Botanical Research Institute, Lucknow; Tropical Botanical Garden and Research Institute, Trivandrum), which has collection of plant products.

Note : The students are expected to prepare a brief illustrated narrative of the Field Survey and Scientific Visits. After evaluation, the grades awarded to the students by the teachers should be added to the final assessment of the practical examination


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**Paper-X : Biotechnology and Genetic Engineering of
Plants and Microbes**

Schemes of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Biotechnology : Basic concepts, principles and scope.

Plant Cell and tissue culture : General introduction, history scope, concept of cellular differentiation, totipotency.

Organogenesis and adventive embryogenesis: Fundamental aspects of morphogenesis: somatic embryogenesis and androgenesis mechanisms, techniques, and utility.

Unit-II

Somatic hybridization: Protoplast isolation, Fusion and culture, hybrid selection and regeneration, possibilities, achievements and limitations of protoplasts research.

Applications of plant tissue culture : Clonal propagation, artificial seed, production of hybrids and somaclones, production secondary metabolites/natural products, cryopreservation and germplasm storage.

Recombinant DNA technology: Gene cloning principles and techniques, construction of genomic/cDNA libraries, choice of vectors, DNA synthesis and sequencing, polymerase chain reaction, DNA finger printing.

Unit-III

Genetic engineering of plants: Aims strategies for development of transgenics (with suitable examples), Agrobacterium-the natural genetic engineer, T-DNA and transposon mediated gene tagging, chloroplast transformation and its utility, intellectual property rights, possible ecological risks and ethical concerns.

Microbial genetic manipulation : Bacterial transformation, selection of recombinants and transformants, genetic improvement of industrial microbes and nitrogen fixers, fermentation technology.

Unit-IV

Genomics and proteomics : Genetic and physical mapping of genes, molecular markers for introgression of useful traits, artificial

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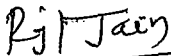
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chromosomes, high throughput sequencing, genome projects, bioinformatics, functional genomics, microarrays, protein profiling and its significance.

Bioactive Compounds : Alkaloid, antioxidants, flavonoid, proteins and terpenoids.

Suggested Readings:

1. Bhojwani, S.S. and Razdan, M.K. 1996. Plant Tissue Culture : Theory and Practice (a revised edition). Elsevier Science Publishers, New York, USA.
2. Bhojwani, S.S. 1990. Plant Tissue Culture: Applications and Limitations: Elsevier Science Publishers, New York, USA.
3. Brown, T.A. 1999. Genomes. John Wiley & Sons (Asia) Pvt. Ltd. Singapore.
4. Callow, J.A., Ford-Lloyd, B.V. and Newbury, HJ. 1997. Biotechnology and Plant Genetic Resources : Conservation and Use. CAB International, Oxon, UK.
5. Chrispeels, M.J. and Sadava, D.E. 1994, Plants. Genes and Agriculture. Jones & Bartlett Publishers, Boston, USA.
6. Collins, H.A. and Edwards, S. 1998. Plant Cell Culture. Bios Scientific Publishers, Oxford, UK.
7. Glazer, A.N. and Nikaido, H. 1995. Microbial Biotechnology. W.H. Freeman & Company, New York, USA.
8. Gustafson, J.P. 2000. Genomes. Kluwer Academic Plenum Publishers, New York, USA.
9. Henry, R.J. 1997. Practical Applications of Plant Molecular Biology. Chapman & Hall, London, UK.
10. Jain, S.M., Sopory, S.K. and Veilleux, R.E. 1996. in vitro Haploid Production in Higher Plants, Vols. 1-5, Fundamental Aspects and Methods, Kluwer Academic Publishers, Dordrecht. The Netherlands.
11. Jolles, OÖ. and Jomvall, H. (eds.) 2000. Proteomics in Functional Genomics. Birkhauser Verlag, Basel, Switzerland.
12. Kartha, K.K. 1985. Cryopreservation of Plant Cells and Organs. CRC Press, Boca Raton, Florida, USA.
13. Old, R.W. and Primrose. S.B. 1989. Principles of gene Manipulation. Blackwell Scientific Publications, Oxford, UK.
14. Primrose, S.B. 1995. Principles of genome analysis. Blackwell Science Ltd., Oxford, UK.
15. Raghavan, V. 1986. Embryogenesis in Angiosperms : A Developmental and Experimental Study. Cambridge University Press, New York, USA.


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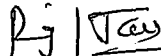
16. Raghavan, V. 1997. Molecular Biology of Flowering Plants. Cambridge University Press, New York, USA.
17. Shantharam, S. and Montgomery, J.F. 1999. Biotechnology, Biosafety and Biodiversity. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
18. Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue Culture. Kluwer Academic Publishers. The Netherlands.


Suggested Laboratory Exercises

1. Growth characteristics of E. coli using plating and turbidimetric methods.
2. Isolation of plasmid from E. coli by alkaline Lysis method and its quantitation spectrophotometrically.
3. Restriction digestion of the plasmid and estimation of the size of various DNA fragments.
4. Cloning of a DNA fragment in a plasmid vector, transformation of the given bacterial population and selection of recombinants.
5. Demonstration of DNA sequencing by Sanger's di-deoxy method.
6. Isolation of protoplasts from various plant tissues and testing their viability.
7. Effect of physical (e.g. temperature) and chemical (e.g. osmoticum) factors on protoplast yield.
8. Demonstration of protoplast fusion employing PEG.
9. Organogenesis and somatic embryogenesis using appropriate explants and preparation of artificial seed.
10. Demonstration of androgenesis in Datura.
11. Electroporation of protoplasts and checking of transient expression of the reporter gene.
12. Co-cultivation of the plant material (e.g. leaf discs) with Agrobacterium and study GUS activity histochemically.

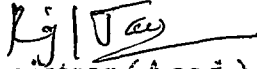
Suggested Readings (for laboratory exercises)

1. Butenko, R.G. 2000. Plant Cell Culture, University Press of Pacific.
2. Collin, H. A. and Edwards, S. 1998. Plant Cell Culture. Bios Scientific Publishers, Oxford, UK.
3. Dixon, R.A. (Ed.) 1987. Plant Cell Culture.: Practical Approach. IRL Press, Oxford.
4. Gelvin, S.B. and Schilperoort, R.A. (eds.) 1994. Plant Molecular Biology Manual. 2nd edition, Kluwer Academic Publishers, Dordrecht. The Netherlands.
5. George, E.P. 1993. Plant Propagation by Tissue Culture. Part 1. The Technology, 2nd edition. Exegetics Ltd., Edington, UK.



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7. George, E.F. 1993. Plant Propagation by Tissue Culture. Part 2. In Practice 2nd edition. Exegetics Ltd., Edington, UK.
8. Glick, B.R. and Thompson, J.E. 1993. Methods in Plant Molecular- Biology and Biotechnology. CRC Press, Boca Raton, Florida,
9. Glover, D.M. and Hames, B.D. (Eds.) 1995. DNA Cloning : A Practical Approach; Core Techniques, 2nd edition. PAS, IRL Press at Oxford University Press, Oxford.
10. Hackett, P.B., Fuchs, J.A. and Meesing, J.W. 1988. An Introduction to Recombinant DNA Techniques: Basic Experiments in Gene Manipulation. The Benjamin/Cummings Publishing Co., Inc. Memo Park, California.
11. Hall, R.D. (Ed.), 1999. Plant Cell Culture Protocols. Humana Press, Inc., New Jersey, USA.
12. Shaw, C.H (Ed.) 1988. Plant Molecular Biology: A Practical Approach. IRL Press, Oxford.
13. Smith, R.H. 2000. Plant Tissue Culture: Techniques and Experiments. Academic Press, New York.


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Paper-XI (a) : Advanced Plant Pathology - I

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of several short objective type of questions such as multiple choice type, one line answer type, one word type and fill in the blanks type.

Unit-I

Plant Pathology : History & Scope. Nature, Origin & Evolution of parasitism. Biotic and abiotic pathogens. Pathogen factors in disease development. Penetration, infection and pathogenesis. Physiological specialisation in phytopathogenic microbes.

Unit-II

Host factors in disease development: Inoculum potential; Phenomena of resistance and susceptibility. Protective and defence mechanisms in plants; Phytoalexins. Breeding for disease resistant plants.

Environmental factors in disease development: Epiphytotic and plant disease forecasting.

Unit-III

IPM, Application of biotechnology and information technology to pest management.

Molecular Plant Pathology : Molecular diagnosis, identification of genes and specific molecules in disease development; molecular manipulation of resistance. Non-parasitic diseases and control measures.

Unit-IV

Principles of plant protection, Physical, chemical and biological control of plant diseases,

Classification and anatomy of galls : Some insect induced plant galls of Rajasthan, mechanism and physiology of insect galls.

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Paper-XII (a) : Advanced Plant Pathology - II

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of several short objective type of questions such as multiple choice type, one line answer type, one word type and fill in the blanks type.

Unit-I

Fungal diseases : Symptomatology, disease identification and control of flag smut of wheat, covered smut of barley, blast of paddy, smut of Jowar, Red rot of sugarcane, flax rust.

Unit-II

Bacteria : Classification and nomenclature of bacterial plant pathogens. Methods of identification of bacterial pathogens (morphology, physiology, serology and pathogenicity).

Bacterial diseases : Brown rot of potato, blight of rice, soft rot of vegetables, crown gall disease, angular leaf spot of cotton.

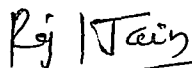
Unit-III

Virus, viroid and phytoplasma disease : Symptomatology and transmission of viral diseases; Potato virus X & Y, Tomato ring mosaic, bunchy top of banana; viroids and important viroid diseases. Phytoplasma General account; Sesame phyllody, Spike disease of sandal.


Unit-IV

Nematology : Brief history, classification and identification of plant pathogenic nematodes. Morphology and anatomy of nematodes. Methods used in Nematology.

Control of plant parasitic nematodes. Nematode Disease : Molya disease of wheat & barley / ear cockle of wheat, root-knot disease.


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Paper-XI (b) : Seed Science and Technology - I

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

History of seed testing and its importance to agriculture, aims of seed testing, Seed definition and its types, Sampling of seeds, purity analysis (physical and genetical), seed moisture content, germination test, rapid test of viability and evaluation, various method of seed separation, cleaning and drying and Seed Processing Plant and its process.

Unit-II

Gross architecture of seed structure of angiosperms, Identification and structure of seeds of important crop plants with special reference to Rajasthan (Wheat, pearl millet, mustard, gram pea) and Identification of designated objectionable weeds at seed level. Physiology of seed germination; seed and seedling vigour.


Unit-III

Principals of seed production, seed production in self and cross pollinated crops; hybrid seed production. Production of Foundation and certified seeds; synthetic seeds, terminator seed technology, Seed storage methods, principals for safe seed storage, effects of storage, mycotoxins-major groups, detection and detoxification, Deterioration of seeds in storage by microorganisms, insects and rodents; control of seed deterioration.


Unit-IV

Seed certification standards and quarantine regulations. International cooperation. International Seed Testing Association – rules and recommendations, Certificates, other seed certificates; Indian Seed Act and recent amendments, National and Regional Seed Corporation of India- their organisation, aims and functions. National and International Co-operation in Seed Pathology. Sanitary and phytosanitary (SPS) agreements of WTO.

List of suggested Practical exercises:


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1. Structure of seeds of some crop plants (wheat, pearl millet, mustard, gram, and pea).
2. Preparation of inventory of designated objectionable weeds at seed level and identification.
3. Identification of seed coat cracking.
4. Study of physical purity of seed sample.
5. Study of seed germination, seedling abnormality and seedling index.
6. Determination of moisture content of seeds.
7. TZ test for seed viability
8. Assay of enzymes in crop seeds.
9. Preparation of synthetic seeds.
10. Localization of starch, protein, lipids, tannins, phenols and lignin in seed sections.
11. Isolation and identification of storage fungi.
12. Preparation of phytosanitary certificate etc. of seed lot.

Suggested Readings:

1. Agarwal, V.K. and Sinclair, J.B. (1987). Principles of Seed-pathology, II edition CRC Lewis Publishers, Boca Raton, New York, London.
2. Anonymous (1985, 2014). International rules for seed testing. International Seed Testing Association (ISTA).
<http://www.seedtest.org/en/home.html>;
<http://www.seedtest.org/en/international-rules-content---1--1083.html>
3. Bewley, J.D. and Black, M. 1983. Physiology and Biochemistry of Seeds in Relation to Germination. Volume I & II. Springer-Verlag, Berlin, Heidelberg, New York.
4. Copeland, L.O. 1976. Principles of Seed Sci. and Technology Minnesota, USA.
5. Khare, D. and Bhale, M.S. (2014). Seed Technology. Scientific Publishers (India), Jodhpur. Revised 2nd Ed.
6. Kulkarni, G.N. 2002. Principles of Seed Technology. Kalyani Publishers, New Delhi.
7. Neergaard, P. 1986. Seed- A horse of hunger or a source of life. Revised print of Danish Government Institute of Seed Pathology for Developing Countries. Hellerup, Denmark.


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8. Winton, A. L. and Winton, K. B. (1932-1939): The structure and composition of foods. Vol I and II: John Wiley and Sons, Inc., New York.

Paper-XII (b) : Seed Science and Technology - II

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Introduction and importance of seed pathology in modern agriculture. History of seed pathology. Various method for testing seed-borne fungi, bacteria and viruses (Dry seed examination, Seed washing test, incubation methods, cultural, biochemical, serological, nucleic acid base test).

Unit-II

Mechanism of seed infection and its types, environment influencing seed infection, infected/contaminated part of seed, morphology and anatomy of seeds in relation to invasion, location of inoculum of the pathogen in seed- seed coat and pericarp, endosperm and perisperm and embryo.

Seed-borne diseases of some important crops with particular reference to the state of Rajasthan and India. Typical case of infection by fungi (wheat smuts and bunts, sesame-charcoal rot; bacteria (Brassicac- black rot, cluster bean- bacterial blight); viruses (Tomato mosaic virus, pea seed borne mosaic virus,) and nematodes (Wheat ear cockle, rice white tip).

Unit-III

Seed-borne inoculum, inoculum density and seed-borne inoculum in relation to plant infection, epiphytotics due to seed-borne inoculum, disease forecast based on infected seed samples: tolerance limits of seed borne pathogens.

Transmission of seed borne disease: Systematic and non-systematic disease transmission, types of disease transmission, mode of establishment and course of disease from seed to seedling and plant, factors affecting seed transmission.

Unit-IV

Management of seed-borne disease, principles of control, seed treatments (physical, chemical and biological), mechanism of action

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of seed treatment, major seed treatments for important seed pathogens and their methods of application.

List of suggested Practical exercises:


1. Dry seed examination of seed lots
2. Isolation and Identification of seed borne mycoflora by standard blotter method.
3. Preparation of culture media (PDA and NA)
4. Plating seed on PDA/NA for identification of food borne fungi and bacteria
5. Other methods of plating e.g. deep freezing; 2.4D- blotter method.
6. Water agar test tube seedling symptom test.
7. Study of any seed borne nematode disease.
8. Detection of bacterial and viral pathogens in seeds.
9. LOPAT tests for detection of seed borne pathogens.
10. Nucleic acid based detection of seed borne pathogens.
11. Histopathology of infected seed samples.
12. Physical control of seed borne pathogens.
13. Antibiotic/fungicidal assay against seed borne pathogens.
14. Biological control of seed borne pathogens.
15. Field visits: Crop fields, FCI, NSC, Seed testing labs, quarantine station (e.g. NBPGR) etc.

Suggested readings:

1. Agarwal, P. C., Mortensen, C. N. and Mathur, S. B. (1989). Seed-borne diseases and seed health testing of rice. Technical Bull, No.3, Danish government institute of seed Pathology for Developing Countries (DGISP), Copenhagen and CAB International Mycological Institute, (CMI) UK.
2. Agarwal, V.K. 200. Seed Health. International Book Distributing Company. Charbahgh, Lucknow, India.
3. Agarwal, V.K. and Sinclair, J.B. (1987). Principles of Seed-pathology, II edition CRC Lewis Publishers, Boca Raton, New York, London.
4. Agrawal, R.L. 1980. Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Agrios, G.N. 2005. Plant Pathology. Academic Press, London., New York
6. Anonymous (1985, 2014). International rules for seed testing. International Seed Testing Association (ISTA). <http://www.seedtest.org/en/home.html>;

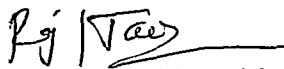
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<http://www.seedtest.org/en/international-rules-content---1--1083.html>

7. Clifton, A. 1958. Introduction to the Bacteria. McGraw Hill Book Co., New York.
8. Khare, D. and Bhale, M.S. (2014). Seed Technology. Scientific Publishers (India), Jodhpur, 2nd edition.
9. Mandahar, C.L. 1978. Introduction to plant viruses. S. Chand & Co. Ltd., Delhi.
10. Mathur, S.B. and Cunfer, B.M. 1993. Seed-borne diseases and Seed Health Testing of Wheat. Danish Government Institute of Seed Pathology for Developing Countries. Hellerup, Denmark.
11. Neergaard, P. (1977). Seed Pathology. Vol. 1 & II. The Mac Millan Press Ltd., London.
12. Rangaswamy, G. & Mahadevan, A. (1999). Diseases of crop plants in India (4th edition). Prentice Hill of India Pvt. Ltd. New Delhi
13. Richardson. M. J. (1990). An Annotated list of seed borne diseases 4thedn. Proc. Int Seed Test Assoc. Zurich, Switzerland.
14. Schaad, N. W. (1980). Laboratory guide for identification of plant pathogenic bacteria (edt.). Bacteriology Committee of American Phytopathological society, St. Paul, Minnesota.
15. Schaad, N. W. (1980) Laboratory guide for identification of plant pathogenic bacteria (2nd eds.). APS Press (The American Phytopathological society) St. Paul, Minnesota.
16. Singh, D. and Mathur, S. B. (2004). Histopathology of seed-borne infections. CRC Press, Boca Raton, Landon, New York, Washington DC, pp 296.
17. Singh, K.G. and Manalo, P.L. 1986. Plant Quarantine and Phytosanitary Barriers in the asean. Asean Plant Quarantine centre and training institute, Malaysia.


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Paper-XI (c) : Ecosystem Ecology

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Grassland Ecosystems - Characteristics of grasslands, stratification, grasslands and grazing, grasslands and drought, grassland and animal life, Grasslands types with special reference to Prairie and Savannah, Indian grasslands.

Forest Ecosystems - Stratification of the forest, Forest types - Boreal, Temperate and Tropical forests, Forest animal life

Unit II

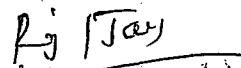
Freshwater Ecosystems -Classification of Freshwater Habitats, Lentic: Lakes & Ponds: Temperature and Oxygen stratification, Zonation based on light penetration, Flora and fauna, Productivity classes of lakes, Marshes and Swamps, Bogs Lotic: Springs, Streams and Rivers.

Marine and Estuarine Ecosystems - Characteristics of marine environment: Salinity, Temperature and pressure, Zonation and Stratification, Tides, Estuarine ecosystem: Types of Estuaries, Flora and fauna, Estuarine productivity, Coral reef ecosystem, Mangrove ecosystem

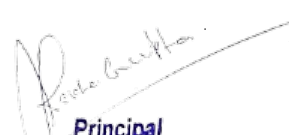
Unit III

Urban Ecosystem -Urban environment and Climatic conditions, additional physical complexes (modified surfaces including parking lots, roofs, and landscaping, buildings, transportation networks, infrastructure and public amenities), flora and fauna (human beings as largest macro consumer), Implications of urbanization: problems of air pollutants, drinking water supply, floods, waste disposal.

Rural ecosystems: Rural environment and climate, physical complexes (fields, agricultural implements and machines), Flora and


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fauna, Problems of discharge of chemical fertilizers, pesticides and drinking water. Management of waste, Principle; Social Forestry.

Unit III

Desert Ecosystem: Desert: Definition, classification (hot and cold), physiography, desert features, flora, fauna and water, formation, topography, distribution and characteristics of world deserts; **Thar desert:** Sand dunes: types, origin and morphology of sand dunes; Vegetation types and plant communities, biological production, conservation of flora and fauna, wild life, Succession in vegetation of western Rajasthan and coastal sand dunes, economic importance of desert plants (general economic plants, medicinal, famine food plants and crops);

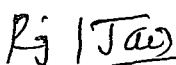
Saline Arid zones: Saline tracts of Rajasthan and plants of saline arid zones (Halophytes), Economic and social considerations in the management of salt affected soils, afforestation in salt affected soils, Importance of halophytes.

Suggested Readings


1. P. L. Jaiswal, A.M. Wadhvani and N.N. Chhabra (Eds.). 1983. Desertification and its Control. ICAR, New Delhi.
2. Smith, R.L. 1996. Ecology and Field Biology, Harper Collins, New York.
3. Subrahmanyam, N.S. and A.V.S.S. Sambamurty 2000. Ecology. Narosa Publishing House, New Delhi.
4. G. M. Masters and W. P. Ela. 2008. Introduction to environmental engineering and sciences. PHI Learning Private Limited, New Delhi.
5. W. P. Cunningham and M. A. Cunningham. 2003. Principles of Environmental Science: Inquiry and Applications. Tata Mcgraw-Hill Publishing Company Limited, New Delhi

Suggested Laboratory Exercises


1. Find out stomatal index of Xerophytes (*Nerium*, *Calotropis*, *Zizyphus*,) growing in your locality.
2. Study of trichomes of xerophytes (*Zizyphus*, *Lantana*, *Calotropis*, *Aerua*) growing in your locality.
3. Study spread of root system of a perennial species in the soil
4. Study ecological adaptations of halophytes in your nearby area.


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5. Seed Viability by T.T.C. method
6. Dormancy (seed coat & temperature) in seeds .
7. Soil moisture and temperature at different depths
8. Salinity of soil sample.
9. Study of Canopy and Basal Cover of trees in your study area
10. Estimate primary productivity of a water body by light and dark bottle method
11. Mean leaf area of 2 plant Species growing in your area by graph method
12. Relative humidity by hair hygrometer
13. Light intensity by lux meter


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Paper-XII (c) : Environmental Biology

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Air Pollution: Important Primary (CO, CO₂, Oxides of Sulphur & Nitrogen, H₂S, Chlorine, Particulates, Odour Producing compounds) & Secondary Air Pollutants (Smog, Acid rain, Primary Photochemical reaction, Formation of ozone and peroxyacetyl nitrate in air), Effects of air pollutants on Buildings & Monuments, Plants, man and animals; Biomonitoring, Air pollution control (particulates and gaseous pollutants), Green belt, Ozone depletion, mechanism of depletion, control strategies;

Unit-II

Water Pollution: Eutrophication – Process and CONTRL; Oil Pollution, Thermal Pollution, Heavy metal Pollution, Treatment, Disposal & Recycling of Wastewaters, drinking water standards, Minimum National Standards

Solid & Hazardous waste management & Resource Recovery: Solid wastes, Types, collection, Shrinking waste streams: 3Rs (Reduction, Recycle & Reuse), composting, energy from waste, demanufacturing; Methods of disposal: Landfill, Open dumps, Exporting waste; Hazardous waste: Definition, disposal and management.

Unit-III

Climatic Issues: Greenhouse gases (CO₂, CH₄, N₂O, CFCs: sources, trends and roles and consequence of greenhouse effects (CO₂ fertilization, global warming, sea level rise, Biodiversity erosion), Carbon sequestration, Applications of GIS and REMOTE Sensing technology in environmental studies, the future of planet earth.

Policies, Regulations & related issues: Water (Prevention and Control of Pollution) Act 1974; Air (Prevention and Control of

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Pollution) Act 1981; Environment (Protection) Act 1986, Wild Life Protection Act 1972, Forest (Conservation) Act 1980, Biodiversity Act 2002.

Unit-IV

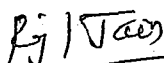
Environmental Concerns: Environmental auditing, Ecological footprints, Environment Impact Assessment, Bioindicator and biomarkers of environmental mhealth; Environmental economics, Ecopolitics and green policies; Ecolabel, Rain water harvesting, Orans, Indira Gandhi Canal and its ecological implications, water logging & salinity problems – The management alternatives.


Suggested Readings

1. Treshow, M. 1985. Air Pollution and Plant Life. Wiley Interscience.
2. Mason, C. I. 1991. Biology of Freshwater Pollution. Longman.
3. Hill, M. K. 1997. Understanding Environmental Pollution. Cambridge University Press.
4. Brij Gopal, P. S. Pathak and K. G. Saxena (Eds.). 1998. Ecology Today; An anthology of Contemporary Ecological Research. International Scientific Publications, New Delhi.
5. P. K. Goel. 1997. Water Pollution: Causes, Effects and Control. New Age international Ltd., Publishers, New Delhi.
6. R. K. Trivedy and P. K. Goel. 1998. An Introduction to Air Pollution. Technoscience Publications, Jaipur
7. I. P. Abrol and V. V. Dhruva Narayana (Editors) 1990. Technologies for Wasteland Development. ICAR, New Delhi.
8. G. M. Masters and W. P. Ela. 2008. Introduction to Environmental Engineering and Sciences. PHI Learning Private Limited, New Delhi.
9. W. P. Cunningham and M. A. Cunningham. 2003. Principles of Environmental Science; Inquiry and Applications. Tata Mcgraw-Hill Publishing Company Limited, New Delhi
10. S. K. Maiti, 2004. Handbook of Methods in Environmental Studies Vol. 1 & 2. ABD Publisher, Jaipur

Suggested Laboratory Exercises

1. To estimate pH, EC and Secchi Disc transparency for polluted and unpolluted water bodies.
2. To estimate Chemical Oxygen Demand of polluted water sample.


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3. To estimate Biological Oxygen Demand of polluted water sample.
4. To estimate inorganic phosphorus content in water samples collected from polluted and unpolluted water bodies.
5. To estimate Total hardness, calcium and magnesium content in water samples collected from polluted and unpolluted water bodies.
6. To estimate chloride content in water samples collected from polluted and unpolluted water bodies.
7. To estimate Total alkalinity in water samples collected from polluted and unpolluted water bodies.
8. To determine diversity indices (Shannon - Wiener, concentration of dominance, species richness, equitability and β - diversity) for polluted and unpolluted water bodies.
9. Chlorophyll content of plant species growing in polluted (along JLN Marg) and unpolluted habitat Botany Department).

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Paper-XI (d) : Advanced Plant Physiology - I

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Proteins and Enzymes : Techniques of protein purification, protein sequencing and proteomics, enzyme kinetics, Michaelis-Menten equation and significance of K_m value, negative and positive cooperativity, enzyme nomenclature and EC number, catalytic mechanisms; acid-base catalysis, covalent catalysis, metal ion catalysis, electrostatic catalysis, catalysis through proximity-orientation effect and catalysis through transition state bonding, Lysozyme as model enzyme for catalytic mechanism, regulation of enzyme activity; feedback and allosteric regulation, active sites, coenzymes, activators and inhibitors, isoenzymes, ribozymes and abzymes.

Unit-II

Nucleotides: Biosynthesis of ribonucleotides (purines and pyrimidines), formation of deoxyribonucleotides, salvage purines, nucleotide degradation.

Vitamins : Water and fat-soluble vitamins, biochemical/function of thiamine, riboflavin, nicotinic acid, pantothenic acid, pyridoxin, biotin, folic acid, vitamin B₁₂, ascorbic acid, vitamin A and vitamin D.

Unit-III

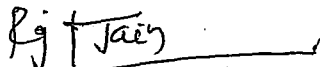
Secondary metabolites :

Coumarins and lignins : structure and synthesis.


Insecticides : (pyrethrins and rotenoids) distribution, chemistry and function.

Tannins : distribution synthesis and function.

Flavonoids and water-soluble pigments: synthesis and function.


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Unit-IV

Hallucinogens :distribution, chemistry and function.

Alkaloids : pyrrole, pyrrolidine, pyridine, polyacetyloquinoline, tropane and indole alkaloids - their distribution, synthesis and function.

Saponins and sapogenins: sterols, steroids, steroidal alkaloids – their distribution, synthesis and function.

Cardiac glycosides : their distribution, structure and function.

Paper-XII (d) : Advanced Plant Physiology - II

Schemes of Examination

Max. Mark : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Plant growth regulators : Natural and synthetic, biochemistry and physiological effects of brassinosteroids, jasmonic acid, salicylic acid, polyamines, morphactins and cyanogenic compounds.

Signal transduction in plants: Receptors and G-proteins, phospholipid signaling, role of cyclic nucleotides, calcium-calmodulin cascade, diversity of protein kinases and phosphatases, signal transduction mechanisms with special reference to: Gibberellin induced signal transduction, auxin induced signal and cytokinin induced signal transduction.

Unit-II

Stress physiology : Plant responses to biotic and abiotic stresses, mechanism of biotic and abiotic stress resistance, plant defense mechanisms against water stress, salinity stress, metal toxicity, freezing and heat stress and oxidative stress.

Unit-III

Photobiology - Photoreceptors, phytochrome : history, discovery, physiological properties, interaction between hormones and phytochrome, role of different phytochromes in plant development and flowering, mechanism of phytochrome signal transduction. Physiology of flowering photo-periodism and vernalisation.

Circadian rhythms in plants : nature of oscillator, rhythmic outputs, entrainments (inputs) and adaptive significance.

Unit-IV

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Tools and Techniques: Principles and application of spectrophotometry, Principles of chromatography, partition chromatography, thin layer chromatography, ion-exchange chromatography, gas-liquid chromatography, high performance liquid chromatography, gel filtration, electrophoresis, isoelectric focusing, immobilized pH gradient, ultracentrifugation (velocity and density gradient), ELISA and RIA.

Paper-XI (e) : Advanced Morphology and Morphogenesis-I
Schemes of Examination **Max. Mark : 100**

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Floral anatomy and its role in explaining the morphology of the Stamen and Carpel, Placentation: Inferior ovary, Taxonomic significance of floral anatomy. Anatomy of the seed and pericarp and their taxonomic significance.

Unit-II

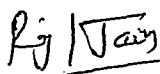
Anther-organizational relationship of anther tissues: ultrastructure aspects of microsporogenesis. Pollen-sporoderm pattern. Pollen analysis, pollen fertility and sterility, allergy due to pollen. Viability, storage and germination of pollen.

Unit-III


Embryosac - basic types and their inter-relationships. Ultrastructural aspects of embryosac development. Endosperm - Inter-relationship of the major types of endosperms, cytology and role in embryo development, Embryo-Major types, embryogenic laws. comparison of Soueges and Johansen's system: physiological factors controlling growth and differentiation of embryo;

Unit-IV

Apomixis - gynogenesis, androgenesis, agri-horticultural importance. Embryological features of the following families: Santalaceae, Loranthaceae, Podostemaceae, Cucurbitaceae, Scrophulariaceae, Acanthaceae, Orobanchaceae, Lentibulariaceae.


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Paper XII (e): Advanced Morphology and Morphogenesis-II
Scheme of Examination **Max. Marks : 100**

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Development and morphogenesis – shoot apex. the apical cell, meristem. the subcellular and biochemical structure of the meristem. The mechanism of primordium initiation, transition to flowering, growth and formation of organs. Experimental work on apical meristems. Meristem culture and virus free plant. Histochemical studies on apical meristems.

Unit-II

The phenomenon of morphogenesis - correlation. polarity, symmetry, differentiation. regeneration.

Morphogenetic factors - Physical, mechanical, chemical and genetic factors. Molecular basis of morphogenesis in plants with special reference to work done in *Arabidopsis*.

Unit-III

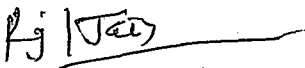
Somatic embryogenesis - Survey of somatic embryogenesis in angiosperms. direct somatic embryogenesis and embryogenesis from callus and protoplasts; cytology. physiology and genetics of somatic embryogenesis, nutritional factors, hormonal factors and embryo rescue in wide hybridization.

Micropropagation advances and synthetic seeds.


Cell Plating technique and isolation of mutant cell lines, auxotrophic mutants. Mechanisms involved in cell culture mutants.

Suspension culture and growth studies.

Unit-IV


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Microtechniques for plant cultures. Fixation (FAA and glutaraldehyde) and embedding in paraffin and GMA. equipment and histological procedures. *Transmission and scanning electron microscopy for plant protoplasts and cultured cells and tissues. Endosperm and ovary culture, control of fertilization, experimental work on embryology of parasitic plants. Role of plant tissue culture in crop improvement.

Paper XI (f) : Biosystematics of Angiosperms-I

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Aims, components and principles of taxonomy, Alpha and Omega taxonomy, documentation, scope, significance and relationship of experimental and orthodox taxonomy, Evolutionary taxonomic classification.

Unit-II

Botanical gardens and Arboreta. Information from plant geography, Indian plant geographical regions. Role of Herbaria in taxonomy, Taxonomic literature, Taxonomic resource information (Data analysis coding of characters, statistics).

Principles, rules, rank of plant nomenclature, ICBN - Principles and important rules, type method. Principle of priority and its limitation, Name of hybrids and cultivars, Concept of Biocode.

Unit-III

Biosystematics Procedures: Steps of biosystematics studies, Biosystematic categories - Palynology, Cytology, Embryology, Anatomy and Histochemistry.

Unit-IV

Numerical taxonomy - Principles, Concept, Operational taxonomic units (OTU), Data processing and taxonomic studies, Taxometric methods for study of Population variation and similarity - Coding, Cluster analysis, cladistics.

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Paper XII (f) : Biosystematics of Angiosperms-II

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Experimental taxonomy - Scope and significance. Experimental categories. Relationship in Experimental and orthodox taxonomy. Synthetic theory of evolution.

Unit-II

Concept of species, speciation, species classification, Concept of characters - analytic versus synthetic character, qualitative versus quantitative characters, good and bad characters, Taxonomic characters - Character weighing. Character variation its role in speciation and isolation.

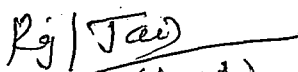
Unit-III

Concept of population, its significance, pattern of phenetic variability, Geographical variability, Transplant experiments. Genotype - environmental interaction, Plasticity. Variation - cause of variation in population. Range of tolerance and phenotypic plasticity, Ecotypes - origin and differentiation. Taxonomic significance of ecotypes.

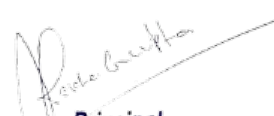
Unit-IV

Experimental taxonomy and hybridization. Role of hybridization in evolution. Stabilization of hybrids and amphidiploidy. introgression and segregation.

Method of analysis of hybrid complex, Introgressive hybridization. Taxonomic treatment of hybrid complex. Breeding


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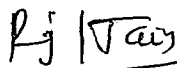
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barriers, epistasis Pleiotropy. Biochemical systematics - method and principles. Systematics markers, chemotaxonomy.

Suggested Readings:

1. Lawrence, G.H.M. 1951 Taxonomy of vascular plants. MacMillan New York.
2. Davis, PH. and Heywood, V.H. 1963. Principles of Angiosperm Taxonomy, Oliver and Boyd, London
3. Heywood, V.H. and Moore, D.H. 1984. Current Concepts in plant Taxonomy. Academic Press, London.
4. Radford, A.F. 1986. Fundamentals of Plant systematics. Harper and Row, New York.
5. Stace, C.A. 1989. Plant Taxonomy and Biosystematics, Edward Armc London.
6. Woodland, D.W. 1991. Contemporary Plant Systematics, Prentice Hall New Jersey.
7. Nordenstam, B., El-Gazaly, G. and Kassar, M., 2000. Plant Systematic for 21st Century, Portland Press Ltd, London,
8. Naik. V.N. 1984. Taxonomy of Angiosperms. Tata McGraw Hill, New, Delhi.
9. Singh. G. 1999. Plant systematics: Theory and Practice, Oxford & IBH Pvt. Ltd., New Delhi.
10. Sivarajan. V.V. 1991. [Reprinted 2001] Principles of Plant Taxonomy. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.


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Paper-XI (g) : Biotechnology-I

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

The concept of totipotency and history of development of plant tissue culture from Haberlandt to the present development of different PTC media and their nutritional components.

Plant tissue culture laboratory - facilities, operation and management, media preparation and handling; Sterile techniques.

Unit-II

Pathways of plant regeneration - proliferation of axillary buds, adventitious shoot bud proliferation, organogenesis and somatic embryogenesis from callus and suspension cultures.

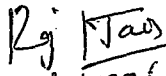
Somatic embryogenesis - Survey of somatic embryogenesis in angiosperms. Zygotic versus somatic embryogenesis in monocots and dicots. Conifer somatic embryogenesis.

Unit-III

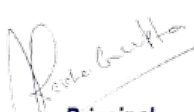
Pollen embryogenesis - Discovery of anther culture, survey of anther and pollen culture in dicots and monocots. Pathways of pollen embryogenesis. Cytology and of pollen embryogenesis. stages of pollen development. Haploids for breeding and selection of mutants.

Isolation and culture of protoplasts of grasses; review of the work done with special reference to rice, wheat and maize.

Propagation of ornamental plants by tissue culture. Application of tissue culture in forestry.


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Micropropagation advances and synthetic seeds. Use of ELISA methods to certify pathogen free plants.

Unit-IV

Quantification of tissue culture procedures - fresh and dry weight, culture density by cell count, packed cell volume, mitotic index.

Microtechniques for plant cultures - Fixation (FAA and glutaraldehyde) and embedding in paraffin and GMA, equipment and histological procedures. Transmission and scanning electron microscopy for plant protoplasts, cells and tissues.

Staining procedures for chromosome analysis.

Paper-XII (g) : Biotechnology-II

Scheme of Examination

Max. Marks : 100

Each paper will have 9 questions, out of which a student has to attempt 5 questions including the question No.1 which will be compulsory. The question No.1 will carry 20 marks and will be of short answer type questions with a limit of 20 words.

Unit-I

Transgenic plants - The concept and history of development of transgenesis in plants.

Agrobacterium - mediated transformation.

Unit-II

Direct DNA transfer into intact plant cells - microprojectile bombardment and chemical uptake of DNA by plant protoplasts.

Tools for genetic transformation - Transformation vectors, promoters, terminators, marker and reporter genes.

Unit-III

Regulation of heterologous gene expression - factors affecting gene expression, introns, plant transcriptional factors, gene silencing, antisense RNA.

Transgenic approaches to crop improvement - protection against biotic (virus, fungi, bacteria, nematode, insect, weed) and abiotic stress (salinity, drought, cold, metals). Nutritional quality improvement - golden rice and other developments. Extension of flower life, pigmentation and fragrance.

Unit-IV

Manufacture of valuable products - antigens, antibodies, edible vaccines, enzymes, proteins.

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Benefits and risks of producing transgenic - plants IPR and regulatory requirements, field testing and regulations to release transgenic plants in India.

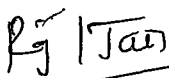
Skeleton Paper

**M.Sc. (Final) Special Paper Adv. Plant Pathology
Practical Examination**


Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	(a) Study the diseased plant material 'A' Provided; make histopathological investigations Draw labelled drawing and identify the pathogen giving reasons (b) Study and identify the mycoflora from the given material	10 5
2.	Give suitable drawings make a suitable preparation so as to study the given material 'C' identify giving reasons	10
3.	Study the external morphology, histopathology and development stages of given material 'D' Draw labelled diagrams. Identify the causal organisms.	10
4.	Calibrate your microscope with the help of micrometers and measure spores and determine the mean size.	10
5.	From given plant material isolate virus free plantlet through apical meristem culture. Briefly describe the procedure.	8


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6.	Stain the given bacterial sample and identify it as gram positive or negative. Write in brief the procedure adopted.	10
7.	Viva-Voce	10
8.	Spots (Four)	12
9.	Practical record	15

Skeleton Paper

M.Sc. (Final) Special Paper - Seed technology and Seed pathology Practical Examination

Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	Study the morphological and anatomical features of given seeds.	20
2.	Study the seed borne mycoflora of given samples	25
3.	Determine the location of pathogen in different components of given symptomatic seeds. Or Estimate the spore load in given seed sample.	10
4.	Examine the viability of seed lot. Or Study the transmission of pathogen in infected seedling or Examine the seed disorder in given seed lot. Or Examine the seed sample for physical purity.	10
5.	Spots 1-5	10
6.	Viva-Voce	10
7.	Practical record	15

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Skeleton Paper

**M.Sc. (Final) Practical Examination
Special Paper : Advance Ecology**

Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	Determine organic matter content of the given soil sample by Walkely and Black method. Or Determine the dissolved O ₂ in a given water body by Winkler iodometric method.	25
2.	Prepare glycerin mount of the given lant materials explaining their anatomical adaptations in relation to habitat. Or Study the various types of trichomes and their rolling mechanism to withstand during drought of given plant material.	25
3.	Determine the total hardness of the given water sample.	10
4.	Determine pH of the given soil sample by pH meter. Or Determine the conductivity of the given soil sample.	05
5.	Comment upon the spots (1-5)	10

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6.	Viva-Voce	10
7.	Practical record	15

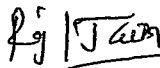
Skeleton Paper

**M.Sc. (Final) Practical Examination
Special Paper: Adv. Plant Physiology**


Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	(a) Perform the physiological exercise given to you and write the object, materials and methods, theory, observation, results and precautions. (b) Write the details of the principle involved in the given exercise	25 5
2.	(a) perform the physiological exercise given to you and write the object, material and methods, theory, observations, results and precautions. (b) Perform test(s) for secondary metabolite(s) in the given material.	25 5
3.	Comment upon Spots 1& 2	15
4.	Viva-Voce	15
5.	Practical record	10


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Skeleton Paper

M.Sc. (Final) Practical Examination Special Paper: Herbarium and Adv. Taxonomy

Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	Make a study of epidermal system of the material A,B and C from a taxonomic point of view and assign these to their respective types giving reason (any one). Study the seed-coat anatomy of material A,B and C by means of sections. Give labelled diagrams to bring out the features of systematic significance.	8
2.	Make Palynological study of one of the specimens A, B and C. draw labelled sketches and give the N.P.C. formula.	10
3.	Study the anatomy of one of the materials A, B and C and mention characters of systematic importance Or Study the floral anatomy by means of serial T.S., of one of the materials A, B and C. make a labelled sketch.	10
4.	Write a taxonomic description of any one of the twigs. A, B and C on the Flora Indian pattern.	20

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	Key out these to the level you can.	
5.	With the help of suitable preparation make detailed morphological studies of chromosomes in the given material D.	06
6.	Prepare a synonymy on the basis of herbarium sheets studied. Find out the basionym and mention the correct name with reasons.	07
7.	Comment upon the spots 1-6	12
8.	Viva-Voce	10
9.	Record with sessional work	17

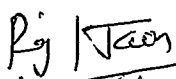
Skeleton Paper

**M.Sc. (Final) Practical Examination
Special Paper: Adv. Morphology of Angiosperms & Pl.
Morphogenesis**


Time : 4 hours

M.M. : 100

Q. No.	Questions	Marks Alloted
1.	Cut serial transverse sections of the wax embedded material provided and submit two well prepared slides. Write the procedure followed briefly.	13
2.	Study the seed coat and anatomy of the seed provided. Identify the seed and classify it according to Corner's/Martin/s system.	20
3.	Make an acetolysed preparation of the pollen grains from the material and describe the pollen morphology and identify the pollen types.	12
4.	Dissect out and mount at least two stages of the endosperm/embryo from the material provided, make suitable mounts and labelled diagrams.	10
5.	Count the cells in the given suspension culture using hemocytometer Or Plate the cells from the suspension culture using cell plating technique. Or	10


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	demonstrate the inoculation of the anthers explant on the culture medium.	
6.	Comment upon spots 1-5	10
7.	Viva-Voce	10
8.	Practical record	15

Skeleton Paper
M.Sc. (Final) Practical Examination
Papers: VII, VIII, IX & X

M.M. : 200

FIRST DAY (4 hours)

VII- Plant Morphology, Developmental Anatomy & Reproduction
Biology

IX- Plant Resources Utilization and Conservation

1. (a) Make suitable preparation of the given material. Draw labelled diagram, and study the anatomical features with special reference to its vascular structure. Discuss points of special interest.

16

(b) with the help of suitable preparation study the floral/seedcoat/epidermal/micro-sporangium wall structure of the material provided. Draw labelled diagram and comment upon its features.

16

2. (a) identify any two material from the given samples. Give economic importance with special reference to origin, cultivation, part used and processing, if any.

16

(b) mark the highest yield producing areas in the map provided to you.

15

3. Spots 1-4

12

M.Sc. (Final) Practical Examination
Papers: VII, VIII, IX & X

SECOND DAY (4 HRS.)

M.M. : 200

VIII- Plant Ecology.

X- Biotechnology and Genetic Engineering of plant and microbes.

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4. (a) Calculate the frequency/Density/Species Cover of the plant species in the plot allotted to you by Quadrat method and compare your results with Raunkier frequency diagram. 16
(b) To investigate the water content/air content/soil particles in given soil sample.

Or

Investigate the pH/chloride content/oxygen content of water sample given to you. 16

5. (a) perform biotechnological exercise given to you 16
(b) write details for the exercise given to you 15
6. spots 1-4 12
7. Records/sessional/project/herbarium 30
8. Viva-voce 20

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SYLLABUS

M.A./M.Sc. GEOGRAPHY


(Annual Scheme)

M.A./M.Sc. (Previous) Examination 2023

M.A./M.Sc. (Final) Examination 2024

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M.A./M. Sc. Geography (Annual Scheme)

(Regular/Non-Collegiate Candidates)

SCHEME OF EXAMINATION

Each Theory Paper	3 Hrs. Duration	100 Marks
Dissertation if offered in lieu of an elective paper		100 Marks
Practical		100 Marks

N.B. Non-Collegiate candidate are not eligible to offer dissertation as per provisions of O. 170-A.

1. The number of papers and the maximum marks for each paper/practical shall be shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in the theory part as well as in practical part (wherever prescribed) of a subject/paper separately. *Each theory paper will have a length of 4 hrs per week*

2. A candidate for passing at each of the Previous and the Final Examination shall be required to obtain:

(i) Atleast 36% marks in the aggregate of all the papers prescribed for the examination, and

(ii) Atleast 36% marks in practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure atleast 25% marks in each individual paper at the examination and also in the dissertation/survey report/field work, wherever prescribed, he shall be deemed to have failed at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination. No division will be awarded at the Previous and the Final Examination. Division shall be awarded at the end of the Final Examination on the combined marks obtained at the Previous and the Final Examinations taken together, as noted below:

First Division	60%	} of the aggregate marks taken together of the Previous and the Final Examination.
Second Division	48%	

All the rest will be declared to have passed the examination.

3. If a candidate clears any Paper(s) Practical(s)/Dissertation prescribed at the Previous and/or Final Examination after a continuous period of three years, then for the purpose of working out his division the minimum pass marks only viz. 25% (36% in the case of practical) shall be taken into account in respect of such Paper(s)/Practical(s)/Dissertation are cleared after the expiry of the aforesaid period of three years, provided that in case where a candidate requires more than 25% marks in order to reach the minimum aggregate as many marks in out of those actually secured by him will be taken into account as would enable him to make up the deficiency in the requisite minimum aggregate.

4. The Thesis/Dissertation/Survey Report/Field Work shall be type written and submitted in triplicate so as to reach the office of the Registrar atleast 3 weeks before the commencement of the theory examinations. Only such candidates shall be permitted to offer Dissertation/Field Work/Survey Report/Thesis (if provided in the

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scheme of examination) in lieu of a paper as have secured atleast 55% marks in the aggregate of all the papers prescribed for the previous examination in the case of annual scheme I and II semester examination taken together in the case of semester scheme irrespective of the number of papers in which a candidate actually appeared at the examination.

5. The Students are permitted to use simple calculator, Log Table & map stencils in the Examinations if needed.
6. Non-collegiate candidates both in previous and final year are required to attend a practical training camp of forty eight hours at the Department of Geography, University of Rajasthan, Jaipur on payment of fee fixed by the University from time to time. The candidate should contact the Head, Department of Geography, University of Rajasthan, Jaipur for practical caraps immediately after the filling the examination forms. Head, Department of Geography will issue a Certificate to each of the non-collegiate candidate for successful completion of the training camp. The candidate have to submit the Certificate at the time of practical examination.

M.A./M.SC. Geography

There will be four theory papers and a practical each in Previous and Final Examination. Each of the theory papers will be 100 marks. Each theory paper will be of three hours duration. Candidate will be required to pass both in theory and practicals separately.

PREVIOUS

- Paper-I Evolution of Geographical Thought
Paper-II Physical Basis of Geography
Paper-III Principles and Theory of Economic Geography
Paper-IV Any one of the following:
(a) Advanced Geography of Monsoon Asia
(b) Geography of Rural Development
(c) Comparative Geography of U.S.A. and Russia
(d) Geography of South Asian Countries (Bangladesh, Nepal, Pakistan, Srilanka)
(e) Advanced Regional Geography of West Europe.
(f) Man and Natural Environment.
(g) Quantitative Techniques in Geography.
Practicals

FINAL

- Paper-V Advanced Geography of India
Paper-VI Any one of the following:
(a) Population Geography
(b) Agricultural Geography (Elements & Applied)
(c) Industrial Geography

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- (d) Transport Geography
 (e) Geography of Settlements
 (f) Advanced Geomorphology
- Paper -VII Any one of the following:
 (a) Urban Geography
 (b) Geography of Crimes
 (c) Climatology and Oceanography
 (d) Applied Geography
 (e) Pedology
 (f) Medical-Geography
 (g) Fundamentals of Remote Sensing and Geographical Information System
- Paper -VIII Any one of the following:
 (a) Political Geography
 (b) Cultural Geography
 (c) Bio-Geography
 (d) Regional Planning and Development
 (e) Meteorology
 (f) Research Methodology
 (g) Geography of water resources, their management and utilization

Dissertation: In lieu of any elective paper of M.A. / M.Sc. Final.

Practical

Instructions for Geography Practical Examination (Both Regular and Non-collegiate)

1. The record work should have 50 sheets (1/6th of 20" x 30") and they should cover the total syllabus proportionately. The teacher should revise fresh exercises every time so that the student may not undertake tracing of old exercise. The work must be done in the class rooms and signed on the same date. This would discourage completing the whole work at the nick of the examination emphasis should be laid on ink; and color maps.
2. The Viva-voce Exam. be held to judge the real knowledge of the student and to examine the authenticity of the record work. The marking on the record work and its viva-voce be based on the original work of the candidate and not by merely producing the record work got done by any other agency. Marks be deducted for the syllabus not covered.
3. On an average about 20 students be examined in one batch in M.A. Previous. As far as possible practical exercise be set to judge the practical skill through the Practical exercise.
4. (a) The field Survey by instruments in M.Sc/M.A. Final be given 3 hours alongwith Viva-voce. Each students will have to do exercise on each instrument individually.
 (b) The practical examination in M.Sc./M.A. (Final) will be conducted in batches of not more then 20 students.
5. The paper for written test in M.A. Final be so set that the questions are not duplicated with field exercise.

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6. The External examiner be provided detailed syllabus and detailed instruction before the commencement of examination.

SYLLABUS

M.A./M.Sc. Previous

Paper- I Evolution of Geographical Thought.

Section A

Definition, scope, nature, purpose and philosophy of geography, fundamental concepts of geography; ancient Indian geography during Vedic and Puranic periods, ancient classical age: contributions of Greeks (Herodotus and Eratosthenese) and Romans (Strabo and Ptolemy); medieval geography: contributions of Al Biruni, Al Masudi, Idrisi, Ibn-Batutta, Ibn Khaldun, Geography during the period of Renaissance: contributions of Sebastian Munster, Philip Cluverius, Nathanael Carpenter, Varenius, Anton Friedrich Bushing, Immanuel Kant and Conrad Malte Brun.

Section B

Modern geography: geography in Germany-contributions of Humboldt and Ritter, Richthofen, Ratzel, Hettner and Schluter; geography as a chorological science, geography in France-Blache and Brunhes, geography in Anglo-American- Sauer and Schafer, geography as science of distribution and relationship, geography as chorological science, geography as science of landscape morphology, geography as spatial science and human ecology.

Section C

Dualism in geography: physical and human geography, systematic and regional geography, environmental determinism and possibilism, qualitative and quantitative, reductionism and holism; quantitative revolution; philosophical pluralism- empiricism, logical positivism, humanistic geography and structuralism. Approaches in geography, behavioural, radical, feminist, Post modern and critical geography; Indian geography: development, problems, perspectives and prospects.

Recommended Readings:

Adhikari, S. 2009. Fundamentals of Geographical Thought. Chaitanya Publishing House, Allahabad.

बंसल, सुरेश चन्द. 2008: भौगोलिक चिन्तन के मूल तत्व। मीनाक्षी प्रकाशन, मेरठ।

Dickenson, R. E. 1967. The Makers of Modern geography. Routledge & Kegan Paul Limited. London.

Dear, M.J. and Flusty, S. (ed.) 2002: The spaces of Post modernity: Readings in Human Geography, Blackwell Publishers Ltd, Oxford.

Dikshit, R. D. 2004. Geographical Thought. A Critical History of Ideas. Prentice-Hall of India, New Delhi. (in English and Hindi).

Iolt-Jensen, A. 1988. Geography: History and Concepts - A Student's Guide. Sage, Los Angeles (Fourth Edition).

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- जाट, सी. 2013: भौगोलिक चिन्तन का इतिहास। मलिक एण्ड कम्पनी, जयपुर।
- जैन, एस.एम. 2005: भौगोलिक चिन्तन एवं विधि तंत्र। साहित्य भवन पब्लिकेशन्स, आगरा।
- James, P.H.; All Possible Worlds 1972: A History of Geographical Ideas; Odyssey Press, 622 pages.
- Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford. 5th edition.
- कौशिक, एस.डी. 2005-06, भौगोलिक विचारधाराएँ एवं विधि तंत्र, रस्तोगी पब्लिकेशन्स, मेरठ, आठवां संस्करण (पुनर्मुद्रित)।
- मौर्य, एस.डी. 2007, भौगोलिक चिन्तन का इतिहास, प्रयाग पुस्तक भवन, इलाहाबाद।
- Majid. H. 2007. Evolution of Geographical Thought. Rawat Publications, Jaipur.
- Peet, Richard 1998: Modern Geographical Thought. Blackwell Publishers, USA.
- सक्सेना, एल.के. व तिवारी, ए.के. 2003, भौगोलिक चिन्तन। राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।

Paper- II: Physical Basis of Geography

Section A

Meaning, scope and development of physical geography, approaches and recent trends in physical geography, zoning of the earth's interior and thermal state, isostasy, endogenetic and exogenetic forces, mountain building theories (Kober, Jeffreys, Daly, Joly, Holmes) plate tectonics, denudation: erosion and weathering: types and processes, models of landscape evaluation: Davis and Penck.

Erosional and depositional landforms formed by running water, underground, wind, glacial-periglacial; process of desertification, models of slope development (Wood, Davis, Penck, King).

Section B

Atmosphere: composition and layers, air temperature, heat balance, adiabatic and non-adiabatic processes, stability and instability, evaporation, humidity and condensation, precipitation, world precipitation pattern.

Air pressure variations, pressure belts and planetary wind system; monsoon winds and local winds, air masses and fronts, secondary circulation: cyclones (Tropical and extra tropical) and anticyclones, world climatic classification: Koppen's and Thornthwaite's schemes.

Section C

Oceanic bottom relief, oceanic deposits, horizontal and vertical distribution of temperature and salinity, oceanic water currents, tides and tidal theories, atolls and coral islands, theories of coral reef formation, marine resources biotic, mineral and energy resources and their utilization.

Soils: genesis, classification and distribution, biodiversity loss and measures for conservation, biotic succession and major biotic regions of the world with special reference to ecological aspects of savannah and monsoon biomes.

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Recommended Readings:

- Chorley R.J. 1972: Spatial Analysis in Geomorphology. Methuen, London.
- Cooke, R.U. and Doornkamp, J.C. 1974: Geomorphology in Environmental Management-A introduction. Clarendon Press, Oxford.
- Dury, G.H. 1959: The Face of the Earth. Penguin Harmondsworth.
- Fairbridge, R.W. 1986: Encyclopedia of Geomorphology. Reinholdts, New York.
- Garner, H.F. 1974: The origin of landscape-A Synthesis of Geomorphology. Oxford University Press, London.
- Goudie, A. 1993: The Nature of the Environment. Oxford & Blackwell, London.
- जाट, बी.सी. 2013: भौतिक भूगोल। मलिक एण्ड कम्पनी, जयपुर।
- Ollier, C.D. 1979: Weathering. Longman, London.
- Pitty, A.F. 1971: Introduction to Geomorphology. Methuen, London.
- Sparks, B.W. 1960: Geomorphology. Longman, London.
- Sharma, H.S. (ed), 1980: Perspectives in Geomorphology. Concept, New Delhi.
- Skinner, B.J & Porter, S.C. 1995: The Dynamic Earth. John Wiley, New York.
- Stoddart, D.R. (ed) 1996: Process and Form in Geomorphology. Routledge, New York.
- Singh, S. 1998: Geomorphology. Prayag Publication, Allahabad.
- Thornbury, W.D 1960: Principles of Geomorphology. John Wiley, New York.
- Young, A. 1972: Slopes. Longmans, London.

Paper III: Principles and Theory of Economic Geography

Section A

Meaning and scope of economic geography, simple model of economy and spatial structure of economy, environmental relations of economy, classification of the economies of the world (primary, secondary and tertiary), theories, concepts and models of development-developed, developing and under developed economies, agricultural typology with special reference to subsistence agriculture, plantation agriculture, Mediterranean agriculture, mixed farming, commercial grain farming, livestock rearing.

Section B

Energy resources: conventional and non-conventional, spatial patterns and supply problems; manufacturing: factors of production, theories of industrial location: Weber, Hoover, Losch, Isard and Smith, major industries: iron and steel, aluminum, paper and pulp, cotton textile, chemical and fertilizers, world transport patterns: accessibility and connectivity.

Section C

Decision making process: Location decision-behavioral view, spatial organization of landuse: Central place theory of Christaller Von Thunen's Agriculture location theory, emerging patterns of world trade, barriers to trade, dynamics of blocks, economic development, regional disparities in economic development, economic regionalization for area development and planning-economic regions of India.

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Recommended Readings:

- Alexander, J.W. 2001. Economic Geography. Prentice Hall of India, New Delhi.
- Chapman, K and Walker, D. 1991. Industrial Location: Principles and Policies. Blackwell, Oxford.
- Grigg, D. 1995. An Introduction to Agricultural Geography. Second edition, Routledge, London.
- Gupta, P. Sen and Sydasuk, Galyna: Economic Regions and Regionalization in India.
- James, O. W. and Peter, O. M. 1986. Economic Geography. John Wiley and Sons, New York.
- Jarret, H. R. 1977. A Geography of Manufacturing. Trans-Atlantic Publishers, London.
- जाट, बी.सी. 2014: आर्थिक भूगोल। पंचशील प्रकाशन, जयपुर।
- Hodder B.W. and Lee, R. 1974: Economic Geography. Methuen, London.
- Mandal, R. B. 1982. Land Utilization – Theory and Practice. Concept Publishing Company, New Delhi.
- Scott, A. J. 1988. New Industrial Spaces. Pion, London
- Shafi, M. 2000. Agricultural Geography of South Asia. Macmillan, New Delhi.
- Singh J. and Dhillon, S. S 2004: Agricultural geography. Tata Mc-Graw-Hill, New Delhi.
- Singh, Kashi Nath and Siddiqui, A.R.: Economic Geography, Prayag Pustak Bhawan, Allahabad.
- Smith, D. M. 1981. Industrial Location – an economic, geographical analysis. John Wiley, New York.
- Tyagi, B. P. 1998. Agricultural Economics and Rural Development. Jai Praksh Nath & Co., Merrut (sixth edition).
- Wheeler, J.O. and Muller, O.P. 1995: Economic Geography. John Wiley, New York.

Paper IV Any one of the following:

Paper IV (a): Advanced Geography of Monsoon Asia

Section A

Unity in Diversity in Monsoon Asia, importance of location, geological structure, physiographic, drainage basins, climate regions, natural vegetation, mineral wealth, population and its characteristics, power resources, agricultural characteristic, importance of Monsoon lands with respect of food stuffs and raw materials, natural rubber lands with respect to good stuffs and raw materials, natural rubber and its world trade, tea, coffee spices, developments of transportation and accessibility.

Section B

Singapore-problems of industrial expansion, port developments, human resource, Philippines-population and food problem and development programme, Thailand-problem of urbanization and regional division and development programmes Indonesia-population

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densities and its trends, mineral resources, type of agriculture, sugar industry, Burma-regional divisions, agricultural, forest and mineral resources, Hong Kong-urban growth, changing trade pattern, industrial development, changing land use pattern, Korea-agricultural and industrial development.

Section C

China state farms and people communes, population and food supply industrialization, changing pattern of industrial complex, Red Basin, the Hwango Ho, Yagize Kiang and Sikiang basins, Japan-Coal resources, water power, conservation of forest, copper production, tea, soyabean and rice culture, fishing industry, motor vehicle steel and industries, industrial belts.

Recommended Readings :

- Hussain, M. 2004: World Geography. Rawat Publication, Jaipur.
- Johnson, D.L. et al 2012: World Regional Geography: A Development Approach. PHI Learning Pvt. Ltd., New Delhi.
- ममोरिया एवं अग्रवाल 2012: एशिया का भूगोल। साहित्य भवन, आगरा।
- राव, बी.पी. एवं सतपथी, डी.पी. 2002: एशिया की भौगोलिक समीक्षा। वसुन्धरा प्रकाशन, गोरखपुर।
- सतपथी, डी.पी. 1995: चीन की भौगोलिक समीक्षा। वसुन्धरा प्रकाशन, गोरखपुर।
- Shafi, M. 2000: Agricultural Geography of Asia. Macmillan, Delhi.
- सक्सेना, एच.एन. 2010-11: विश्व का प्रादेशिक भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।
- Tikkha, R.N. 1997: World Regional Geography. New Academic Publishing Company, Jalandhar.
- Wadia, D.N. 1919: Geology of India. Longman, London.

Paper IV (b): Geography of Rural Development

Section A

Geography and rural development, agricultural geography and rural development, agricultural location theory, rural land use, agricultural, pastoral, forestry and land use competition, land use and landscape, approaches to rural development, growth center approach, infrastructure reformist, rural settlement, housing, population and employment, rural transport service provision, recreation, health and nutrition.

Section B

Rural planning and land management: resource development and integrated rural development: crop and soil management, live stock range and management: water management, ecological management, desertification monitoring and control

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Section C

Rural development in Rajasthan: major tools and techniques, rural development schemes-Irrigation and land development schemes, drought prone areas schemes, desert development programme, integrated rural development in Rajasthan, tribal areas development, wasteland development.

Recommended Readings:

- Association of Country Councils 1979: Rural Deprivation, London, ACC.
Allan, J.A. 1980: Remote Sensing in Land Use Studies, Geography.
Anderson, J.R.L.J. 1977: Harddarkar-Agricultural decision Analysis, Ames, Iowa State University Press.
Andrease, B. 1981: Farming Development and Space-World Agricultural Geography, New York, Water Cryter.
Bowler, I.R. 1948: Agricultural Geography, Progress in Human Geography 8.
Grigg, D.B. 1974: The Agricultural Systems of the World, Cambridge University Press.
Grigg, D.B. 1984: An Introduction to Agricultural Geography, London Hutchinson.
Glig, A.W. 1985: An introduction to Rural Geography, Edward, Arnold, London.
Jones, A. 1975: Rural Housing, The Agricultural Tied College, London Bell.
Lasse, W.R. 1977: Planning in Rural Environment, New York, McGraw Hill.
Lavery P. (ed.) 1974: Recreational Geography, Newton Abbot: David and Charles.
Leasdale, R. 1981: Settlement Systems in Sparsely Populated Regions and Homes (ed.), Oxford, Pergamon.
Menab. A 1984: Integrated Rural Development, Gloucester Gloucester College of Arts.
Morgan, W.B. and RJS Munon-Agricultural Geography, London Methuen.
Newbury, Pa. 1980: Geography of Agriculture, Plymouth Macodonald and Evans.
Pacione, M. 1981: Rural Geography, London, Pappur Clark, (ed.) and Row 1984-Register of Research in Rural Geography Leicester: Rural Geography Study Group.
Tewari, A.K. (ed.) 1988: Desertification: Monitoring and Control, Scientific Pubs, Jodhpur.

Paper IV (c): Comparative Geography of U.S.A. & Russia

Section A

Strategic importance of location, geological structure, physical features and physiographic division, drainage pattern and river basins, climatic controls and climatic divisions, natural vegetation and vegetation divisions, demographic characteristics.

Section B

Natural resources-forest, soil mineral, livestock, development of power resources, development of agriculture-agricultural crop regions (Belts).

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Section C

Important industries, their location and distribution, transportation networks (rail, road, air, water and pipelines).

International trade.

Detailed study of important regions-economic and industrial programmes for future development.

Recommended Readings:

- Alexander: The North Eastern United States : (D. Van Nostrand Co., New York).
Barg, L.S.: Natural Regions of U.S.S.R. (Mac. Millian and Co., New York).
Balzak, S.S.: Economic Geography of Soviet Union (Mac Millian and Co., New York).
Hait: The South Eastern United Co., N.Y.
Hodkins: Soviet Power, Energy, Resources, Production and Potentials (Prentice Hall, New York).
Lames, P.E.: Latin America (Cassel and Co., London).
Martin, M.C.: The United States at Work (George G. Harrp and Co., New York).
McCarry, H.H.: Geographic Basis of American Economic Life (Harper and Co., London).
Mirow, N.T.: Geography of Russia (John Willey and Sons, New York).
Methn, Vendo: Soviet Economic Development and Structure, Sterling Publisher Pvt. Ltd., AB/9 Safdarganj Enclave, New Delhi.
Osttolenk, B.: Economic Geography of the United States (Thomas Y. Crowell Co., New York).
Russel, I.C.: North America (Oxford University Press).
Robinson, H.: The U.S.S.R. (University Tutorial Press, Ltd.).
Shaw, E.B.: Anglo-America, A, Regional Geography (John Willey and Co., New York).
Smith, J.B. and Philip, M.G.: North America: (Harcourt Brace, New York).
Shabad, T.: Geography of U.S.S.R. (Oxford University Press, Oxford).
Schwartz, H.: Russia's Social Economy (Prentice Hall of India, Delhi).
Turin, S.P.: The U.S.S.R. (Mathuen and Co., New York).
T. Shabad: Industrial Resources of U.S.S.R.
White, C.L.: Regional Geography of Anglo America (Prentice Hall, New York).

Paper IV (d): Geography of South Asian Countries (Bangladesh, Nepal, Pakistan, Srilanka)

Section A

Geographical realms of South Asia, homogeneity and diversity, study of Pakistan under the following heads-geographical and political units, climate and climatic regions, vegetation, agriculture, livestock, mineral resources, power resources, industries, trade population and natural regions, political relations.

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Section B

Study of Bangladesh under the following heads-geographical and political units, climate and climatic regions, vegetation, agriculture, livestock, mineral resources, industries, trade, population, natural regions, political relations.

Section C

Study of Nepal, Bhutan, Srilanka and Maldiv Islands under the following heads-geographical and political units, climate, vegetation, agriculture, livestock, industrial and economy, trade, population, political relations.

Recommended Readings:

- Ahmed, N. 1958: Economic Geography of East Pakistan, Oxford University Press, London.
Cooke: Ceylon.
Johnson, B.L.C. 1975: Bangladesh, Heinemann Education Books, London.
Johnson, B.L.C. 1970: Geography of South Asia.
Karan, P.P.: The Himalayan, Kingdom.
Kulshrestha, S.H. 1983: Simple Geography of Nepal, Educational Enterprise Pvt. Ltd., Kathmandu.
Rashid, R.E. 1977: Geography of Bangladesh, University Press Ltd., Bangladesh.
Spencer, J.E. 1952: Asia East by South, John Wiley and Sons, London.

Paper IV (e): Advanced Regional Geography of West Europe

Section A

Strategic importance of location, geological structure, physical features and physiographic divisions.

Drainage Pattern and river basins, climatic controls and climatic division, natural vegetation, vegetation division, demographic characteristics.

Section B

Natural resources-forest, soil mineral livestock, development of power resources, development of agriculture - major agricultural crop regions (belts)

Section C

Important industries: their location and distribution, transportation networks (Rail, road, air, water and pipe lines), international trade, detailed study of important regions-economic and industrial, programmes and plans for future development.

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Recommended Readings:

- Houston J.M. 1963: Social Geography of Europe, Duckworth.
वर्मा, एल.एन. 2001: प्रादेशिक भूगोल, राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर, तृतीय संस्करण
Husain, M. 2012: world Geography, Rawat Publications, Jaipur
Tikkha, R.N. 1997: World Regional Geography, New Academic Publishing Company, Jalandhar
अल्ला, एल.आर. व अन्य 1999: प्रादेशिक भूगोल। कुलदीप पब्लिकेशनस, अजमेर
सक्सेना, एच.एम. 2010-11: विश्व का प्रादेशिक भूगोल। रस्तोगी पब्लिकेशनक, मेरठ।
Johnson, D.C. et al 2012: World Regional Geography: A Development Approach, PHI Learning Private Limited, New Delhi, Edition

Paper IV (f): Man and Natural Environment

Section A

Definition and scope of environmental geography, its relation with other subjects, elements of the environment, man and environmental relationships: environmental determinism, possibilism and neo determinism, biosphere and its components, concept of ecology and ecological succession, types of ecosystems, energy flow in the ecosystem, soil system, geobiochemical cycles, major biomes of the world .

Section B

Environmental degradation and natural disasters, environmental crises: ozone depletion, green house gas effects, El-Nino, global warming and climate change, water scarcity, acid rain, sea level change, desertification, environmental pollutions: water, air, soil, noise and radioactive.

Section C

Environmental quality, sustainable development, environmental management, soil and forest resources management, water management, wildlife conservation, biodiversity and its conservation, environmental awareness and education, international efforts of environmental conservation.

Recommended Readings :

- Agarwal, A. and Narain, S. 1997: Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System. Centre for Science and Environment, New Delhi.
Detwyler, J.R. 1975: Man's Impact on Environment. John Wiley and Sons, New York.
Economic and social commission for Asia and the Pacific United Nations 1989: Guidelines for the preparation of National Master Water Plans.
Govt. of India, 1980: Ministry of Energy and Irrigation. Rastriya Barh Ayog (Report-

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- National Commission of Floods. Vol. I & II, New Delhi).
- Govt. of India, 1972: Ministry of Agriculture Report of the Irrigation Commission. Vol. I to IV, New Delhi.
- गुर्जर, आर.के. एवं जाट, बी.सी. 2001: पर्यावरण भूगोल। पंचशील प्रकाशन, जयपुर।
- Gulhati, N.D 1972: Development of Inter-State Rivers: Law and Practice in India. Allied Pub., Bombay.
- Harvey, B. And Hallet, J.D. 1977: Environment and Society: An Introductory Analysis. Macmillan, London.
- International Water Resource Association and Central Board of Irrigation & Power, Water of Human Needs, 1975: Vols. I to V Proceedings of the Second World Congress on Water Resources, 12-16 December, New Delhi.
- Jones, J.A. 1997: Global Hydrology: Processes, Resources and Environmental Management. Longman.
- Kates R.w. and Burton, I. (ed.) 1980: Geography, Resource and Environment. Ottawa.
- Matter, J.R., 1984: Water Resources Distribution, Use and Management. John Wiley, Marylane.
- Rao, K.L. 1979: India's Water Wealth. Orient Longman, New Delhi.
- सिंह, जगदीश 2003: पर्यावरण एवं संविकास। ज्ञानोदय प्रकाशन, गोरखपुर।
- शर्मा, पी.डी. 2009: पारिस्थितिकी एवं पर्यावरण। रस्तोगी पब्लिकेशन्स, मेरठ।
- Singh, R.A. and Singh, S.R. 1979: Water Management: Principles and Practices. Tara Publication, Varanasi.
- Singh, Savindra 2006: Environmental Geography. Prayag Pustak Bhawan, Allahabad.
- Smith, K. 1972: Water in Britain. A Study in Applied Hydrology and Resource Geography. McMillan, London.
- श्रीवास्तव, वी.के. एवं राव, बी.पी. 2002: पर्यावरण और पारिस्थितिकी। वसुन्धरा प्रकाशन, गोरखपुर।
- Tebbutt, T.H.Y. (ed.) 1985: Advances in Water Engineering. Elsevier Applied Science Pub., London.
- Thomas, W.L. (ed) 1956: Man's Role in Changing the Face of the Earth; University of Chicago Press, Chicago.
- Todd, D.K. 1959: Ground Water Hydrology. John Wiley, New York.
- U.S.D.A. 1955: The Year Book of Agriculture: Water. Oxford and I.B.H. Publishing Co., New Delhi.
- Verghese, B.G. 1990: Water of Hope: Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga. Brahmaputra-Barak Basin, Oxford IBH, New Delhi,

Paper IV (g) Quantitative Techniques in Geography

Section A

Probability: theory of probabilities-law of addition and multiplication probabilities of distribution: normal, binomial, poisson-sampling: basic concepts, sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples.

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Hypothesis testing: needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures; contingency tables, chi-square test, binomial test, t-test, mann-whitney U test, analysis of variance (ANOVA)

Section B

Bivariate analysis: forms of relation and measuring the strength of association and relation-construction and meaning of scatter diagram simple linear and regression analyses-spearman's rank and product moment correlation coefficients- the ordinary least square method of fitting a regression line-construction of regression-line: interpolation, prediction, explanation and residual-statistical tests of significance of the estimates, residuals and their mapping.

Section C

Multivariate analysis, basics of multiple regression-partial correlation coefficient regression analysis and ANOVA-testing the overall significance of a regression auto correlation-multicollinarity basis principles and elements of factor analysis and principal component analysis.

Surface and models: gravity potential, model-spatial interpolation and trend surface analysis-simulation models, random walk and diffusion models-markov chain model similarity indices and region building construction of Thiessen polygons.

Recommended Readings:

Gupta, S.P. 1979. Statistical Methods. Sultan Chand & Sons, New Delhi, (Twelfth thoroughly revised edition).

Mahmood, A. 1998. Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi (fourth revised edition).

श्रीवास्तव एवं प्रसाद 2008, भूगोल की सांख्यिकी विधियाँ, वसुधरा प्रकाशन, गोरखपुर।

Kailash nath nagar, sankhiki ke mool tatva, 1992, Meenakshi Prakashan, Meerut.

David unwin, Introductory spatial Analysis, Methuen, London, 1981.

Gregory, S. Statistical Methods and Georapner, Longman, London, 1978.

Hammond R and P.S. McCullagh Quantitative Techniques in Geography: An Introduction, Clearendan Press, Oxford, 1974.

John P. Cole and Cuchlanie A.M. King, quantitative Geography, John Wiley, London, 1968.

Johnston R.J., Multivariate Statistical Analysis in Geography, Longman, London, 1973.

Kautsoniannis, Theory of Econometrics, Mcmillan, London, 1973.

Maurice Yeats, An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.

Peter Haggett, Andrew D. Cliff, & Allan Frey, Location Methods vol I and II, Edward Arnold, London, 1977.

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Practicals

Scheme of examination

Min. Pass Marks: 36	Non-collegiate candidate	Regular candidates	Max. Marks: 100
Bifurcation of Marks			Time
Written test	60 (6 questions)	40	4 hrs.
Record work and viva voce	30+10	20+10	
Project report and viva voce	--	20+10	

N.B. In written test there shall be 2 questions from each section. Candidates have to answer 4 questions selecting at least one question from each section. All questions carry equal marks. Examination be conducted in batches of not more than 20 candidates in any case. 12 hours of teaching practicals be provided for a batch of 20 students per week.

SYLLABUS

Section A

The art and science of cartography, history of maps, materials, techniques and preparation of maps, enlargement, reduction and finding of area of maps, use of planimeter, Study of geological maps and preparation of their section and interpretation, interpretation of weather maps and weather forecast.

Section B

Map projections (mathematical construction): classification and characteristics of any three from each of the four classes of projections.

I. Conical Projections:

1. Equal area with the one standard parallel (Lambert's Projections)
2. Equal Area with two standard parallels (Alber's Projections)
3. Bonne's
4. Polyconic

II. Cylindrical Projections:

1. Cylindrical Equal Area
2. Mercator's
3. Gall's Stereographic

III. Zenithal Projections:

1. Gnomonic: (a) Polar Case (b) Eq. Case
2. Stereographic: (a) Polar Case (b) Eq. Case
3. Orthographic: (a) Polar Case (b) Eq. Case
4. Equal Area: (a) Polar Case (b) Eq. Case
5. Equidistant: (a) Polar Case (b) Eq. Case

IV. Conventional Projections:

1. Sinusoidal
2. Mollweide
3. Interrupted Sanson Flemstead (Homoclosine)

Choice of projections, used for maps produced in India.

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Section C

Geographical maps and diagrams: computation of data, preparation of frequency tables, representation of data by histograms and ogives, finding skewness, computation of mean, median and mode, deviation-standard deviations and mean deviations, theoretical basis of nearest neighbor analysis, practical exercises of nearest neighbor analysis, location analysis of urban centers, coefficient variation, All these be computed from the Statistical data, preferably based on State, District, Tehsil and community Development Block as unit areas and the following types of maps and diagrams be prepared.

Maps and their interpretations: isopleths, choropleth and chorochromatic; choroschematic and isochronic map, population pyramids map.

Three dimensional diagrams of economic and social data, accessibility and flow maps, ^{Transport} Network analysis.

Diagrams: Polygraph semi-log and log graphs, trilinear chart, circular graph, climatograph, Hythergraph, climograph, annual water deficiency and water surplus graph.

Project Report: A regular candidate is to prepare project report of a village area. The candidate is free to select any supervisor amongst the staff members of the project. A supervisor can take only 5 candidates, the marking on the project report will be awarded by the external examiner in consultation with the supervisor concerned, the project should be based on primary data obtained by the candidates, the data should be represented by suitable cartographic methods.

N.B. Project Report is not applicable in case of non-collegiate candidates.

Recommended Readings:

चौहान, पी.आर. 2005: प्रयोगात्मक भूगोल, वसुधरा प्रकाशन, गोरखपुर।

Dickinson, G.C. 1973: Statistical Mapping and Mapping Statistics, London.

Khullar, D.R. 2000: Essentials of Practical Geography, New Academic Publishing Co., Jalandhar.

Lawrence, G.R.P. 1971: Cartographic Methods, Methuen, London.

Mahmood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publications, New Delhi.

Robinson, A.H. et al. 2004: Elements of Cartography, John Wiley & Sons, Inc., New York (Sixth Edition)

Rampal, K.K. 1993: Mapping and Compilation: Methods and Techniques Concept Publishing Company, New Delhi (Reprint 2009)

शर्मा, जे.पी. 2010-11: प्रयोगात्मक भूगोल की रूपरेखा, रस्तोगी पब्लिकेशन्स, मेरठ।

Singh, R.L. and Singh RPB 1991: Elements of Practical Geography, Kalyani Publishers, New Delhi (Reprint 2002)

तेवारी, आर.सी. एवं सुधाकर, त्रिपाठी 2009: प्रयोगात्मक भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद।

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M.A./M.Sc. Final

Paper V: Advanced Geography of India

Section A

Geological structure and its relation to distribution of minerals, physiographic divisions, climate: seasons and associated weather characteristics, mechanism of Indian monsoon, major climatic regions; soils: characteristics, distribution and major soil regions; drainage pattern, watersheds and river systems.

Section B

Resource potential and evaluation. Water resources & Multi-purpose irrigational projects. Vegetational resources. Agriculture:- typology, major crops, changing pattern of crops and green revolution. Animal resources. Mineral resources. Human resources & Population policies.

Section C

Resources development and utilization: power, industries and transport, river basins of India, riverine problems of sharing water and their planning, industrial regions and economic regions of India and regional economic disparities.

Recommended Readings:

Bansil, B.C. 1975: Agricultural Problems in India, Delhi.

चौहान, बी.एस. व गौतम, ए. 2012-13: भारत: भारतवर्ष का विस्तृत भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।

Deshpande, C.D. 1992: India-A Regional Interpretation. Northern Book Centre, New Delhi.

Gopal Krishnan, R. 2001: Geography of India, Jawahar Publishers & Distributions, New Delhi.

Govt. of India: National Atlas of India, NATMO Publication, Calcutta.

Govt. of India 1965: The Gazetteer of India, Vol. I & II Publication Division, New Delhi.

इसनैन, रन. 2001: जनजातीय भारत। जवाहर पब्लिशर्स एण्ड डिस्ट्रीब्यूटर्स, नई दिल्ली।

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Kinnear, D R. 2006. India a comprehensive Geography. Kalyani Publishers, New Delhi.

महाराष्ट्र, सी. 1999: आधुनिक भारत का वृहत् भूगोल। साहित्य भवन पब्लिकेशन्स, आगरा।

Mitra, A. 1967: Levels of Regional Development India Census of India. Vol. I, Part I-A (i) and (ii). New Delhi.

Singh, G. 1998: A Geography of India. Atma Ram & sons, Delhi.

Singh, R.L. (ed.) 1971: India: A Regional Geography. National Geography Society, India, Varanasi.

Tirtha, R. 2000: Geography of India. Rawat Publications, Jaipur.

Wadia, D.N. 1967: Geology of India. McMillian & Co., London.

Paper IV Any one of the following

Paper VI (a): Population Geography

Section A

Population geography: definition, nature and scope and interdisciplinary study, theories of population growth: pre-Malthusian views, Malthus' Theory, Marxist theory, optimum population theory, demographic transition model, World population distribution growth, trends and determinants.

Section B

Migration: brief history, theories, trends and patterns of international and internal migration, population dynamics: fertility and mortality- measurement, determinants and distribution, World population composition and characteristics, World urbanization: trends, patterns and challenges.

Section C

India- population characteristics and relationship with development; population control movement and policies; urbanization and population explosion; post independence development: reproductive and child health programme, contemporary issues – ageing of population; declining sex ratio; HIV/AIDS.

Readings Recommended:

Shende Asha A and Kanitkar 2002: Principles of Population Studies. Himalaya Publishing House, Mumbai.

Handna, R. C. 2013: Population Geography. Kalyani Publishers, Delhi.

Handna, R C 2006: Jansankhya Bhugol. Kalyani Publishers, Delhi.

Assan, M.I. 2005: Population Geography. Rawat Publication, Jaipur.

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Prasad, M.K. 1991: India's Population Heading Towards a Billion. B.R. Publishing Corporation, New Delhi.

Kundu, A. 2006: Trends and Patterns of Urbanization and their Economic Implications. India Infrastructure Report, pp. 28-41.

Garnier, J. B. 1978: Geography of Population. Longman, London.

Woods, R. 1997: Theoretical Population Geography. Longman, London.

Newbold, K. B. 2010: Population Geography: Tools and Issues. Rowman & Littlefield Publications, London.

Weeks, J. R. 1988: Population: An Introduction to Concepts and Issues. Springer, Wadsworth.

UNESCO 2013: Rural Urban Dynamics and the Millennium Development Goals: Global Monitoring Report.

Paper VI (b): Agricultural Geography (Elements & Applied)

Section A

Agriculture geography : nature and development, Origin Dispersal and Development of Agriculture. Field Survey and Mapping in Agriculture Geography. Determinants of Agriculture Land Use :Relief and Climate. Soils. Human Determinants of Agriculture.

Section B

Agriculture typology, shifting agriculture, tropical plantation agriculture, mixed farming and mediterranean agriculture, Models in Agricultural Geography. Diffusion of Agriculture Innovations. Land Use and Land Capability Classification. Agricultural Efficiency and Productivity.

Section C

Agricultural Evaluation Techniques: Crop Ranking Intensity, Crop Diversification and Crop Combination Regions Agricultural Regionalization. Green Revolution. Agricultural Scenario in India. Agro-Climatic Zones: India and Rajasthan. Agricultural Policy in India.

Recommended Readings:

Ali Mohammad 1981: Situation of Agricultural Geography. Rajesh Publication, New Delhi.

Ali Mohammad: Situation of Agricultural, Food and Nutrition in Rural India. Concept Publishing Co., Delhi.

Ali Mohammad : Synamics of agriculture Development in India. Concept Publication Co., Delhi.

Dhillon, S.S. 2004: Agricultural Geography. Tata McGraw Hill Education, New Delhi.

Jusain, M. 1996: A Systematic Agricultural Geography, Rawat Publications, Jaipur.

CAR (1956-71): Soil and Water Conservation Research.

CAR : Soil Conservation of India.

at, B.C. 2013: Arthik Bhugol. Panchsheel Prakashan, Jaipur.

ostowickie, Z. : Agricultural Typology. Polish Academy, Warsaw.

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Mohammad, N. 1992: New Dimensions in Agricultural Geography: Landuse and Agricultural Planning Concept Publishing Company, New Delhi.

Symon Lesin 1967: Agricultural Geography. G. Gell and Sons Ltd., London.

Singh, J. and Dhillon, S. 1994: Agricultural Geography. Tata McGraw Hill, New Delhi.

Singh, R.L. (Ed.) : Applied Geography. BHU Press, Varanasi.

Singh P.P. Govind Raju, K.C. and others : new Seeds Adoption and Yield, Sterling Publication Pvt. Ltd., New Delhi.

Singh, Jasbir : Agricultural Atlas of India. vishal Publishers.

Singh, Jasbir : Agricultural Geography of Haryana.

Paper VI (c): Industrial Geography

Section A

Evolution of industrialization (India and World), locational factors of industries, theories of Industrial location: least cost school, transport cost school, market area school, marginal location school and behavioural school, new trends in industrial geography concept of entrepreneur and firm, significance of cost and price, concept of optimum location.

Geographical inertia, multi-locational industries, market oriented industries, foot loose industries, raw material oriented industries, manufacturing industries, processing industries.

Section B

Formation and delineation of industrial regions, industrial complexes, industrial houses including public sector undertakings. industrial regionalization.

Industrial regions in India: Hooghly side industrial regions, Damodar valley industrial regions, DMIC (Delhi-Mumbai industrial corridor): industrial policies of India: liberalization, privatization and globalization (special reference of india); special economic zones (SEZs).

Section C

Industries: cotton, jute, textile, iron and steel, aluminium, fertilizer, paper and pulp, copper, chemical and pharmaceutical, ship building, automobile, cottage and agro-based industries and tourism industry.

industrial regions of world: Ruhr basin industrial region and Great lakes industrial region.

Recommended Readings:

Lloyd and Dicken: Location in Space: A theoretical Approach to Economic Geography.

M.C. Cart and Lindberg Hodder and Lee Economic Geography: A Preface to Economic Geography.

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- Smith, D.E. Cox K.P. Man: Industrial Location. A Economic, Geographical Analysis Location and Behavior-An Introduction to Human Geography.
- Riley, R.C. 1973: Industrial Geography, Chalto and windus, London.
- Alexanderson Gnnar: Geography of Manufacturing(Englewood Cliffs, N.J.).
- Alexander, J.W.: Economic Geography (Prentice Hall, New York).
- Jat, B.C. Arthik Bhugol, 2013: Panchsheel Prakashan, Jaipur.
- Bengston, N.A.: Fundamentals of Economic Geography(Prentice Hall, New York).
- Besoh, H.: A Geography of world Economy(D. Van Nostrand).
- Britton, John. N.H.: Regional Analysis and Economic Geography (G. Bell and Sons, London).
- Estall, R.C. and Buchanan, R.O.: Industrial Activity and Economic Geography (Hutchinson and Co., London).
- Ghose, B.C.: Industrial London.
- Hoover, E.M.: The Location of Economic Activity,(McGraw-Hill Books Co: New York).
- Wheeler, J.O. and Muller, O.P. 1995: Economic Geography. John Wiley, New York.

Paper VI (d) : Transport Geography

Section A

Meaning, scope and nature of transport geography, transportation and space, network growth models, nature of inter regional flows, basis for interaction, models of spatial interaction, distance decay theory, gravity models and potential surface models, issues and challenges in transport geography.

Section B

Transportation and spatial structure, transportation models, model accessibility and hinterlands, accessibility and land use, transport economics, transport problems of metropolitan areas and urban travel patterns.

Section C

Developments of transport system in India, role of transportation in regional development in India, major transport regions, regional development in India, transport-network, structure, connectivity and transport mobility linkages.

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Recommended Readings:

- Berry, B.J.L. 1966: Essays on Commodity Flow and the Spatial Structure of Indian Economy. University of Chicago, Chicago.
- Eliot, H. and E. Michael (eds.) 1974: Transportation Geography. Comments and Readings M.C. Growth M.S.
- Hagget, P. and Chorley, R. 1969: Network Analysis in Geography. Edward Arnold, London.
- Hoyle, B.S. 1998: Modern Transport Geography. Wiley, New York.
- Hensher, D.A. 2004: Handbook of Transport Geography and Spatial Systems. Elsevier, London.
- Kausty, K.J. 1963: Structure of Transportation Networks. University of Chicago, Chicago.
- Rodrigue, J.P. et al 2013: The Geography of Transport Systems, Routledge, New York.
- सिंह, के.एन. 2003: परिवहन भूगोल। ज्ञानोदय प्रकाशन, गोरखपुर।
- Taaffe, E.L. and Gautir, H.L. 1973: Geography of Transportation. Prentice Hall, Englewood Cliffe.
- White, H.P. and Senior, M.L. 1983: Transport Geography. Longman, London.

Paper VI (e) : Geography of Settlements

Section A

Definition, scope and development of settlement geography, theories in settlement geography, methodology in settlement geography, causes of origin of settlement types, the form of settlements types clustered, semi-clustered and dispersed, settlement pattern, size and spacing of rural settlements.

Section B

Site and situation of rural settlements, the evolution of street pattern in rural settlements, morphological characteristics of rural settlements, segregation and orientation of social groups in settlements, the evolution of field boundaries and the field patterns, folk housing, folk architecture and traditional building materials.

Section C

Urban settlements: their site and situation, size and spacing of urban settlements, Christallers system of urban hierarchy and spacing of cities morphological characteristics of urban

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settlements, the cultural ecology of the city, theories of structure of urban centres: grid, concentric zone, sector, multiple nuclei and irregular pattern models, problems of urban housing and emergence of slums.

Recommended Readings:

- Bogue, D.J. 1969: Principles in Demography, John Wiley, New York.
- Bhende, Asha, A. and Kanitkar, 2002: Principles of Population Studies, 14th Edition, Himalaya Publishing House, Mumbai.
- Census of India 1991: India-A State Profile.
- Chandna, R. C. 2013: Population Geography, Kalyani Publishers, Delhi.
- Chandna, R.C. 2006: Jansankhya Bhugol, Kalyani Publishers, Delhi.
- Clarke, John I. 1973: Population Geography, Pergamon Press, Oxford.
- Garnier, J. B. 1978: Geography of Population, Longman, U.K.
- Hassan, M.I. 2005: Population Geography, Rawat Publication, Jaipur.
- Kundu, A. Lopamudra, R.S 2012: "Migration and Exclusionary Urbanisation in India", *Economic & Political Weekly*, XLVII (26/27): 219-227.
- Kundu, A. 2006: Trends & patterns of urbanization and their economic implications. India Infrastructure Report, pp. 28-41.
- Newbold, K. B. 2010: Population Geography: Tools and Issues, Rowman & Littlefield Publications, London.
- Premi, M.K. 1991: India's Population Heading Towards a Billion, B.R. Publishing Corporation, New Delhi.
- Rural Urban Dynamics and the Millennium Development Goals 2013: Global Monitoring Report.

Paper VI (f) : Advanced Geomorphology

Section A

Fundamental concepts of geomorphology; schools in geomorphology, recent trends in geomorphology, earth movements: epeirogenic, orogenic types and classification of weathering, mass movement erosion. plate tectonics, seismicity, vulcanicity, orogenic structures with reference to the evolution of Himalaya, various models of landscape evolution (Davis, Penck, King, Hacks, Morisawa, Schumm, multicyclic and polygenetic evolution of landscapes.

Section B

Geomorphic processes, dynamics of fluvial, glacial, Aeolian, marine, and karst processes and resultant landforms, polycyclic landforms, various models of slope development (Wood, Davis, Penck, King, R. Savigear, Strahler, Fisher-Lehmann, Young), concept of

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geomorphic region, Systems in geomorphology; Models in geomorphology, erosion surfaces techniques of identification and correlation.

Section C

Terrain evaluation, geomorphic mapping, geomorphic hazards and mitigation measures; Digital Elevation Model (DEM) and Triangulated Irregular Network (TIN) unit, land capability and land suitability classification, hydro-geomorphology, urban geomorphology, environmental geomorphology, geomorphic hazards.


Recommended Readings:

- Ahmed, E. 1985: Geomorphology. Kalyani Publishers, New Delhi.
Bloom, A. L. 1998/2001: Geomorphology. Prentice Hall of India, New Delhi.
Chorley, R.J., Schumm S A and Sugden D E. 1984: Geomorphology. Methuen and Company Ltd., London.
Cooke, R.U. and Doornkamp, J.C. 1974: Geomorphology in Environmental Management-A introduction. Clarendon Press, Oxford.
Chorley, R.J. 1972: Spatial Analysis in Geomorphology. Methuen, London.
Dayal, P. 1994: A Text Book of Geomorphology. Kalyani Publishers, New Delhi.
Dury, G.H. 1959: The Face of the Earth. Penguin Harmondsworth.
Fairbridge, R.W. 1986: Encyclopedia of Geomorphology. Reinholdts, New York.
Goudie, A. 1993: The Nature of the Environment. Oxford & Blackwell, London.
Garner, H.F. 1974: The origin of landscape-A Synthesis of Geomorphology. Oxford University Press, London.
Jog, S. R. (ed.) 1995: Indian Geomorphology (2 vols.): Rawat Publications, Jaipur.
Kale, V. and Gupta, A. 2001: Introduction to Geomorphology. Orient Longman, Hyderabad.
Mitchell, C.W. 1973: Terrain Evaluation. Longman, London.
Ollier, C.D. 1979: Weathering Longman. London.
Pitty, A.F. 1971: Introduction to Geomorphology. Methuen, London.
Singh, S. 2004: Geomorphology. Prayag Pustak Bhawan, Allahabad.
Stoddart, D.R. (ed) 1996: Process and Form in Geomorphology. Routledge, New York.
Sparks, B.W. 1986: Geomorphology. Longmans, London.
Thornbury, W.D. 2005: Principles of Geomorphology. John Wiley and Sons, New York.
Thornbury, W.D. 1960: Principles of Geomorphology, John Wiley, New York.

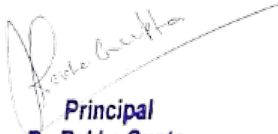
Paper VII (a) : Urban Geography

Section A

Meaning, aims, importance and scope of urban geography, factors affecting growth of towns and cities of different historical periods: neolithic, greek and roman. dark ages, medieval renaissance, industrial revolution, and modern times, chief characteristics of the towns,


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Patterns and trends of urbanisation in the world, urbanisation in India since 1901 and its problems, definitions of urban centres, chief characteristics of modern towns, city conurbation metropolitan and megalopolis, spatial pattern and distribution of urban centres, types of cities-central places and urban transportation and mobility.

Section B

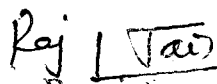
Functions and functional classification of towns urban rank-size relationship. concept of urban economic functions and its urban hierarchy based on functions-law of primate city. urban morphology, unplanned growth of towns, urban master plans, morphology of Indian cities. functional structure of towns, characteristics of C.B.C. residential area, and other functional areas central place theory (Christaller and Losch) and models of urban structure theory of urban structure (Burgess, Hoyt, Harris & Ullman, Mann, White).

Section C


Centrifugal and centripetal forces in urban geography: development of suburbs, rural, urban fringe, satellite towns, ring towns, sphere of urban influence (umland) and its delimitation control of urban problems: urban poverty, slums, transportation, housing, crime: principles of town planning, preparation of a master plan, study of master plan of Jaipur city, principles of town and regional planning country.

Recommended Readings:

- A.E. Smailes: The Geography of Towns. Hutchinson, University Library, London.
Abercrombie: Town and Country-Planning. Oxford University Press, London.
बंसल, एस.सी. 2010: नगरीय भूगोल, मीनाक्षी प्रकाशन, मेरठ।
Carter, Harold 1995: The Study of Urban Geography, Arnold (Publisher) Pvt. Ltd., London.
Dickinson, R.E.: City Region and Regionalism. Routledge and Kegan Paul London.
Herrold M. Mayer: Readings in Urban Geography, Central Book Depot, Allahabad.
N.V. Sovani: Urbanization and Urban India. Asia publishing House, Bombay.
P.C. Malhotra: Survey of Bhopal City and Bairagarh (Asia publishing Bombay)
R.L. Singh: Bangalore as Urban Survey. National Geographical Society of India, B.H.U., Varansi.
Shah Manzoor Alam: Hyderabad and Secuderabad, Twin City Studies in Urban Geography. Allied Published, Delhi.
Singh, R.L.: Banars A study in Urban Geography. Student Friends, Allahabad.
Taylor G.: Urban Geography. Muthuen and Co., London.
V.K.R.V. Rao: Socio-Economic survey of Greater Delhi. Asia Publishing Bombay.
V.L.S. Prakash Rao: T Gowns of Mysore state. Statistical Publishing House, Calcutta.


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Paper VII (b): Geography of Crimes

Section A.

Meaning, scope and nature of geography of crimes, approaches to the study of geography of crime, causes of crimes: physical, economic, social, spatial dimension of crimes and crime mapping, source of data on crimes and reliability of crime data.

Section B

Crimes in developing countries with special reference to India, seasonality of crimes, crime and poverty, crime and illiteracy, urban and rural crimes: crime towards women, children and weaker section of the society; crime as social pollution and role of police and legal system in prevention and mitigation of crimes at varying spatial scale.

Section C

Role of illegal migration and its impact on crime scenario, problem of naxalites and its social implications, international links of terrorism, role of religion in terrorism in India, controlling crimes and terrorism: international and national efforts and strategy; measures of rehabilitation and socialization of criminals.

Recommended Readings:

- Ahuja, Ram 1996: Youth and Crime, Rawat Publications, Jaipur.
Ahuja, Ram 1987: Crime Against Women. Rawat Publications, Jaipur.
Boggs, S.L.: Urban Crime Pattern, Honter and Row, New York.
Chandel, R.S.: Aparadh Samasya Aur Samadhan: Kitabghar, Delhi.
Gupta, A.S.: Crime and Police in India, Sahitya Bhawan, Agra.
Harries, K.D.: The Geography of Crime and Justice, McGraw Hill, New York.

Paper VII (c): Climatology and Oceanography

Section A

The basis of modern climatology, composition and layered structure of atmosphere, atmospheric energy: air temperature, the energy balance, atmospheric pressure and pressure belts, the planetary wind system, moisture in the Atmosphere: humidity and its expression, diabatic non-adiabatic processes, stability and instability, evaporation: factors affecting vaporation, precipitation types, world precipitation pattern.

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Section B

Air masses, fronts and synoptic climatology, the nature and hazard of atmospheric extreme events: cyclones (tropical and extra tropical) and anticyclones. Koppen and Thonhwaite classification of world climates; major climatic types – equatorial, monsoon, Mediterranean and savanna types.

Section C

Scope of oceanography, horizontal and vertical distribution of temperature, salinity, factors and distribution patterns, dynamics of oceanic water: currents, sea waves, tides and tidal theories currents of Atlantic ocean, Pacific ocean, Indian ocean and other seas, oceanic bottom relief, (Atlantic, Pacific and Indian oceans) oceanic deposits, coral reef formation, atolls and coral islands, theories of coral reef formations, Man and oceans, marine resources- biotic and abiotic, (mineral and energy resources) and their utilization.

Recommended Readings:

Critchfield, H.J. 1983: General Climatology. Prentice-Hall of India, New Delhi.

Glantz, M.H., 2001: Currents of Change: Impacts of El Nina and La Nina on Climate and Society. Cambridge University Press, Cambridge.

गौतम, अल्का 2010: जलवायु एवं समुद्र विज्ञान। रस्तोगी पब्लिकेशनस, मेरठ, द्वितीय संस्करण।

गुप्ता, एस.एल. 2000: जलवायु विज्ञान। हिन्दी माध्यम कार्यालय निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली।

Oliver, J.E. and Hidore, J.J. 2011: Climatology : An Atmospheric Science, Dorling Kindersky. India Pvt. Ltd., Licensees of Pearson education in South Asia, New Delhi.

Sharma, R.C. and Vatal, M. 1999: Oceanography for Geographers. Chaitanya Publishing House, Allahabad.

Singh, S., 2007: Climatology. Prayag Pustak Bhawan, Allahabad.

Singh, S., 2008: Oceanography. Prayag Pustak Bhawan, Allahabad.

Siddhartha, K. 2000: Oceanography. A Brief Introduction, Kisalaye Publications, New Delhi.

सिंह, एस. 2006: जलवायु विज्ञान। प्रयाग पुस्तक भवन, इलाहाबाद।

Trewartha, G. T. and Horn, L.H. 1980: An Introduction to Climate. McGraw-Hill, New Delhi.

Paper VII (d) : Applied Geography

Section A

Meaning, nature and scope, principles and approaches, application of geographical methods of survey and geospatial tools in analysis of resource base, its appraisal, micro regional planning and demographic attributes.

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Section B

Delineation of resource regions, regional divisions according to variations in levels of socio-economic development, special purpose regions-river valley regions, national capital region, problem regions- hilly regions, tribal regions, regions of drought and floods.

Section C

Planning for a region's development, state capital region (Jaipur), indicators of development and their data sources, measuring levels of regional development and disparities-case study of Rajasthan. land use policy implications with special reference to India, review of policies related to decentralized planning, formulation of plans at national, state, district, block and grass root level.

Recommended Readings:

- Bhat, L.S. et al 1976: Micro-Level planning: A Case Study of Karnal Area, Haryana, K.B. Publications, New Delhi
- Blair, J. P. and Carroll, M. C. 2009. Local Economic Development - Analysis, Practices, and Globalization. SECOND EDITION, SAGE PUBLICATIONS, INC
- Chandna, R. C. 2008. Regional Planning and Development. Third Edition, Kalyani Publishers, Luchina.
- Dutta, A.K., Mishra, H.N. and Chatterjee, M. 2008 (eds.): Explorations in Applied Geography, Printice-Hall of India Private Limited, New Delhi.
- Friedmann, J. 1992: Empowerment: The Politics of Alternative Development. Blackwell, Oxford.
- Gosal, G.S. and Krishan, G. 1984: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra.
- Gupta, P., and Sdasyuk, G. 1968: Economic Regionalization of India: Problems and Prospects. Census of India, New Delhi
- Johnson, E.A.J. 1970: The Origanisation of Space in Developing Countries, Harvard University Press, Cambridge.
- Kundu, A. and Raza, M. 1982: Indian Economy, The Regional Dimension, Spectrum Publishers, New Delhi.
- Misra, R. P. (ed.) 1992: Regional Planning: Concepts, Techniques, Policies and Case Studies. 2nd edition. Concept Publishing Company, New Delhi.
- Nangia, S. 1976: Delhi Metropolitan Region, Rajesh Publication, Delhi.
- Pacione, M. 2009 (ed.): Applied Geography: Principles and Practice, Routledge, London.
- Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Association., Kolkata.
- Raza, M. 1988: Contributions to Indian Geography, Volume X, Regional Development, Heritage Publishers, New Delhi.
- बीवास्तव, वी.के. 1997: प्रादेशिक नियोजन और सन्तुलित विकास, वसुन्धरा प्रकाशन, गोरखपुर।
- undaram, K. V. 2004: The Trodden Path: Essays on Regional and Micro Level Planning. naunya Publications., New Delhi.

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Paper VII (e): Pedology

Section A

Modern pedological principles underlying soil formations: soil genesis and factors influencing it, characterization and classification of soil groups of the world and their distribution, soils: of Indian soils, soil nutrients in relation to agriculture and problems.

Section B

Methods of soil survey, soil analysis, soil mapping, soil profiles, their description, analysis and interpretation of results, soil erosion, soil exhaustion, soil conservation mechanical and biological measures with special reference to India.

Section C

Physical properties of soils, structure, texture, colour and moisture, organic matter, culture practices affecting soil characteristics, manures and fertilizer in relation to soils with special reference to India, soil survey for land capability and land utilization, detailed study of soils of Rajasthan, soil productivity and fertility status, management of sandy, loamy and clay soils.

Recommended Readings:

- Jeffe, J.S.: Pedology.
Comber: Scientific Study of Soils Soil Survey Staff Bureau.
U.S. Deptt. of Agriculture: Soil Survey Manual.
Moghe, B.: Soils of Rajasthan, Hindi Academy.
Wright: Soil Analysis.
Sygmont: Principles of Soil Science.
Robinson, W.C.: Soil-Their Origin, Classification and Constitution.
Ray-Choudhary: Soils of India.
Russel, F.I.: The World of Soil.
Agarwal, R.R.: Soil Fertility in India.
De. S.K.: Methods of Soil Analysis: Soil-Geographical Zoning of the USSR (Published by the Academy Sciences of the USSR, Moscow).
Volebuey, V.R.: Ecology of Soil.
Clarke: The Study of Soil in the Field.
Bunting, B.T.: The Geography of Soil.
Proceeding of the Symposium of Fertility of India Soil Bulletin No. 26 of 1964. National Institute of Science of India, New Delhi.

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Paper VII (f) : Medical Geography

Section A

Definition, nature, scope and contents, relation of medical geography with other allied disciplines, elementary, knowledge of human anatomy and physiology, geographical, pathology, epidemiology and geomedicine, history and development of medical geography in the West and India, concept of health and disease, major disease and their geomedical classification.

Section B

Geomedical data: source, methods of representation, analysis limitations and problems; conceptual and cartographic models, pathogenic and geogenic aspects of medical geography studies in disease environment association disease diffusion, spatial and temporal variations in the physical, cultural and the biotic environment and its influence upon human health, nutritional levels in India, disease of under-nutrition and malnutrition.

Section C

Disease of civilization: Cancer, blood vascular the smoking disease accidents, drug abuse and drug abdications, distribution of major diseases in Rajasthan, community health: distribution of medical facilities and population, healthcare planning in urban and rural area. A critical evaluation of health care delivery system in your own area/state, family planning programme in India, national malaria eradication programme in India, survey of common epidemic and endemic diseases in a small area on the basis of field study, standard of living: housing, diet, clothing, income and sanitation

Recommended Readings:

Learmon, A.T.A. 1976: "So You Want to be Medical Geographer? An open letter to students". In: Prakashan Rao, V.L.S. et al. (Eds.). The Golden Jubilee Volume, Madras. The Indian Geographical Society.

Learmonth, A.T.A. 1976: "Models and Medical Geography" in Mishra, V.C. (Ed) Essays in Applied Geography, Saugar, University of Saugar.

Lenian, J. and Fletcher, W.W. (Eds.) 1976: Health and the Environment, Chapter 2, Glasgow, Blackie.

May, J.M. 1950: "Medical Geography : Its Methods and Objectives", Geographical Reviews : Vol. 40, pp. 10-40.

May, J.M. 1961: "Studies in Disease Ecology", New York Hafner.

May, J.M. 1958: Ecology of Human Diseases", New York, American Geographical Society.

Mc Glashan, N.D. (Ed) 1972 : "Medical Geography Techniques and Field Studies", London Methuen.

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- Mishra, R.P. 1981 : "The Medical Geography of Common Diseases in Rajasthan", Unpublished Ph.D. Thesis Jaipur University of Rajasthan.
- Mishra, R.P. 1969 : "The Medical Geography of India", New Delhi National Book Trust.
- Park J.E. Park K. Preventive and Social Medicine.
- Patwardhan, V.N. 1961 : "Notification of India", Bombay. India Journal of Medical Sciences.
- Prothero, B.N. 1965 : Migrants and Malaria, London, Longmans.
- Pyle, G.W. and Alan Dever, G.E., Health Care Delivery : Spatial Perspectives, New York, McGraw.
- Shannon, G.W. and Alan Dever, G.E. Health Care Delivery : Spatial Perspectives, New York, McGraw.
- Singh, Amar : 1978 "The Lower Chambal Basin : A Study in Medical Geography", unpublished Ph.D. Thesis, Gwalior, Jiwaji University.
- Stamp, L.D. 1964 : "Some Aspects of Medical Geography", Oxford University Press.
- Stamp, L.D. 1964 : "The Geography of Life and Death", London, Fontana.
- Stevenson-Introduction of Food and Nutrition.
- Wilson and Evad-Principles of Nutrition.

Paper VII (g) : Fundamentals of Remote Sensing and Geographical Information System

Section A

Definition and scope of remote sensing, remote sensing as an established field, elements of remote sensing: Electro-magnetic radiation and interaction with Earth surface features, data products and users, atmospheric windows, remote sensing systems: platforms, sensors, resolution and radiometric characteristics, elements of image interpretation and keys, types of aerial photographs, aerial cameras types of mosaics, relief displacement and parallax, satellites: LANDSAT- MSS & TM, SPOT, NOAA-AVHRR, IRS, MODIS, RADARSAT, IKONOS, QUICKBIRD & CARTOSAT.

Section B

Digital image processing and classification: pre-processing and image enhancement techniques- rectification and restoration, contrast manipulation, density slicing, spatial filtering and band ratio, classification- supervised and unsupervised, post-classification analysis and accuracy assessment. microwave remote sensing, advantages over optical, unique capabilities of microwave (SAR & SLAR).

Section C

S applications: mapping and monitoring of land use and land cover, forestry and desertification, soil and water resources, remote sensing and hazard mapping and

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environmental monitoring. introduction to GIS as an automated geography, fundamentals of GIS- Geospatial databases, data structure and formats, projections and coordinate system. raster and vector data infrastructure and analysis, implication of integration of remote sensing and GIS.

Recommended Readings:

American society of Photogrammetry 1983: Manual of Remote sensing. ASP, Falls Church, V.a..

Barrett E.C. and L.F. Curtis, 1992: Fundamentals of Remote sensing and Air photo Interpretation. Mcmillan, New York.

Compbell J. 1989: Introduction to Remote Sensing. Guilford, New York.

Curran, paul J. 1985: Principles of Remote Sensing. Longman, London.

Hord R.M. 1989: Digital Image Processing of Remotely Sensed Data. Academic, New York.

Jalan, Seema 2010: Image Processing. Sahityagar, Jaipur

Lillesand, T., Kiefer, R.W. and Chipman, J. 2007: Remote Sensing and Image Interpretation. John wiley & Sons, New York.

Luder D. 1959: Aerial photography Interpretation: Principles and Application. McGraw Hill, New York.

Pratt W.K. 1978: Digital Image Processing. John Wiley & Sons, New York.

Rao D.P.(ed.) 1988: Remote Sensing for Earth Resources. Association of Exploration Geophysicist, Hyderabad.

Thomas M. Lillesand and Ralph W. Kefer 1994: Remote Sensing and image interpretation. John wiley & Sons, New York.

Paper VIII (a) : Political Geography

Section A

Definition, scope nature and importance of political geography: its relation with other social sciences, history and development of political geography : pre-modern phase (before 19th Century), geopolitics and German school of thought. global strategic views : views of Mackinder, Spykman, Meining, Hooson and De Seversky, world's geostrategic regions, critical.

Section B

State and nation, the idea of state: the elements of the state: territory, population, organization and power concept of nation, nationalism. heart of the state: core areas, the focus: capital city, frontiers and boundaries: definitions, classification and concepts, boundaries as economic barriers, buffer zones, concept of territorial sea and maritime boundaries, landlocked states:

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problem of access, growth of nations and disintegration of empires: unitary and federal states, dying colonialism and resurgent nationalism, supernationalism.

Section C

Politics and transportation, geography of foreign aid and economic development, emergence of third world block, politico-geographical study of india, political geography of administration, politico-geographical implications of space research. function, methods and trends of electoral geography: voter's participation before voting prediction, conceptual model of the voting decision, operationalisation of conceptual decision, gerrymandering in relation to india.

Recommended Readings:

- Adhikari, S. 2004: Political Geography. Rawat Publications, Jaipur.
- Alexander I.M. 1966: World Political Patterns. John Murray and Co., London.
- De Blij, H.J. and Glassner, Martin 1968: Systematic Political Geography. John Willey, New York.
- Deshpande, C.D. 1992: India- A Regional Interpretation. Northern Book Centre, New Delhi.
- Dikshit, R.D. 1982: Political Geography: A Contemporary Perspective. Tata McGraw-Hill Publishing Co., New Delhi.
- East, W.G. and Spate, O.H.K. 1966: The Changing Map of Asia. Methuen, London.
- Fellmann, J., Getis, A. and Getis, J. 1995: Human Geography: Landscapes of Human Settlements. WCB Brown Publishers, Dubuque.
- Guha, J.L. and Chatteraj, P.R.: A New Approach to Economic Geography. World Press, Kolkatta.
- Pounds, N.J.G. 1972: Political Geography. McGraw Hill, New York.
- Short, J.R. 1982: Political Geography of the 20th Century: A Global Analysis. New York.
- सक्सेना, एच.एम.: राजनैतिक भूगोल के सिद्धान्त। रस्तोगी पब्लिकेशन्स।
- Taylor, P. 1985: Political Geography. Longman, London.

Paper VIII (b) Cultural Geography

Section A

Definition, nature and scope of cultural geography, the evolutionary approaches and conceptual framework, evolution of man and human society from pleistocene to palaeolithic period, rise and dominance of homo sapiens and their deployment over the continents, spatial distribution and characteristics of primary races of the world.

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Section B

Beginning of plant domestication, animal domestication and their regions, evolution of civilization: Mesopotamian, Nile, Indus and Hwang Ho Valley with respect to racial, ethnic, religious, linguistic, demographic, and organizational characteristics. School of cultural determinism, cultural adaptation, assimilation, integration diffusion and Environmental perception. Major cultural hearths, realms and regions of the world, basic similarities and differences.

Section C

Major linguistic families and their distribution in the world. bases of cultural diversity: race, religion, language and nationalism, culture and environment, human settlements: origin, types, pattern and distribution, westernization, sanskritization and cultural urbanization and cosmopolitization.

Readings Recommended:

- Anderson, J. 2009: Understanding Cultural Geography-Places and traces. Routledge, USA.
- Anderson, K., Domosh, M., Pile, S. and Thrift, N. (eds.) 2003: Handbook of Cultural Geography. Sage Publications, London.
- Ahmad, Aijazuddin 1999: Social Geography. Rawat Publication, New Delhi.
- Crang, Mike 1999: Cultural Geography. Routledge, London.
- Chapman, K. 1979: People, Pattern and Process-An Introduction to Human Geography. Edward Arnold Ltd., London.
- Dreze Jean, Sen Amartya 1996: Economic Development and Social Opportunity. Oxford University press, New Delhi.
- Dubey, S.C. 1991: Indian Society. National Book Trust, New Delhi.
- Haq, Mahbubul: Reflection on Human Development. Oxford University Press. New Delhi.
- Mitchell, D. 2000: Cultural Geography: A Critical Introduction. Blackwell Publishers, Inc. USA.
- Norton, W. 2006: Cultural Geography. Environments. Landscapes. Identities. Inequalities. Oxford University Press, Toronto. 2nd edition.
- Robertson, Iain, and Penny Richards 2003: Introduction in Studying cultural landscapes, ed. Iain Robertson and Richards, 1-18.
- रिजवी, मुनीरुद्दीन 2001: सांस्कृतिक भूगोल। राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।
- Rubenstein, J. M. and Becon, J. M. 1990: Cultural Geography, John Wiley and Sons Inc., New York.
- Scott, A. J. 1997: The Cultural Economy of Cities. International Journal of Urban and Regional Research, 21(2), 323-339.
- Saberwal, Vasant K. 1996: Pastoral Politics: Gaddi Grazing, Degradation and biodiversity conservation in Himachal Pradesh, India. Conservation Biology 10, no. 3: 741-749.
- Sen, Amartya and Dreze Jean 1996: Indian Development Selected Regional Perspectives. Oxford University Press.

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- Popper, D. 1980: An Exploration of India: Geographical Perspectives on Society and Culture. Cornell University Press, Ithaca, New York.
- Smith, D.M. 1977: Human Geography: A Welfare Approach. Edward Arnold Publication, London.
- Spencer, J. E. and Thomas, W. L. 1969: Cultural Geography. John Wiley and Sons Inc., New York.
- Subba Rao. personality of India 1958: Pre and Proto Historic Foundation of India and Pakistan. M.S. University, Baroda, Vadodara.
- Wagner, P.L. & Mikesell, H.W. (eds.) Readings in Cultural Geography.
- Mukherjee, A.B. and Aijazuddin, A. 1985: India- Culture, society and economy. Inter India publications, New Delhi.
- Broke, J.C. and Webb, J.W. 1978: A geography of Mankind, McGraw Hill, New York.

Paper VIII (c): Biogeography

Section A

Definition, scope and significance nature, approaches, history, recent trends and developments, plant and animal ecology forms and functions of eco system, ecosystem with special reference to mountair and desert factors influencing distribution of flora, taxounomical and ecological classification of plant, ecological succession, ecotone and community, patterns of distribution of world vegetation.

Section B

Nature and classification of animals, dispersal and migration of animals: type and causes – case studies, geographical isolation. the zoo-geographical region, biogeography of the seas: island biogeography.

Section C

Conservation and management of forest and wild life with reference to India, process of desertification, its censequences and management principals, projecting into the future: climate change: biogeographical consequences of global change : changing communities and biomes, effect of climate change on biological diversity; environmental hazards and problems of pollutions.

Recommended Readings:

- Anjuneyulu, Y. 2002: Environmental Impact Assessment Methodologies. B.S. Publications, Hyderabad.
- Anjuneyulu, Y. 2004: Introduction to Environmental Science. B.S. Publications, Hyderabad.
- Beaikie, P. Cannon, T. and Davis, I. (eds.) 2004: At Risk: Natural Hazards Peoples Vulnerability and D.sasters. Routtedge, London.

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- Clark, J.I. Carson, P. Kayastha, S.L. and Nag, P. (eds.) 1991: Population and Disaster. Basil Blackwell, U.S.A.
- Cox, C.B. Moore, P.D. 2010: Biogeography- An Ecological and Evolutionary Approach. John Wiley and Sons. U.S.A.
- Huggett, R.J. 1998: Fundamentals of Biogeography. Routledge, London.
- Ladle, R.J. and Whittaker, R.J. 2011: Conservation Biology. Blackwell Publications Co., U.S.A.
- Mathur, H.S. 1988: Essentials of Biogeography. Pointer Publishers, Jaipur.
- Macdonald, Geen, 2002: Biogeography: Introduction to Space-Time and Life. John Wiley, New York.
- Odum, E.P. 1975: Ecology, Rowman and Littlefield. Lanhan U.S.A.
- Robinson, H. 1982: Biogeography. Elsevier, Mc Donald and Evans London.
- Singh, A.K., Kamra, V.K. and Singh, J. 1986: Forest Resource: Economy and Environment. Concept Publishing Company, New Delhi.
- सिंह, एस. 2013: जैव भूगोल। प्रयाग पुस्तक भवन, इलाहाबाद।

Paper VIII (d) : Regional Planning and Development

Section A

Conceptual and theoretical framework of regional planning, principles and determinants of regional planning, multi-level planning and inter-regional stresses, regional hierarchy, role of geography in preparation of a regional plan, significance of the term integration (political, economic and spatial) for regional planning.

Section B

The process of regional development: indicators of development; levels of regional development and disparities, strategies for development, regional planning in India: concept and indicators of development; regional imbalances; type of regions and methods of regionalization, growth pole and growth centres, environmental issues in regional planning for sustainable development.

Section C

Use of remote sensing, global positioning systems (GPS) and geographic information system (GIS) in modern regional planning, case studies from selected countries: Regional planning in USA (TVA) and regional planning in India (DVC and NCR), fundamentals of town and country planning.

Recommended Readings:

Chube K. N. (ed) 1990: Planning and Development in India. Asia Publishing House, New Delhi.

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Govt. of India 1986: Regional Plan 2001 - National Capital Region. NCRPB, Ministry of Urban Development, New Delhi.

Bhat, S. 1973: Regional Planning in India. Statistical Publishing Society, Kolkata.

Blair, J. P. and Carroll, M. C. 2009: Local Economic Development - Analysis, Practices, and Globalization. Second Edition, Sage Publications, Inc.

Chandna, R. C. 2008: Regional Planning and Development. Kalyani Publishers, Ludhiana.
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Hufschmidt, M.M. 1969: Regional Planning: Challenges and Prospectus. Praeger and Company, New York.

Mishra, R.P. 1978: Regional Planning and National Development. Vikas Publications, New Delhi.

Mishra R.P. (ed) 1992: Regional Planning: Concepts, Techniques, Policies and Case Studies. Concept Publications, New Delhi.

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www.academia.edu/Papers/in/Economic_Geography

www.jstor.org/stable/143805

Paper VIII (e): Meteorology

Section A

Atmosphere: chemical composition and layered structure insolation, temperature distribution, temperature: heat budget of atmosphere, radiation, measurement, various lapse rates inversion, albedo, adiabatic processes in the atmosphere and greenhouse effects, pressure: definition, law and hydrostatic equilibrium. variation of pressure, Laplace formula, measurements of pressures, isobars and pressure systems, humidity: vapour pressure, humidity quantities. the dry bulb and dew point density of air, stability and instability, thermodynamic diagrams and instability, clouds and precipitation: classification of clouds and their description, formation of clouds, condensation, formation of rain, bergeron's and capture theories, convective, frontal and orographic precipitation.

Section B

Motion of air : byes ballot law, coriolis force, geostrophic and gradient winds, effect of friction, seas and land breeze, orographic winds, thermal wind, gust and squall, variation and wind the height, jet-streams, upper air observations : history, balloon observations, radiosound, uses of radar and satellites, upper observation in india.

synoptic meteorology :

structure of pressure systems: weather conditions associated with different types of pressure system, air masses fronts. frontogenesis and frontolysis world circulation of air and

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geographical distribution of fronts, intertropical convergence zones, tropical revolving storms, development and movement of simple pressure systems and fronts, Morgan's formula.

Section C

Monsoon climate, genesis of the Indian summer monsoon, the energetics and physics of monsoon rain, distribution of rainfall in monsoon and associated pressure system, long range forecasts of monsoon rain, consideration of analogues charts, climate classification of World-Koppens classification, precipitation and temperature criteria, Thornthwaite climatic classification, seasons in India with special reference to western disturbance, north western monsoon depressions and dust storms, physical climatology, biometeorology: health and design of houses.

Recommended Readings:

- Critchfield, H.J. 1983: General Climatology. Prentice-Hall of India, New Delhi.
- Glantz, M.H., 2001: Currents of Change: Impacts of El Niño and La Niña on Climate and Society. Cambridge University Press, Cambridge.
- गौतम, अल्का 2010: जलवायु एवं समुद्र विज्ञान। रस्तोगी पब्लिकेशन्स, मेरठ, द्वितीय संस्करण।
- गुप्ता, एस.एल. 2000: जलवायु विज्ञान। हिन्दी माध्यम कार्यालय निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली।
- Oliver, J.E. and Hidore, J.J. 2011: Climatology : An Atmospheric Science, Dorling Kindersky. India Pvt. Ltd., Licensees of Pearson education in South Asia, New Delhi.
- Singh, S., 2007: Climatology. Prayag Pustak Bhawan, Allahabad.
- सिंह, एस. 2006: जलवायु विज्ञान। प्रयाग पुस्तक भवन, इलाहाबाद।
- Trewartha, G. T. and Horn, L.H. 1980: An Introduction to Climate. McGraw-Hill, New Delhi.

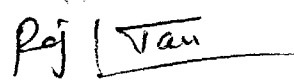
Paper VIII (f) : Research Methodology

Section A


Research: meaning, objectives, significance, types of research, research approaches, problems of geographical research, relevant and applied research, hypothesis and its basic concepts, testing of hypothesis, models and paradigm, formulation of research proposal and research design, types of research projects and report writing.

Section B

Sources of data, methods of data collection, processing, analysis and results, observation and interview questionnaire and field schedule, sampling theory, sample size, sampling techniques, selected techniques of spatial analysis, concentration and dispersal of economic activities, interaction theories, scaling techniques. ~~measurements of~~ disparities and


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inequalities, methods of delimitation of economic, industrial, agricultural and planning regions.

Section C

Regional population analysis, population projections, network analysis, delimiting sphere of city influence, core and marginal area, morphometric analysis, drainage basin analysis and slope analysis, integrated, area development planning, introduction to remote sensing and geographical information system in land use analysis.

Recommended Readings:

- आहूजा, राम 2010: सामाजिक अनुसंधान। रावत पब्लिकेशन्स, नई दिल्ली।
डी.डी. चौनियाल 2006: सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली। शारदा पुस्तक भवन, इलाहाबाद।
Guthrie, G. 2010: Basic Research Methods—An Entry to Social Science Research. SAGE Publications, India Pvt Ltd., New Delhi.
Gupta, S.P. 1979: Statistical Methods. Sultan Chand & Sons, New Delhi.
Harvey, D. 1969: Explanation in Geography. Arnold Heinemann, London.
Har Prasad 1992: Research Methods and Techniques in Geography. Rawat Publication, Jaipur.
K.R. Sharma 2004: Research Methodology. National Publishing House, Jaipur.
Kothari, C.R. 1990: Research Methodology—Methods and Techniques. Wishwa Prakashan, New Delhi.
Mishra, H.N. and Singh, V.P. 1998: Research Methodology in Geography. Rawat Publication, Jaipur.
Mahmood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi.
Mishra, R.P. 1989: Research Methodology. Concept Publishing Company, New Delhi.
Pal, S.K. 1998: Statistics for Geoscientists – Techniques and Applications. Concept Publishing Company, New Delhi.
Sharma, P.R. and Yadav, R.S. 2011: Research Methodology: Concepts and Studies. R.K. Books, New Delhi.
श्रीवास्तव एवं प्रसाद 2008: भूगोल की सांख्यिकी विधियाँ। वसुन्धरा प्रकाशन, गोरखपुर।
वीरेन्द्र प्रकाश शर्मा 2001: रिसर्च मैथाडोलोजी। पंचशील प्रकाशन, फिल्म कॉलोनी, चौड़ा रास्ता, जयपुर।

Paper VIII (g) : Geography of Water Resources, their Management and Utilization

Section A

Definition and scope of water resource geography, inventory and distribution of world's water resources, water resources of India, Groundwater, hydrological cycle, demand and use of water, irrigation methods and conservation of water.

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Section B

Salinity, alkalinity, overexploitation of groundwater and arsenic problem, water pollution, river water pollution, demand and water supply in industries, flood management, drought and dry farming projects in India and Rajasthan.

Section C

Water conservation/participatory approach, traditional methods of water conservation in India and Rajasthan, integrated basin planning, watershed management, river water disputes, water management using remote sensing technology, environmental disasters and water crisis.

Recommended Readings:

- Agarwal, Anil 2001: Drought: Try Capturing the Rain, Briefing paper, Down to Earth. Centre for Science and Environment, New Delhi.
- Agarwal, Anil and Narain Sunita, 1998, (eds.): Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System. Centre for Science and Environment, New Delhi.
- Black, Magie, 2005: The No-Nonsense Guide to Water. Rawat Publications, Jaipur.
- Black, Magie, 2004: A Matter of Life and Health. OUP, New Delhi.
- Barlow and Clark Tony, 2002: Blue Gold: The Battle Against Corporate Theft of the World's Water. Earthscan, London
- भारती, राधाकांत, 1998: भारत की नदियाँ। नेशनल बुक ट्रस्ट ऑफ इण्डिया, नई दिल्ली।
- Climate Change, 2001: International Panel on climate Change. Cambridge University Press.
- Clarke, Robin 1991: Water: The International Crisis. Earthscan, London.
- Dams and Development 2000: Report of the World Commission on Dams. November.
- Das, P.K. 1996: The Monsoon. National book Trust, India, New Delhi.
- Dhuruv Narain, V.V., Shastry, G. and Patnaik U.S. 1990: Watershed Management. ICAR, New Delhi.
- Dakshinamurti, C., Michael, A.M. and Mohan, S., 1972: Water Resources of India and their Utilization in Agriculture. IARI Monograph No. 3, New Delhi.
- गुर्जर, आर.के. एवं जाट, बी.सी. 2012: जल संसाधन भूगोल। रावत पब्लिकेशन, जयपुर।
- Gurjar R.K., Jat B.C., 2011: Geography of Water Resource. Rawat Publication.
- गुर्जर, आर.के. एवं जाट, बी.सी., 2001: जल प्रबंध विज्ञान। पोइंटर पब्लिशर्स, जयपुर।
- Gurjar, R.K. 1990: Geographical Perspectives on Irrigation. Rawat Publications, Jaipur.
- Goudie, A., 1997: The Nature of the Environment, Blackwell, London.
- जाट, बी.सी. 2007: जलग्रहण प्रबन्धन पोइंटर पब्लिशर्स। जयपुर।
- Jat. B.C., 1999: Watershed Prioritization and Rainfall Runoff Modelling Using Remote Sensing and GIS Approach. IIRS, Dehradun.
- Kirnerslay, David, 1988: Troubled Water: River, Politics and Pollution, Hillen Shipman, London.
- Mahnot, S.C. and Singh, P.C., 1993: Soil and Water Conservation. Intercooperation Coordination Office, Jaipur.
- Narain, Sunita, 2004: Down to Earth, February 29, 2004.
- Park, C., 1997: The Environment: Principles and Application. Routledge, London.

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- Rao, K.L., 1975: India's Water Wealth. Orient Longman, New Delhi.
- Singh, Gopal, 2004: A Geography of India. Atma Ram & Sons, New Delhi.
- Singh, Vandana, 2002: Water Wars: Privatization, Pollution and Profit. Pluto Press, London.
- Sata Water Resources Plan, 1998: Volume, I, II, III : Tahal consulting Engineer. Ltd. Tel Aviv, Israel.
- Sidhartha, K., 1990: Flood in India: A Model for Generating Factors. Cender Patna.
- Sidhartha, K., 1989: Drought in India: Spatio Temporal Variations. H.T. Patna.
- Singh, R.L., 1971: India: A Regional Geography. NAGI, New Delhi.
- World, C., 1997: Reflected in Water: A Crisis of Social Responsibility. Cassed London.

DISSERTATION

The candidates can offer dissertation on any geographical problem in lieu of any elective paper in final year examination.

N.B.: The candidates will be required to submit dissertation four weeks after the theory examination which will be examined by a board of two examiners. Three copies of dissertation will be submitted to the University out of which one copy will be returned to the Department/College and one to the supervisor.

The dissertation should exclusively be based on secondary data and statistical analysis as far as possible and prepared under the guidance of a post graduate teacher of five year standing. The volume of the dissertation will not exceed 100 pages.

Practicals

Scheme of examination

Min. Pass Marks: 36	Bifurcation of Marks		Max. Marks: 100 Time
	Non-collegiate candidates	Regular candidates	
Written test	60(4 questions)	40 (4 questions)	4 hrs.
Record work and viva voce	15+5	14+06	
Field survey and viva voce	15+5	14+06	4 hrs.
Camp work and viva voce	--	14+06	

N.B. In written test there shall be 2 questions from each section. Candidates have to answer 4 questions selecting at least one question from each section. All questions carry equal marks. Examination be conducted in batches of not more than 20 candidates in any case. 12 hours of teaching practicals be provided for a batch of 20 students per week.

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SYLLABUS

Section A

Methods and techniques of representation of relief:

Methods and techniques of depicting relief Profile, gradients and calculation of slope, Block diagrams, hypsographic curves, altimetric frequency graph.

Interpretation of topographical maps:

A brief history of topographical maps of the world with special reference to India and their interpretation. Detailed study of such topographical sheets which depict typical geomorphological and cultural landscapes.

Section B

Scanning and digitization of maps, knowledge of stereoscopic vision and types of stereoscopes, identification of cultural and physical features on aerial photographs, calculation of scale on air photo, number of runs, air photographs in each run and total air photographs for a given area.

Section C

Field surveying and camp work: resectioning using plane table: two and three point problems, use of dumpy level, practical on contouring and profiles.
Parts and use of theodolite in traverseing and angle computation.

Camp Work: A topographical survey of a settlement of about 200 hectares of land will be done by organizing a camp at least for a week away from the centre of the institution and maps and reports of the same will be prepared with help of computer technology (word programme & Autocard). (Students are expected to stay in the camp at night).

Books Recommended

- B.C. Punmia 1988: Surveying and Field Work. Vol. I, Laxmi Publications, New Delhi.
Breed, C.B. and Hosmer, G.L.: The Principle of Surveying. Vol. I and II, New York.
Devis, R.E. and Foot, F.S.: Surveying theory and practice. Mc-Graw Hill Book Co., New York.
Gautam, N.C.: Urban Land use studies through Airphoto Interpretation .
Monkhouse, F.J. and Wilkinson, H.R. 1971: Maps and Diagrams. Methuen, London.
Lorke Engineering College: Manual of Surveying.
Robinson, A.H. et al. 2004: Elements of Cartography. John Wiley & Sons, Inc., New York.
Sampal, K.K. 1993: Mapping and Conflation: Methods and Techniques. Concept Publishing company, New Delhi.
Singh, R.L. and Singh RPB 1991: Elements of Practical Geography. Kalvani Publishers, New Delhi.

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Sharma, J.P. 2011: Practical Geography. Rastogi Publications, Meerut.

Tiwari, E. 2009: Practical Geography. Prayag Pustak Bhawan, Allahabad.

T.R. ...: Surveying theory and practice. John Willey and Sons, Inc., New York.

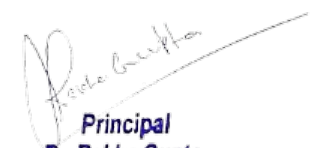
Thrillfan, H.S., A.: Text Book of surveying and Levelling. Charles' Grafflin, London.

Techniques: Pink Publishing House, Mathura.

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SYLLABUS

M.A. Political Science

Annual Scheme

M.A. (Previous) Examination	2023
M.A. (Final) Examination	2024

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एम.ए. पूर्वार्द्ध राजनीति विज्ञान परीक्षा

M.A. PREVIOUS POLITICAL SCIENCE EXAMINATION

प्रश्न-पत्रों की रूपरेखा

प्रत्येक प्रश्न-पत्र 3 घण्टे की अवधि का होगा तथा प्रत्येक प्रश्न-पत्र के अधिकतम 100 अंक होंगे।

प्रत्येक प्रश्न-पत्र के तीन खण्ड होंगे। प्रथम खण्ड 20 अंको का होगा। इस खण्ड में दो अंकों के 10 अनिवार्य प्रश्न होंगे। जिनमें से प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20-25 शब्दों में अपेक्षित होगा।

द्वितीय खण्ड 20 अंकों का होगा। इस खण्ड में 05 अंकों के 04 अनिवार्य प्रश्न होंगे, जिनमें से प्रत्येक का उत्तर 150 शब्दों में अपेक्षित होगा।

तृतीय खण्ड 60 अंकों का होगा। इस खण्ड में तीन भाग होंगे। जिनमें प्रत्येक में 20 अंको के दो निबंधात्मक प्रश्न होंगे। परीक्षार्थी से प्रत्येक खण्ड में से एक प्रश्न का उत्तर अपेक्षित होगा। प्रत्येक खण्ड से एक प्रश्न का चयन करते हुए कुल 03 प्रश्नों का उत्तर अपेक्षित होगा।

General Scheme of Question Papers

Each question paper shall be of three hours duration and of 100 marks.

Each question paper shall consist of three parts. Part I shall carry 20 marks and shall consist of 10 compulsory questions of 2 marks each to be answered in 20-25 words each.

Part II shall carry 20 marks and shall consist of 4 compulsory questions of 5 marks each to be answered in 150 words each.

Part III of the question paper shall carry 60 marks. This part shall be divided into 3 sections each comprising of 2 essay-type questions of 20 marks each. Candidates will be required to attempt one question from each section (3 questions in all, one from each section)

एम.ए. पूर्वार्द्ध परीक्षा

अग्रांकित चार अनिवार्य प्रश्न-पत्र होंगे

- | | |
|-----|--------------------------------------|
| I | पाश्चात्य राजनीतिक चिन्तन |
| II | भारतीय राजनीतिक चिन्तन |
| III | अन्तर्राष्ट्रीय राजनीति |
| IV | लोक प्रशासन के सिद्धान्त एवं व्यवहार |

There shall be following four compulsory papers:

- | | |
|-----|--|
| I | Western Political Thought |
| II | Indian Political Thought |
| III | International Politics |
| IV | Theory and Practice of Public Administration |

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एम. ए. उत्तराद्ध परीक्षा
अनिवार्य प्रश्न-पत्र

- (V) आधुनिक राजनीतिक सिद्धान्त एवं तुलनात्मक राजनीति
(VI) भारतीय शासन और राजनीति
(VII) अनुसंधान प्रविधि

वैकल्पिक प्रश्न-पत्र

VIII व IX प्रश्न-पत्र हेतु अग्रांकित प्रश्न-पत्रों में से किन्हीं दो प्रश्न-पत्रों का चयन

1. यूनानी राजनीतिक चिन्तन
2. संविदावादी
3. उदारवादी
4. समाजवादी चिन्तन
5. प्राचीन भारतीय राजनीतिक चिन्तन
6. आधुनिक भारतीय राजनीतिक चिन्तन
7. गाँधीय राजनीतिक चिन्तन
8. लोक अन्तर्राष्ट्रीय विधि
9. राजनय के सिद्धान्त व व्यवहार
10. संयुक्त राज्य अमेरिका, भारत, चीन एवं पाकिस्तान की विदेश नीतियाँ
11. भारत में मानवाधिकार
12. अन्तर्राष्ट्रीय संगठन
13. दक्षिण एशिया में शासन व राजनीति
14. भारत में लोक प्रशासन
15. भारत में जिला प्रशासन: पंचायती राज के विशिष्ट संदर्भ में
16. तृतीय विश्व के देशों में तुलनात्मक शासन व राजनीति
17. भारत में राज्य-राजनीति
18. भारत में निर्वाचनिक राजनीति
19. राजनीतिक समाजशास्त्र
20. महिला, शासन एवं राजनीति

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M. A. Final Examination
Compulsory Papers

- (V) Modern Political Theory and Comparative Politics
- (VI) Indian Government Politics
- (VII) Research Methodology

For Selection of VIII and IX Paper shall be selected from the following list of Papers

1. Greek Political Thought
2. Contractualists
3. Liberals
4. Socialist Thought
5. Ancient Indian Political Thought
6. Modern Indian Political Thought
7. Gandhian Political Thought
8. Public International Law
9. Theory & Practice of Diplomacy
10. Foreign Policies of U.S.A., India, China and Pakistan
11. Human Rights in India
12. International Organisation
13. Government and Politics of South Asia
14. Public Administration in India
15. District Administration in India with Special Reference to Panchayati Raj
16. Comparative Government & Politics in Countries of the Third World
17. State Politics in India
18. Electoral Politics in India
19. Political Sociology
20. Women, Governance and Politics

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M.A. PREVIOUS POLITICAL SCIENCE EXAMINATION

प्रश्न -पत्र प्रथम - पाश्चात्य राजनीति चिन्तन

खण्ड-क

जीवन, राज्य व राजनीति के संबंध में यूनानी दृष्टिकोण, सुकरात, प्लेटो व अरस्तु, मध्ययुगीन राजनीतिक चिन्तन: संत अगस्टाइन, थॉमस एक्विनास,

खण्ड - ख

पुनर्जागरण: मेकियावली, संविदावादी: हॉब्स, लॉक व रूसो, उपयोगितावादी, बेंथम व जॉन स्टुअर्ट मिल:

खण्ड -ग

प्रत्ययवादी: हीगल, ग्रीन, समाजवादी: कार्ल मार्क्स एवं लेनिन, समकालीन उदारवादी: जॉन रॉल्स, रॉबर्ट नोजिक

PAPER I - WESTERN POLITICAL THOUGHT

Section A

Greek View of Life, State and Politics, Socrates, Plato, Aristotle. Medieval Political Thought : Saint Augustine, Thomas Aquinas.

Section B

Renaissance : Machiavelli, Contractualists : Hobbes, Locke & Rousseau, Utilitarians : Bentham and J.S. Mill.

Section C

Idealists: Hegel and Green, Socialists: Karl 'Marx, Contemporary Liberals: John Rawls, Robert Nozick.

Recommended Books :

R.N. Berki, The History of Political thought: A Short Introduction, Every Man's University Library, 1977.

J. Coleman, A History of Political Thought; From Ancient Greece to Early Christianity, Wiley, 2000. V.R Metha: Hegel and the Modern State

G.H. Sabine, A History of Political Theory, IBH, 1973.

Q. skinner, The Foundations of Modern Political Thought, Volumes 2, Cambridge University Press, reprint, 2004.

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जे.पी. सूद: पाश्चात्य राजनीतिक विचारों का इतिहास

नरेश दाधीच: जॉन रॉल्स के न्याय का सिद्धान्त

प्रभुदत्त शर्मा: पाश्चात्य राजनीतिक विचारों का इतिहास

हरिदत्त वेदालंकार: पाश्चात्य राजनीतिक चिंतन का इतिहास

माइकल बी.फोस्टर: राजनीतिक चिंतन के आचार्य, हिंदी माध्यम कार्यन्वयन निदेशालय, दिल्ली विश्वविद्यालय

जॉर्ज एच. सेबाइन: राजनीतिक दर्शन का इतिहास, एस.चांद पब्लिकेशन दिल्ली, 1982

प्रश्न-पत्र द्वितीय – भारतीय राजनीतिक चिन्तन

खण्ड –क

मनु, वाल्मीकि, व्यास, कौटिल्य,

खण्ड –ख

राजाराम मोहन राय, दयानन्द सरस्वती, विवेकानन्द, गोखले व तिलक

खण्ड-- ग

मोहनदास कर्मचन्द गांधी, एम.एन. रॉय व जवाहरलाल नेहरू, भीमराव अम्बेडकर, जयप्रकाश नारायण एवं दीन दयाल उपाध्याय

PAPER II - INDIAN POLITICAL THOUGHT

Section A

Manu, Valmiki, Vyas, Kautilya.

Section B

Raja Ram Mohan Roy, Dayanand Saraswati, Vivekananda, Gokhale and Tilak.

Section C

M. K. Gandhi, M.N. Roy, Jawahar Lal Nehru, BR. Ambedkar, Jay Prakash Narayan & Deen Dayal Upadhyaya

Recommended Books :

D.D. Kosambi, Culture and Civilizations in Ancient India, Vikas, 1980

V.P. Verma, Studies in Hindu Political Thought and Its Metaphysical Foundations, Delhi, Motilal Banarsidass, 1974

U.N. Ghoshal, *A History of Indian Political Ideas*, London, Oxford University Press, 1959.

K.P. Jayaswal, *Hindu Polity*, Calcuta, Butterworth, 1924.

Jha Rakesh Kumar, Religion, Dharma, and Polity, Concept Publication Ltd. New Delhi 2012

Arvind, Sharma, Classical Hindu Thought: An Introduction Oxford, 2000

V.P. Varma, Modern Indian Political Thought, Laxmi Narain Agarwal, Agra

मधुकर श्याम चतुर्वेदी, प्रमुख भारतीय राजनीतिक विचारक, कॉलेज बुक हाऊस, जयपुर

रामशरण शर्मा: प्राचीन भारत में राजनीतिक विचार एवं संस्थाएँ, राजकमल प्रकाशन नई दिल्ली, 2010

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मंजु शर्मा, प्राचीन भारत में राजनय(एक तुलनात्मक अध्ययन) आर.बी.एस पब्लिशर्स जयपुर 2007
 भारतीय राजशास्त्र प्रणेता, श्याम लाल पाण्डेय, उत्तर प्रदेश हिन्दी ग्रंथ अकादमी लखनऊ
 प्राचीन भारतीय राजनीतिक विचार एवं संस्थाएं, परमात्माशरण, मीनाक्षी प्रकाशन मेरठ

प्रश्न-पत्र तृतीय – अन्तर्राष्ट्रीय राजनीति

खण्ड-क

अन्तर्राष्ट्रीय राजनीति के सिद्धान्त एवं अध्ययन के उपागम: आदर्शवादी, यथार्थवादी, व्यवस्था, निर्णय-निर्माण एवं खेल सिद्धान्त
 राष्ट्रीय शक्ति के तत्त्व एवं उद्विकास

खण्ड -ख

राष्ट्रीय हित एवं राष्ट्रीय नीति: राजनय, प्रचार एवं राजनैतिक युद्ध, राष्ट्रीय नीति के आर्थिक साधन: साम्राज्यवाद एवं नव-साम्राज्यवाद, युद्ध: युद्धों की प्रकृति, कारण एवं प्रकार, वैश्विक आतंकवाद: राष्ट्रीय शक्ति की सीमाएं: शक्ति संतुलन, सामुहिक सुरक्षा, अन्तर्राष्ट्रीय विवादों का शान्तिपूर्ण निपटारा, अन्तर्राष्ट्रीय विधि, नि: शस्त्रीकरण: संयुक्त राष्ट्र संघ: लक्ष्य, उद्देश्य, संरचना एवं भूमिका, संरचनात्मक सुधारों का प्रश्न

खण्ड-ग

शीत युद्ध का अंत, यूरोप का पुनर्गठन, वैश्वीकरण, क्षेत्रीय संगठन: सार्क एवं आसियान, ब्रिक्स, इबसा, अन्तर्राष्ट्रीय मामलों में भारत की भूमिका: भारत एवं उसके पड़ोसी, गुट निरपेक्षता एवं उसके बदलते प्रतिमान, समकालीन अन्तर्राष्ट्रीय राजनीति के मुख्य मुद्दे एवं प्रवृत्तियाँ

PAPER III - INTERNATIONAL POLITICS

Section A

Theories and Approaches to the study of International Politics Idealist, Realist, Systems, Decision-Making, Game Theory and Feminist Perspective, Concept of National Power, Elements and Evolution of National Power.

Section B

National Interest and National Policy: Diplomacy, Propaganda and Political Warfare, Economic Instruments of National Policy, Imperialism and Neo-Imperialism. War : Nature, Causes and Types of Wars, Global Terrorism.

Limitations of National Power, Balance of Power, Collective Security, Pacific Settlements of International Disputes, International Law, Disarmament.

United Nations: Aims, Objectives, Structure and Role, Issue of Restructuring.

Section C

End of Cold War, Reorganization of Europe, Globalization. Regional Organization especially SAARC, ASEAN, BRICS, IBSA. India's Role in International Affairs, India and her Neighbours, Non-Alignment and its changing patterns. Major issues and trends in Contemporary International Politics.

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1. Waltz, Kenneth N., 'Laws and Theories', in *Theory of International Politics*, (New York: Random House, 1979).
2. Waltz, Kenneth N., *Man, the State and War: A Theoretical Analysis*, New York, Columbia University Press, 1954, pp. 1-15, 224-238.
3. Singer, David J., 'The Level-of-Analysis Problem in International Relations', *World Politics*, 14(1), 1961, pp. 77-92.
4. Wight, Martin, 'Why is there no International Theory' in James Der Derian (ed.), *International Theory: Critical Investigations*, (New York: New York University Press, 1995).
5. Kaplan, Morton A. , 'Problems of theory building and theory confirmation in International Politics', *World Politics*, 14(1), October, 1961, pp. 6-24.
6. Rosenau, James N., 'Thinking Theory Thoroughly' as reproduced in Paul R.Viotti and Mark V. Kauppi, *International Relations Theory* (Longman, 2012).
7. Hollis, Martin and Steve Smith, *Explaining and Understanding International Relations*, (New York: Oxford University Press, 1990).
8. Vincent, John R., 'The Hobbesian Tradition in Twentieth Century International Thought', *Millennium: Journal of International Studies*, 10(2), 1981, pp. 91-101.
9. Hurrell, Andrew, 'Kant and the Kantian Paradigm in International Relations', *Review of International Studies*, 16 (July 1990), pp. 183-205.
10. Waltz, Kenneth N., 'Realist Thought and Neorealist Theory', *Journal of International Affairs*, 44(1): pp. 21-37 at <http://www.irchina.org/waltz/waltz1990.pdf>.
11. Waltz, Kenneth N., "Political Structures", in Waltz, Kenneth N., *Theory of International Politics*, (New York: Random House, 1979).
12. Milner, Helen, 'The Assumption of Anarchy in International Relations Theory: A Critique', *Review of International Studies*, 17(1), January 1991, pp. 67-85.
13. Jean BethkeElshtain, "International Politics and Political Theory", in Booth and Smith, eds., *International Relations Theory Today*, pp. 263-278.
14. यू.आर.घई-के.के.घई अन्तर्राष्ट्रीय राजनीति सिद्धांत तथा व्यवहार, न्यू पब्लिकेशन कम्पनी जालंधर
15. वी.एन.खन्ना-लिपाक्षी अरोड़ा भारत की विदेश नीति, विकास पब्लिकेशन हाऊस नोएडा
16. तपन बिस्वाल: अंतर्राष्ट्रीय संबंध, मेक्सिमलन, दिल्ली
17. पुष्पेश पंत: अंतर्राष्ट्रीय संबंध

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प्रश्न-पत्र चतुर्थ- लोक प्रशासन के सिद्धान्त एव व्यवहार

खण्ड-क

लोक प्रशासन: अर्थ, क्षेत्र, प्रकृति एवं अध्ययन की पद्धतियाँ, निजी एवं लोक प्रशासन, वेश्ठीकरण का लोक प्रशासन पर प्रभाव, लोक-निजी भागीदारी

संगठन सिद्धान्त एवं उपागम: मनोवैज्ञानिक उपागम, मानवीय संबंध उपागम, प्रशासनिक नेतृत्व, निर्णय-निर्माण का विज्ञान

संगठन के सिद्धान्त: मुख्य कार्यपालिका और उसके कार्य, लाइन और स्टाफ, पदानुक्रम, नियंत्रण का क्षेत्र, प्रत्यायोजन एवं विकेन्द्रीकरण, संचार, समन्वय और पर्यवेक्षण

खण्ड-ख

लोक उद्यमों के सांगठनिक प्रारूप: विभाग, निगम एवं कम्पनी, लोक उद्यमों की समस्याएं, पी पी पी मॉडल (सार्वजनिक निजी सहभागिता)

खण्ड-ग

वित्तीय प्रशासन: बजट का निर्माण, अनुमोदन एवं क्रियान्विति, वित्त पर विधायी नियंत्रण, लोक लेखा समिति एवं प्राक्कलन समिति,

प्रशासन पर विधायी एवं न्यायिक नियंत्रण, सूचना का अधिकार, लोकपाल एवं लोकायुक्त. ई-गवर्नेन्स प्रशासनिक सुधार

PAPER-IV— THEORY AND PRACTICE OF PUBLIC ADMINISTRATION

Section A

Public Administration: Meaning, Scope, Nature and Methods of Study; Private and Public Administration; Impact of Globalization on Public Administration; Public-Private Partnership.

Theories and Approaches of Organizations: Psychological Approach, Human Relations Approach, Administrative Leadership; Science of Decision Making.

Section B

Principles of Organizations: Chief Executive and its Functions, Line and staff, Hierarchy, Span of Control, Delegation and Decentralization, Communication, Coordination and Supervision. Organizational Patterns of Public Enterprises: Department, Corporation and Company; Problems of Public Enterprises, PPP (Public Private Partnership).

Section C

Financial Administration: Formulation, Approval and Execution of Budget, Parliamentary Control over Finance, Public Accounts Committee and Public Estimates Committee.

Legislative and Judicial Control over Administration, Right to Information, Lok Pal and Lokayukta, E- governance, Administrative Reforms.

Recommended Books :

Henry Nicholas, Public Administration and Public Affairs, Prentice Hall, New Jersey, 2005.

Osborne, David and Gaebler, Ted., Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector, Prentice Hall of India, New Delhi, 1992.

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Frederickson George, New Public Administration, Alabama, University of Alabama Press, 1990.

Heady Farrel, Public Administration: A Comparative Perspective, Nareel Dekker, 2002.
A. Avasthi and S.R. Maheswari, Public Administration, Agra, Lakshmi Naran Aggarwal, 1996

M. Battacharya, Public Administration: Structure, Process and Behavior, Culcutta, The World Press, 1991.

D. Waldo, Ideas and Issues in Public Administration, New York, McGraw Hill, 1953.

L.D. White, Introduction to the Study of Public Administration, New York, Macmillan, 1955.

M.P Sharma and Sadana "Theory and Practice of Public Administration."

Guy Peters B and Pierre Jon(Eds) Handbook of Public Administration, Sage, London, 2005.

Spicer Michael W. Public Administration and the State: A Postmodern Perspective, Alabama Press, Tuscaloosa, 2001.

Hyden Goran Court, Julius, Mease, Keneth, Making Sense of Governance Viva: New Delhi, 2010.

अवस्थी व अवस्थी : लोक प्रशासन के सिद्धान्त व व्यवहार

बी.एल फड़िया, लोक प्रशासन: सिद्धान्त एवं व्यवहार

पी.डी.शर्मा, हरिश चन्द्र शर्मा, लोक प्रशासन सिद्धान्त व व्यवहार

एम.पी.शर्मा, बी.एल.सड़ाना, लोक प्रशासन सिद्धान्त व व्यवहार

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अनिवार्य प्रश्न-पत्र

- (V) आधुनिक राजनीतिक सिद्धान्त एवं तुलनात्मक राजनीति
 (VI) भारतीय शासन और राजनीति
 (VII) अनुसंधान प्रविधि

वैकल्पिक प्रश्न-पत्र

VIII & IX प्रश्न-पत्र हेतु अग्रांकित प्रश्न-पत्रों में से किन्हीं दो प्रश्न-पत्रों का चयन

1. यूनानी राजनीतिक चिन्तन
2. सविदावादी
3. उदारवादी
4. समाजवादी चिन्तन
5. प्राचीन भारतीय राजनीतिक चिन्तन
6. आधुनिक भारतीय राजनीतिक चिन्तन
7. गाँधीय राजनीतिक चिन्तन
8. लोक अन्तर्राष्ट्रीय विधि
9. राजनय के सिद्धान्त व व्यवहार
10. संयुक्त राज्य अमेरिका, भारत, चीन एवं पाकिस्तान की विदेश नीतियाँ
11. भारत में मानवाधिकार
12. अन्तर्राष्ट्रीय संगठन
13. दक्षिण एशिया में शासन व राजनीति
14. भारत में लोक प्रशासन
15. भारत में जिला प्रशासन: पंचायती राज के विशिष्ट संदर्भ में
16. तृतीय विश्व के देशों में तुलनात्मक शासन व राजनीति
17. भारत में राज्य-राजनीति
18. भारत में निर्वाचनिक राजनीति
19. राजनीतिक समाजशास्त्र
20. महिला, शासन एवं राजनीति

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M. A. Final Examination**Compulsory Papers**

- (V) Modern Political Theory and Comparative Politics
(VI) Indian Government Politics
(VII) Research Methodology

For Selection of VIII & IX Paper shall be selected from the following list of Papers

1. Greek Political Thought
2. Contractualists
3. Liberals
4. Socialist Thought
5. Ancient Indian Political Thought
6. Modern Indian Political Thought
7. Gandhian Political Thought
8. Public International Law
9. Theory & Practice of Diplomacy
10. Foreign Policies of U.S.A., India, China and Pakistan
11. Human Rights in India
12. International Organisation
13. Government and Politics of South Asia
14. Public Administration in India
15. District Administration in India with Special Reference to Panchayati Raj
16. Comparative Government & Politics in Countries of the Third World
17. State Politics in India
18. Electoral Politics in India
19. Political Sociology
20. Women, Governance and Politics

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M.A. FINAL EXAMINATION

प्रश्न-पत्रों की रूपरेखा

प्रत्येक प्रश्न-पत्र 3 घण्टे की अवधि का होगा तथा प्रत्येक प्रश्न-पत्र के अधिकतम 100 अंक होंगे।

प्रत्येक प्रश्न-पत्र के तीन खण्ड होंगे। प्रथम खण्ड 20 अंको का होगा। इस खण्ड में दो अंकों के 10 अनिवार्य प्रश्न होंगे। जिनमें से प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20-25 शब्दों में अपेक्षित होगा।

द्वितीय खण्ड 20 अंकों का होगा। इस खण्ड में 05 अंकों के 04 अनिवार्य प्रश्न होंगे, जिनमें से प्रत्येक का उत्तर 150 शब्दों में अपेक्षित होगा।

तृतीय खण्ड 60 अंकों का होगा। इस खण्ड में तीन भाग होंगे। जिनमें प्रत्येक में 20 अंको के दो निबंधात्मक प्रश्न होंगे। परीक्षार्थी से प्रत्येक खण्ड में से एक प्रश्न का उत्तर अपेक्षित होगा। प्रत्येक खण्ड से एक प्रश्न का चयन करते हुए कुल 03 प्रश्नों का उत्तर अपेक्षित होगा।

General Scheme of Question Papers

Each question paper shall be of three hours duration and of 100 marks.

Each question paper shall consist of three parts. Part I shall carry 20 marks and shall consist of 10 compulsory questions of 2 marks each to be answered in 20-25 words each.

Part II shall carry 20 marks and shall consist of 4 compulsory questions of 5 marks each to be answered in 150 words each.

Part III of the question paper shall carry 60 marks. This part shall be divided into 3 sections each comprising of 2 essay-type questions of 20 marks each. Candidates will be required to attempt one question from each section (3 questions in all, one from each section)

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एम. ए. उत्तराद्ध परीक्षा

अनिवार्य प्रश्न-पत्र

प्रश्न-पत्र : पंचम आधुनिक राजनीतिक सिद्धान्त एवं तुलनात्मक राजनीति

खण्ड -क

राजनीतिक सिद्धान्त की अभिनव प्रवृत्तियाँ : परम्परागत से आधुनिक की ओर प्रयाण, राजनीतिक सिद्धान्त में व्यवहारवाद, अर्थ, प्रकृति, भूमिका और सीमायें, उत्तर व्यवहारवाद, राजनीति विज्ञान का विकास। व्यवस्था सिद्धान्त (ईस्टन), संरचनात्मक-प्रकार्यात्मक सिद्धान्त (ऑमण्ड कोलमैन),

खण्ड -ख

राजनीतिक आधुनिकीकरण एवं राजनीतिक विकास, राजनीतिक सामाजीकरण एवं राजनीतिक संस्कृति, समूह सिद्धान्त, वितरणात्मक उपागम (लॉसवेल)

खण्ड -ग

संस्थाए एवं कार्यकरण- लोकतंत्र एवं निरंकुश तंत्र, संसदीय एवं अध्यक्षतात्मक, संघीय एवं एकात्मक सरकार के अंग उनके कार्य एवं अन्तर्संबंध, दलीय व्यवस्था, दबाव समूह एवं जनमत।

M. A. Final Examination

Compulsory Paper

Paper V Modern Political Theory and Comparative Politics

Section A

Recent Trends in Political Theory: Shift from Traditional to Modern

Behaviouralism in Political Theory, Meaning, Nature, Role & Limitations, Post Behaviouralism, Development of Political Science.

Systems Theory (Easton), Structural Functional (Almond and Coleman)

Section B

Political Modernization and Political Development, Political Socialization and Political Culture. Group Theory, Distributive Approach (Lasswell)

Section C

Institutions and Dynamics : Democracy and Dictatorship, Parliamentary and Presidential, Federal and Unitary, types of government, Organs of Government their functions and interrelationships, Party system, Pressure groups and Public opinion.

Recommended Books :

Kymlicka, Will, "Contemporary Political Philosophy: An Introduction," OUP, New Delhi, 2002

Rawls John, "A Theory of Justice", OUP, New York, 1971

Nozick, Robert, "Anarchy, State and Utopia," Basic Books, New York, 1974

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- Bakaya, Santosh, "The Political Theory of Robert Nozick," Kalpaz Publications, Delhi, 2006
- Bell, Daniel A, "Communitarianism and its Critics," OUP, New York, 1993
- Heater, Derek, "What is Citizenship", Blackwell, New York, 2000
- Okin, Susan, "Justice, Gender and the Family," Basic Books, New York, 1989
- Willet, Cynthia, "Theorising Multiculturalism: A Guide to the Current Debate," Blackwell, New York, 1998
- Roemer John (Ed.), "Analytical Marxism", Cambridge University Press, Cambridge, 1986
- Dobson, Andrew, "Green Political Thought," Rotledge, London, 1980
- Gould and Thursby (ed.) Contemporary Political Thought.
- James, C. Charlesworth: (ed.) Contemporary, Political analysis.
- Engene J. Meehan: Contemporary Political Thought A Critical Study
- K.R. Memouse and Crespingy: Contemporary Political Philosophers.
- S.P. Verma: Modern Political Theory
- M. Crasston : The New Left
- J. C. Johari: Contemporary Political Theory.
- S.E. Finer: Comparative Government.
- C.J. Friederich: Constitutional Government and Democracy.
- Arnold Brecht : Political theory : Foundations of Twentieth Century Political Thought.
- Ronald Young (ed.): Approaches to the study of the Political Science. . David Easton : Framework for Political Analysis.
- Lasswell and Kaplan : Power and Society : Framework for Political Inquiry.
- Austin (Ed.)' Essays on the Behavioural Study of policy.
- Almond and Powell: Comparative Politics—A Development Approach . Samuel P. Huntington.: Political Order in Changing Societies.
- Hass and Kariel (Ed): Approaches to the study of Political Science.
- Herbert J Storing: Essays on the Scientific Study of Politics
- David Easton : The Political System : An Enquiry into the State of Political Science.
- Harold D lasswell: Politics: Who gets, What, When and How.
- Dant Germino: Beyond Ideology : Revival of Political Theory.
- Eugene J. Mechan: The Theory and Method of Political Analysis.
- Hayes and Hedlund, (eds). The Conduct of Political Enquiry : Behavioral Political Analysis.
- एस.पी. वर्मा : आधुनिक राजनीतिक सिद्धान्त
- एस.एल. वर्मा : आधुनिक राजनीतिक सिद्धान्त
- हरिशचन्द्र शर्मा : आधुनिक राजनीतिक सिद्धान्त
- सी.बी. गेना: तुलनात्मक राजनीतिक संस्थाए।

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प्रश्न-पत्र-षष्ठम्: भारतीय शासन और राजनीति

खण्ड-क

संविधान सभा, संविधान के दार्शनिक आधार, मूल अधिकार, मूल कर्तव्य, राज्य-नीति के निदेशक सिद्धान्त।

संघीय कार्यपालिका- राष्ट्रपति, प्रधानमंत्री, मंत्रि-परिषद्, संसद और उसके दोनों सदनों के मध्य संबंधों का स्वरूप।

खण्ड -ख

उच्चतम न्यायालय और न्यायिक पुनरावलोकन, लोकहित वाद एवं न्यायिक सक्रियतावाद, संविधान-संशोधन, संघ-राज्य संबंध, राज्यपाल का पद और राष्ट्रपति शासन की राजनीति, क्षेत्रवाद और राष्ट्रीय एकीकरण।

खण्ड-ग

राजनैतिक दल, चुनाव व मतदान व्यवहार, निर्वाचन-सुधारों की आवश्यकता, जाति, वर्ग, संप्रदायवाद और भाषा की राजनीति, पंथ-निरपेक्षता, अल्पसंख्यकों की समस्या, सामाजिक और आर्थिक न्याय की समस्या, भारतीय राजनीति में संचार की भूमिका

Paper VI—Indian Government and Politics

Section A

Constituent Assembly, Philosophical Foundations of the Constitution, Fundamental Rights, Fundamental Duties, Directives Principles of State Policy, Federal System. The Union Executive - The President, Prime Minister, Council of Ministers, Parliament and relationship pattern between the two chambers.

Section B

The Supreme Court and Judicial Review, Public Interest litigation and Judicial activism, Amendment of the Constitution, Union-State Relations, Office of the Governor and Politics of President's Rule, Regionalism and National Integration.

Section C

Political Parties, Elections and Voting behavior, Need for electoral reforms, Politics of Caste, Class, Communalism and Language, Secularism, Problem of Minorities, Problem of Social and Economic Justice, Role of Media in Indian Politics.

Recommended Books:

Granville Austin: The Indian Constitution: Cornerstone of Nation.

W.H. Morris-Jones : Government and Politics of India.

Rajani Kothari : Politics in India.

K.L. Kamal: Democratic Politics in India.

Manju Singh : Assam Politics of Migration and quest for identity.

Iqbal Narain: Indian Government and Politics.

Bhawani Singh : Politics of Alienation in Assam.

Bhawani Singh Council of States in India.

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V. R. Mehta : Ideology Modernisation & Politics in India.

Upendra Baxi: The Indian Supreme Court.

J.R. Siwach : Politics of President's Rule in India.

Rakhahari Chatterjee : Union, Politics and the State.

Ghanshyam Shah: Politics of Scheduled Castes & Scheduled Tribes. . Min Shákir : Politics of Minorities.

JR. Siwach Constituent Assembly.

J.R Siwach: Office of the Governor.

Shakdhar : Parliamentary. Practice in India.

Paul Wallace & Surendra Chopra : Political Dynamics of Punjab.

Myron Weiner : Party Politics in India - The Development of Multiparty System.

Myron Weiner : Politics of Scarcity Public Pressure and Political Response in India.

D.D. Basu, An Introduction to the Constitution of India, New Delhi, Prentice Hall, 1994.

D.D. Basu and B. Parekh (ed.), Crisis and Change in Contemporary India, New Delhi, Sage 1994.

Zoya Hasan, E Sridharan, R. Sudarshana (Edited) : India's Living Constitution- Ideas Practices, Controversies , 2006

एल.एम.सिंघवी : भारत का संविधान : चुनौतियाँ उत्तर

एस.एन.जैन : भारतीय संविधान व राजनीति

पी.के. त्रिपाठी: भारतीय संविधान के मूल तत्त्व

रामगोपाल चतुर्वेदी: सांविधानिक दर्शन (तीन खण्ड)

एम.पी. राय: भारतीय शासन व राजनीति

बी.एल. फडिया : भारतीय शासन व राजनीति

रजनी कोठारी: भारत में राजनीति

प्रश्न-पत्र -- सप्तम् : अनुसंधान प्रविधि

खण्ड - क

राजनीति विज्ञान में शोध की आवश्यकता और स्वरूप। अनुसंधान के प्रकार: आदर्शीय, अनुभव परक और व्यवहारवादी, नीतिविश्लेषण, अन्तः अनुशासनात्मक अनुसंधान, वैज्ञानिक पद्धति, अध्ययन के विभिन्न प्रकार : पैनल, केस व क्षेत्रीय।

खण्ड - ख

शोध समस्या का निरूपण, शोध का प्रारूप, प्रायोगिक शोध का प्रारूप, संकल्पना और परिकल्पना, समग्र का चुनाव, आंकड़ों के स्रोत-प्राथमिक और द्वितीयक, निदर्शन, आंकड़ों के संकलन की तकनीक, पर्यवेक्षण, प्रश्नावली और अनुसूची।

खण्ड - ग

गुण-स्थान की अवधारणा : संकेतीकरण व सारणीयन, आंकड़ा-विश्लेषण, प्रतिवेदन-लेखन, राजनीतिशास्त्र में सिद्धान्त निर्माण।

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(VII) - Research Methodology**Section-A**

Need and Nature of Research in Political Science. Forms of Research: Normative, Empirical and Behavioural, Policy Analysis, Inter-disciplinary Research, The Scientific Method, Various forms of Studies Panel, Case, & Area.

Section-B

Formulation of Research Problem, Research Designs, Experimental Research Designs, Concepts and Hypothesis, Selection of Universe: Source of data: Primary and Secondary, Sampling, Techniques of data-collection, Observation, Questionnaire & Schedule,

Section-C

Concept of Property and Space, Coding and Tabulation, Data Analysis, Report Writing, Theory Building in Political Science.

Recommended Books:

Karl Popper: The Logic of Scientific Discovery.

Kenneth Janda: Data Processing: Application to Political Research.

Louis D. Hayes and Ronald D Hed'nd (ed.) : The Conduct of Political Inquiry : Behavioural. Political Analysis.

I. Villiman Buchman: Understanding Political Variables.

Thomas A. Sprangens : The Dilemma of Contemporary Political Theory: Toward a Post-Behavioural Science of Politics.

John Galtung: Theory and Methods of Social Research.

Russell L. Ackoff: The Design of Social Research.

Meehan: The Foundation of Political Analysis : Empirical and Normative,

H.W Smith: Strategies of Social Research-The Methodological Imagination.

G. Sjoberg and Roger Nett: A Methodology for Social Research.

Dr. B.M. Jam: Research Methodology.

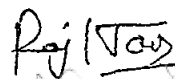
Goode and Hatt: Methods in Social Research, Mc Graw-Hill Books Co., New Delhi, 1987.

एस. एल. वर्मा : राजनीति विज्ञान में अनुसंधान प्रविधि।

वैकल्पिक प्रश्न पत्र

VIII व IX प्रश्न-पत्र हेतु अग्रांकित प्रश्न-पत्रों में से किन्हीं दो प्रश्न-पत्रों का चयन किया जा सकता है:

1. यूनानी राजनीतिक चिन्तन
2. संविदावादी
3. उदारवादी
4. समाजवादी चिन्तन
5. प्राचीन भारतीय राजनीतिक चिन्तन


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6. आधुनिक भारतीय राजनीतिक चिन्तन
7. गाँधीय राजनीतिक चिन्तन
8. लोक अन्तर्राष्ट्रीय विधि
9. राजनय के सिद्धान्त व व्यवहार
10. संयुक्त राज्य अमेरिका, रूस, ब्रिटेन, चीन व भारत की विदेश नीतियाँ
11. भारत में मानवाधिकार
12. अन्तर्राष्ट्रीय संगठन
13. दक्षिण एशिया में शासन व राजनीति
14. भारत में लोक प्रशासन
15. भारत में जिला प्रशासन: पंचायती राज के विशिष्ट संदर्भ में
16. तृतीय विश्व के देशों में तुलनात्मक शासन व राजनीति
17. भारत में राज्य-राजनीति
18. भारत में निर्वाचनिक राजनीति
19. राजनीतिक समाजशास्त्र
20. महिला, शासन एवं राजनीति

M. A. Final Examination

OPTIONAL PAPERS

For Selection of VIII & IX Paper shall be selected from the following list of Papers

1. Greek Political Thought
2. Contractualists
3. Liberals
4. Socialist Thought
5. Ancient Indian Political Thought
6. Modern Indian Political Thought
7. Gandhian Political Thought
8. Public International Law
9. Theory & Practice of Diplomacy
10. Foreign Policies of U.S.A., Russia, U.K., China and India
11. Human Rights in India
12. International Organisation
13. Government and Politics of South Asia
14. Public Administration in India
15. District Administration in India with Special Reference to Panchayati Raj
16. Comparative Government & Politics in Countries of the Third World
17. State Politics in India
18. Electoral Politics in India
19. Political Sociology
20. Women, Governance and Politics

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वैकल्पिक प्रश्न पत्र

1. यूनानी राजनीतिक चिन्तन
अग्रणी कृतियों का अध्ययन –
- प्लेटो-रिपब्लिक
 - अरस्तु-पॉलिटिक्स

1. Greek Political Thought.

Study of the following texts:

- Plato-Republic
- Aristotle-Politics

Recommended Books

- Ernest Barker, Greek Political Theory Plato and his predecessors, London 1951.
- Robert J. Bonner: Aspect of Athenian Democracy, Berkeley, .Calif. G. Glotz: Greek City and its Institutions. Eng. Tr. by N. Maliii London.
- EM. Cornford: Before and after Societies, Cambridge. . TA. Sinclair: A History of Greek Political Thought.
- A.E. Taylor: Societies, New York, 1993.
- K.R. Popper: The Open Society and its Enemies. Rev. ed. Prince, 1950, Part I.
- Ronald B. Levinson: In Defence of Plato, Cambridge.
- Ernest Barker (Translated); The Politics of Aristotle, Oxford.

2. संविदावादी

संविदावादी विचारकों की मूल कृतियों के संदर्भ में अध्ययन-कृतियाँ

- हॉब्स-लेवियाथन
- लॉक-टू ट्रीटाइजेज ऑन सिविल गवर्नमेण्ट
- रूसो-सोशल कॉन्ट्रैक्ट, ऐसे ऑन इनईक्वैलिटी

2. Contractualists

With reference to the original writings of Contractualists:

- Hobbes - Leviathan
- Locke - Two Treatises on Civil Government
- Rousseau - Social Contract, Essay on Inequality.

Recommended Books

Leo Strauss : The Political Philosophy of Hobbes. In Basis and Genesis. Warrender: Political Philoophy of Thomas Hobbes.

Christopher Hill : Puritanism and Revolution.

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C.B. Macperson: The Political Theory of Possessive Individualism.

John Bowle : Hobbes and High Critics: A Study in Seventeenth Century Constitutionalism

JW. Geough: John Locke's Political Philosophy.

Alfred Cobban: Rousseau and the Modern State.

E. Wright: The Meaning of Rousseau.

3. उदारवादी

अग्रकित उदारवादी चिंतकों के सन्दर्भ में अध्ययन की मूल कृतियाँ :

(i) बेन्थम – फ्रेग्मेण्ट्स ऑन गवर्नमेन्ट

(ii) जे.एस.मिल – यूटिलिटेरियानिज्म, ऑन लिबर्टी

(iii) टी.एच.ग्रीन – लेक्चर्स ऑन प्रिंसीपल्स ऑफ पोलिटिकल ऑब्लिगेशन

3. Liberals

With reference to the following texts of the liberal thinkers:

(i) Bentham-Fragments on Government.

(ii) J.S.Mill-Utilitarianism, on Liberty.

(iii) T.H. Green-Lectures on Principles of Political Obligations.

Recommended Books:

Harold J.Laski : Political Thought in England from Locke to Bend . William Davidson: Political Thought in England : The Utilitarians I Bentham to J.S. Mill, New York.

Lester Sephen : The English Utilitarians.

Ernest Barket : Political Thought in England 1814, 1914, London. . Isaiah Berlin: Two Concepts of Liberty, Oxford.

Karl Briton : John Stuart Mill.

Melvin Richter : The Politics of Conscience : T.H. Green and his Times.

4. समाजवादी चिंतन

खण्ड –क

माक्स से पूर्ववर्ती समाजवादी परम्परा: थॉमस मूर, विलियम गॉडविन, संत साइमन, चार्ल्स फोरियर, राबर्ट ओवन, लुई ब्लांक्

खण्ड –ख

माक्स, लेनिन, स्टालिन एवं माओ के विचार व योगदान

खण्ड –ग

प्रोधां, बाकुनिन एवं क्रोपाटोकिन के विचार व योगदान: श्रमिक संघवाद, श्रेणी समाजवाद, अराजकतावाद, राष्ट्रीय समाजवाद, लोकतांत्रिक समाजवाद।

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4. Socialist Thought

Section A

Pre-Maxian Socialist Tradition: Ideas of Thomas Moore William Godwin, Saint Simon, Charles Fourier, Robert Owen, Louis Balance.

Section B

Ideas and contribution of Karl Marx; Lenin, Stalin and Mao

Section C

Ideas and Contribution of Proudhon, Bakunin and Kropotkin; Syndicalism Guild Socialism, Anarchism, National Socialism, Democratic Socialism.

Recommended Books:

Alexander Gray: The Socialist Tradition, Marx to Lenin

Alfred G. Heyer: Leninism,

Edward Me Nall Lurns: Ideas in Conflict, Chapter V VI, VII

George Lichtheim : A Historical and Critical Study.

Joseph Schumpeter: Socialism in Evolution.

Dr. K. L. Kamal : समाजवादी चिंतन

Ashok Mehta: Studies in Asian Socialism.

परमात्मा शरणः प्राचीन भारतीय राजनीतिक चिंतन व संस्थाएं

5. प्राचीन भारतीय राजनीतिक चिंतन

खण्ड -क

प्राचीन भारतीय राजनीतिक चिंतन की प्रमुख विशेषताएँ, प्राचीन भारतीय चिंतन के दार्शनिक आधार, व्यक्ति तथा समाज व राज्य से उनके संबंध के विषय में प्राचीन भारतीय दृष्टिकोण, वेदों में राजनीतिक विचार, बौद्ध व जैन राजनीतिक विचार।

खण्ड-ख

स्मृतियों व महाकाव्यों में राजनीतिक विचारः मनुस्मृति, याज्ञवल्क्य स्मृति, रामायण व महाभारत (शांति पर्व के विशिष्ट संदर्भ में)

खण्ड -ग

नीतिग्रन्थों में राजनीतिक विचारः कौटिल्य का अर्थशास्त्र, शुक्रनीतिसार, सोमदेव का नीतिवाक्यामृतम

5. Ancient Indian Political Thought

Section A

Main features of Ancient Indian Political Thought; Its Philosophical Bases; Ancient Indian view of man and his relation to Society and State, Political Ideas in Vedas, Political Ideas of Buddhists and Jains.

Section B

Political Ideas in Smrities and Epics: Manusmiriti, Yajnavalkya Smriti, Ramayan and Mahabharat (with special reference to Shantiparva).

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Section C

Political Ideas in Neetigianthas: Arthshashtra of Kautilya, Sukranitsar and Som Dēv's Neeti Vakyamritam;

Recommended Books :

D.D. Kosambi, Culture and Civilizations in Ancient India, Vikas, 1980.

V.P. Verma, Studies in Hindu Political Thought and Its Metaphysical Foundations, Delhi, Motilal Banarsidass, 1974.

U.N. Ghoshal, *A History of Indian Political Ideas*, London, Oxford University Pres, 1959.

K.P. Jayaswal, *Hindu Polity*, Calcuta, Butterworth, 1924.

Arbind, Sharma, *Classical Hindu Thought: An Introduction* Oxford, 2000.

R.C. Majumdar, *History and Culture of Indian People*, (11 volumes), Calcutta, 1956

A.S. Atekekar, *State and Government in Ancient India*, Motilal Banarasidas, 1966

A. Appadurai, : *Indian Political Thinking*, Oxford Press,

R. P. Kangle, : *Arthashastra of Kautilya*, Delhi, Motilal Banarasidas, 1965.

Dr. R.G. Chaturvedi and Dr. Inakshi Chaturvedi: *Yajnavalkya Smriti, The code of Laws by Yajnavalkya Smriti.*

मधुकर श्याम चतुर्वेदी, प्रमुख भारतीय राजनीतिक विचारक, कॉलेज बुक हाऊस, जयपुर

रामशरण शर्मा: प्राचीन भारत में राजनीतिक विचार एवं संस्थाएँ, राजकमल प्रकाशन नई दिल्ली, 2010

मंजु शर्मा, प्राचीन भारत में राजनय(एक तुलनात्मक अध्ययन) आर.बी.एस पब्लिशर्स जयपुर 2007

श्याम लाल पाण्डेय: भारतीय राजशास्त्र प्रणेता, उत्तर प्रदेश हिन्दी ग्रंथ अकादमी लखनऊ

परमात्माशरण: प्राचीन भारतीय राजनीतिक विचार एवं संस्थाएँ, मीनाक्षी प्रकाशन मेरठ

6. आधुनिक भारतीय राजनीतिक चिंतन

खण्ड—क

राष्ट्रवाद व राजनीतिक उद्भव का दर्शन: सामाजिक पुनरुद्धार: राजा राममोहन राय, दयानन्द सरस्वती व विवेकानन्द।

खण्ड—ख

गोपाल कृष्ण गोखले, बाल गंगाधर तिलक, अरबिन्दो, वी.डी. सावरकर, लाला लाजपतराय एवं दीन दयाल उपाध्याय के विचार व योगदान।

खण्ड—ग

मोहन दास करमचन्द गांधी, जवाहर लाल नेहरू, भीमराव अम्बेडकर, मानवेन्द्र नाथ रॉय एवं विनोबा भावे के विचार व योगदान।

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6. Modern Indian Political Thought.

Section A

Philosophy of Nationalism and Political Evolution; Social
Regeneration: Ideas of Ramnohan Roy, Dayanand Saraswati, Vivekanand.

Section B

Ideas and contribution of Gopal Krishan Gokhale, Bal Gangadhar Tilak, Aurbindo,
V.D. Savarkar and Lajpat Rai and Deen Dayal Upadhyaya.

Section C

Ideas and contribution of M.K.. Gandhi, Jawahar Lal Nehru, B.R. Ambedkar, M.N.
Roy and Vinoba Bhave.

Recommended Books:

A. Appadorai, Documents on Political Thought in Modern India, 2 Vol. Bombay
Oxford University Press, 1970.

K. N. Kadam, Dr. B. R. Ambedkar, New Delhi, Sage, 1992.

M. J. Kanetkar, Tilak & Gandhi: A Comparative Study, Nagpur, Author, 1935.

B. R. Nanda, Gokhale, Gandhi and Nehrus : Studies in Indian Nationalism, London,
Allen and Unwin, 1974.

G. Omvelt, Dalits and the Democratic Revolution : Dr. Ambedkar & Dalit
Movement in Colonial India, New, Delhi, Sage, 1994.

T. Pantham & K. Deustch, Political Thought in Modern India, New Delhi, Sage,
1986.

S. A. Wolpert, Tilak & Gokhale, Berkeley, University of California Press, 1962.

Rakesh Kumar Jha, Religion, Dharma and Polity-; Concept Publication, Delhi, 2012.

मधुकर श्याम चतुर्वेदी: प्रमुख भारतीय राजनीतिक विचारक, कॉलेज बुक हाऊस, जयपुर

पुरुषोत्तम नागर: आधुनिक भारतीय सामाजिक एवं राजनीतिक विचारक, राजस्थान हिन्दी
ग्रन्थ अकादमी

वी.पी.वर्मा: आधुनिक भारतीय राजनीतिक विचारक लक्ष्मी नारायण अग्रवाल, आगरा (हिन्दी
व अंग्रेजी)

ए.अवस्थी व आर.के.अवस्थी: भारतीय राजनीतिक चिन्तन, रिसर्च पब्लिकेशन, जयपुर

7. गांधीय राजनीतिक चिंतन

खण्ड-क

गांधी के विचारों व व्यक्तित्व पर निर्धारक प्रभाव, गांधी के विचारों व कर्मण्यताका
उद्विकास, दक्षिण अफ्रीका में प्रयोग, गांधी के विचारों के तात्विक आधार, सत्य, अहिंसा,
गांधीय तकनीक-सत्याग्रह, साधन व साध्य

खण्ड-ख

हिन्द स्वराज में मूलभूत विचार, वर्ण व्यवस्था, अस्पृश्यता निवारण, स्त्री की स्थिति, शिक्षा
एवं धर्म, गांधीय अर्थशास्त्र: अर्थशास्त्र का नैतिक आधार, मुख्य आर्थिक
संकल्पनाएँ-विकेन्द्रीकरण, औद्योगीकरण व यंत्रों के प्रति दृष्टिकोण, स्वदेशी, रोटी के लिये
श्रम, श्रम व पूँजी के मध्य संबंध, प्रत्यास सिद्धांत।

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खण्ड-ग

राज्य व शासन के प्रति गांधी का दृष्टिकोण, राज्य -व्यवस्था का गांधीय प्रतिमान, मार्क्स, माओ व गांधी: सामाजिक परिवर्तन के वैकल्पिक प्रतिमान, विनोबा, मार्टिन लूथर किंग (जूनियर) व गांधी, शांति-स्थापना व द्वंद्व -समापन का गांधीय प्रतिमान।

7. Gandhian Political Thought

Section-A

Formative influence, Evolution of Gandhi's ideas and activism, Experiments in South Africa, Metaphysical foundations of Gandhi's ideas, Truth, Ahinsa, Gandhian Technique Satyagraha, End & Means.

Section-B.

Fundamental ideas in Hind Swaraj, Varna-Vyavastha, Eradication of Untouchability place of women, Education and Religion. Gandhian Economics, Ethics of Economics, Main economic formulations : Decentralization, views on Industrialization and Machines, Swedeshi, Bread - Labour, Labour-Capital Relationship, Trusteeship.

Section-C

Gandhi's view of State and Government, Gandhian model of polity, Marx, Mao and Gandhi-Alternative for social change, Vinoba, Martin Luther King (Jr.) and Gandhi; Gandhian frame-work for peace and conflict resolution.

Recommended Books:

Murty V.V. Raman: Essential Writings of Gandhi.

Allen, Douglas; (Ed.), "The Philosophy of Mahatma Gandhi for the Twenty-First Century",

Laxington Books, Lanham, 2008

Andrews, C.F.; "Mahatma Gandhi : His life and Ideas", Anmol Publications, New Delhi, 1987

Bandyobadhyaya, J.; "Mao-tse-tung and Gandhi: perspective on Social Transformation", Allied

Publishers, New Delhi, 1973

Bondurant, Joan V.; "Conquest of Violence: The Gandhian Philosophy of Conflict", OUP,

Mumbai, 1959

Bose, Nirmal Kumar "Studies in Gandhism", Navajivan Publishing House, Ahmedabad, 1972

Brown, Judith M.; & Parel, Anthony; (Ed.), "The Cambridge Companion to Gandhi", Cambridge University Press, Cambridge, 2011

Dadhich, Naresh "Gandhi and Existentialism", Rawat Publications, Jaipur, 1993

Dadhich, Naresh; "Women, Conflict Resolution and culture: Gandhian Perspective", Aavishkar

Publishers, Jaipur, 2003,

Dadhich, Naresh; "Non-Violence, Peace and Politics: Understanding Gandhi", Aavishkar

Publishers, Jaipur, 2003.

Datta, Dharendra Mohan; "The Philosophy of Mahatma Gandhi" The University of Wisconsin,

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- Madison, 1953
- Dhawan, Gopinath; "The Political Philosophy of Mahatma Gandhi", Navjivan Publishing House, Ahmedabad, 1951
- Ericson, Eric H.; "Gandhi's Truth: on the Origins Militants Non-violent", Norton New York, 1969
- Fischer, Louis; "The Life of Mahatma Gandhi", Granada, London, 1951.
- Gandhi, Rajmohan; "Mohandas: A True Story of a Man, His People and An Empire", Penguin Books, New Delhi, 2006
- Ganguli, B.N.; "Gandhi's Social Philosophy: perspective and relevance", Vikas Publishing House, New Delhi, 1973
- Guha, Ramchandra; "Gandhi Before India", Allen Lane, New Delhi, 2013
- Gundam, Rahul Ram; "Gandhi's Khadi: A History of Contention and Conciliation", Orient Longman, Hyderabad, 2008
- Iyer, Raghavan N.; "The Moral and Political Thought of Mahatma Gandhi, OUP, Delhi, 1973
- Kulkarni, Sudheendra; "Music of the Spinning Wheel: Mahatma Gandhi's Manifesto for the Internet Age", Published by Amarwllas, New Delhi, 2012
- Lalyveld, Joseph; "Great Soul: Mahatma Gandhi and his struggle with India", Harper Collins, New Delhi, India, 2011
- Parekh, Bhikhu; "Colonialism Tradition and Reform: An Analysis of Gandhi Political Discourse", Sage Publication, New Delhi, 1989.
- Parel, Anthony; "Hind Swaraj and Other Writings", Foundation Books, New Delhi, 2005.
- Richards, Glyn; "Gandhi's Philosophy of Education", OUP, New Delhi, 2001
- Roy, Ramashray; "Self and Society: A Study in Gandhian Thought", Sage Publications, New Delhi, 1984.
- Rudolph, Lloyd I.; & Rudolph, Susanne H., "Postmodern Gandhi and Other Essays : Gandhi in the World and at Home" OUP, New Delhi, 2006.
- Terchek, Ronald; "Gandhi: Struggle for Autonomy," Rowman and Littlefield Publishers, Lanham, USA, 1998.
- D.K. Mishra: Gandhi and Social Order.
- लुई फिशर; "गाँधी की कहानी" सरस्ता साहित्य मण्डल प्रकाशन, नई दिल्ली, 2008
- बी आर नन्दा; "महात्मा गाँधी – एक जीवन" सरस्ता साहित्य मण्डल प्रकाशन, नई दिल्ली, 1986
- एम के गाँधी; "दक्षिण अफ्रिका के सत्याग्रह का इतिहास" नवजीवन प्रकाशन मन्दिर, अहमदाबाद, 2011
- एम के गाँधी; "सत्य के प्रयोग अथवा आत्मकथा" नवजीवन प्रकाशन मन्दिर, अहमदाबाद, 2012
- एम के गाँधी; "हिन्द स्वराज" नवजीवन प्रकाशन मन्दिर, अहमदाबाद, 2012
- एम के गाँधी; "ग्राम स्वराज" नवजीवन प्रकाशन मन्दिर, अहमदाबाद, 2011
- नन्द किशोर आचार्य (हिन्दी रूपान्तर); "हिन्द स्वराज: पश्चिमी दृष्टि में" प्राकृत भारती अकादमी, जयपुर, 2009

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महादेव प्रसाद: महात्मा गांधी का समज दर्शन, साहित्य अकादमी, पंचकूला

8. लोक अन्तर्राष्ट्रीय विधि

खण्ड-क

अन्तर्राष्ट्रीय विधि की प्रकृति व क्षेत्र, अन्तर्राष्ट्रीय विधि के स्रोत, अन्तर्राष्ट्रीय विधि व राष्ट्रीय विधि में संबंध-विविध सिद्धान्त, अन्तर्राष्ट्रीय विधि का ऐतिहासिक क्रम-विकास तथा उसके विकास में सहायक कारक, महाशक्तियों तथा तृतीय विश्व के देशों का उदय तथा उनका अन्तर्राष्ट्रीय विधि पर प्रभाव, अन्तर्राष्ट्रीय विधि की विभिन्न विचारधाराएँ, अन्तर्राष्ट्रीय विधि का संहिताकरण।

खण्ड-ब

राज्य: संप्रभु व अंशतः संप्रभु राज्य, तटस्थीकृत राज्य, राज्य-क्षेत्र, राज्य क्षेत्र के अर्जन व अपहरण के तरीके, राज्य-उत्तराधिकार, राज्यों की मान्यता, आत्मरक्षा हस्तक्षेप, आवश्यकता व आत्म-परीक्षण का सिद्धान्त, अन्तर्राष्ट्रीय विधि के विषय- राज्य व व्यक्ति, राष्ट्रीयता, राजनयिक अभिकर्ता व वाणिज्यदूत, राज्यों के अन्तर्राष्ट्रीय दायित्व, संधियाँ, क्षेत्राधिकार: राज्य के क्षेत्राधिकार पर मर्यादाएँ, शरण व प्रत्यर्पण, स्थायी न्यायालय, अन्तर्राष्ट्रीय न्यायालय, अन्तर्राष्ट्रीय विधि में संयुक्त राष्ट्र संघ की भूमिका, अन्तर्राष्ट्रीय विवादों का निपटारा, सहमतिपूर्ण व बाध्यकारी।

खण्ड -ग

युद्ध के नियम: युद्ध की परिभाषा व प्रकृति, युद्ध की घोषणा, युद्ध के प्रभाव, युद्ध के समापन के तरीके, युद्ध स्थिति व विद्रोहिता, व्यक्ति, सम्पत्ति निगम आदि का शत्रु चरित्र, स्थल युद्ध, विद्रोही-अभिग्रहण, समुद्री युद्ध, नोजितमाल न्यायालय (प्राइज कोर्टस), हवाई युद्ध व नाभिकीय युद्ध, युद्ध - अपराध, युद्धोत्तर परावर्तन के सिद्धान्त, तटस्थता की विधि: तटस्थता की परिभाषा व उसके प्रकार, तटस्थ व युद्ध स्थित, तटस्थों व युद्ध - स्थितों के दायित्व, संकटाधिकार, परिवेष्टन तथा विनिषिद्ध, अतटस्थ सेवाएँ, निरीक्षण व तलाशी का अधिकार, समुद्री मार्ग की निरंतरता का सिद्धान्त

8. Public International Law

Section-A

Nature and Scope of International Law, Sources of International Law, Relation between International law and Municipal Law, Various theories. Historical Evolution and Factors helping the growth of International Law, Emergence of Super powers and Countries of the III World and their impact on International Law, different schools of International Law. Codification of International Law.

Section-B

The Law of peace: States Sovereign States and partly Sovereign States, Neutralized States. State Territory: modes of acquisition and loss of State territory, States Succession, Recognition of States, Self-Defence, Intervention; Doctrine of necessity and self preservation. Subject of International Law-States and Individuals, Nationality, Diplomatic Agents and Consuls, International responsibility of States, Treaties, Jurisdiction, Limits on State's Jurisdiction, Asylum and Ex-tradition. International organization History, League of Nations, Permanent Court of Justice,

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International Court of Justice, Leading Cases, United Nations and its contribution to International Law, Settlement of International Disputes : Amicable and compulsive.

Section-C

Laws of War: Definition and nature of war, Declaration of War, Effects of War, Modes of termination of War, Belligerency and Insurgency. Enemy Character of person, Property, Corporation etc., Warfare on land, Belligerent occupation etc., Warfare on sea, Prize Courts; Aerial Warfare and nuclear warfare; War Crimes; Doctrine of Postliminium, The Law of Neutrality: Neutrality its definition and kinds, Evolution of Neutrality: Neutrals and belligerents. Duties of neutrals and belligerents, Angary, Blockade and contraband. Unneutral service and Right of Visit and search, Doctrine of Continuous voyage.

Books Recommended:

Oppenheim: International Law: Vols. I and II.

Fenwick: International Law.

Stark: International Law.

Kelson : Principles of International Law.

Gould: An Introduction to International Law.

Frendman: The changing structure of International Law.

Richard A Falk :/ The Status of Law in. International Society.

Nagendra Singh: Recent Trends in the Development to International Law.

Vasscher: Theory and Reality in International Law.

Arun Chaturvedi : Contemporary diplomatic in contemporary International relations.

Pitt Cobbet: Case on International Law.

Green: International Law through Cases.

J. Stone: Legal Control of International Conflicts. . Jenks : The Common Law of Mankind.

शील कान्ता आसोपा: अन्तर्राष्ट्रीय विधि

एम.पी. टण्डन: अन्तर्राष्ट्रीय विधि

एस.के. कपूर: अन्तर्राष्ट्रीय विधि

अरुण चतुर्वेदी : विमलेन्दु तायल: नए राष्ट्र व अन्तर्राष्ट्रीय विधि

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9. राजनय के सिद्धान्त व व्यवहार

खण्ड-क

राजनय की उत्पत्ति, प्रकृति, विकास व उद्देश्य, राष्ट्रीय शक्ति के उपकरण, साधन के रूप में राजनय का विकास, राजनयिक आचार का विकास, राजनय की यूनानी, रोमन, इतालवी व फ्रांसीसी पद्धतियाँ, राजनय की भारतीय पद्धति, स्मृतियों, महाकाव्यों व नीतिशास्त्रों का योगदान, राजनय के कार्य, राजनयिक अभिकर्ता-श्रेणियाँ, विशेषाधिकार व उन्मुक्तियाँ, तृतीय राज्य के संदर्भ में स्थिति, राजनयिक निकाय, अग्रता के सिद्धान्त, प्रत्यय पत्र व पूर्णाधिकार, आदर्श राजनयज्ञ।

खण्ड-ख

राजनय के प्रकार— प्रजातांत्रिक राजनय, संसदीय राजनय, शिखर राजनय, सम्मेलनीय राजनय, वैयक्तिक व सहमिलनीय राजनय, पुरातन व नवीन राजनय, राजनय की नई प्रविधियाँ तथा अधुनातन विकास, गुट-निरपेक्षता का राजनय, संयुक्त राष्ट्र संघ में राजनय, आधुनिक राजनय में प्रचार, युद्ध व शांति के दौरान राजनय, भारतीय राजनय, वाणिज्यदूत व उनके कार्य।

खण्ड-ग

अन्तर्राष्ट्रीय बैठकों व संव्यवहार, संधियाँ: स्वरूप उद्देश्य व वर्गीकरण, संधियाँ व उनके विभिन्न पक्ष-अविप्रतिपत्ति संधि (कॉन्कोर्डेट), अपर-अनुच्छेद (एडीशनल आर्टिकल्स), वृत्त-सार (फाइनल एक्ट), अधिकृत कार्यवृत्त (प्रॉसेस वर्बल), अनुसमर्थन (रॉटिफिकेशन), अधिमिलन (एसेशन), अपवाद (रिजर्वेशन) तथा समाप्ति (टर्मिनेशन), राजनयिक संव्यवहारों की भाषा तथा प्रलेखों का प्ररूप, राजनय का महत्त्व व परिवर्तनशील भूमिका, राजनय का भविष्य, विदेशनीति व राजनय, विदेश सेवाएँ व विदेश कार्यालय-भारत के विदेश मंत्रालय के संगठन व कार्यों के विशिष्ट संदर्भ में।

9. Theory and Practice of Diplomacy

Section-A

Origin, Nature, Development, Objectives of Diplomacy, Evolution of Diplomacy as a weapon and tool of National Power; Evolution of Diplomatic practices; Greek, Roman, Italian and French Schools of Diplomacy; Indian School of Diplomacy— Constitution of Smritis; Epics and Neetigranths; Functions of Diplomacy; Diplomatic Agents - Classes, Privileges and Immunities, Position with regard to Third State; Diplomatic body; Principles of Precedence, Credentials and full power; Ideal Diplomat.

Section-B

Types of Diplomacy: Democratic Diplomacy, Parliamentary Diplomacy, Summit Diplomacy, Conference Diplomacy, Personal and Coalition Diplomacy. Old Diplomacy and new Diplomacy; New Technique's and recent Development in Diplomacy; Diplomacy of Non-alignment; UN Diplomacy; Propaganda in Modern Diplomacy; Diplomacy during war and peace; Indian Diplomacy; Consular Agents and their functions.

Section-C

International Meetings and transactions; Treaties; Forms, Objectives and Classifications; Treaties and their different aspects—Concordat, Additional Articles, Final Act, Process Verbal, Ratification; Accession; Reservation and termination; Language of Diplomatic Intercourse and form of Documents. Significance and

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changing Role of Diplomacy; Future of Diplomacy; Foreign Policy and Diplomacy; Foreign Service and Foreign Office with special reference to the Organisation and Functions of the Ministry of External Affairs in India.

Recommended Books:

Nicholson Diplomacy

Nicholson : Evolution of Diplomatic Methods.

Saltow: Guide to Diplomatic Practice.

Panikkar : Principles and Practice of Diplomacy.

Roy M.P. : Rajnay Siddhant and Vyavahar (Hindi Granth Academy, Jaipur)

Krishnamurthy: Dynamics of Diplomacy.

Girija Mukerjee : French School Diplomacy.

Thayer: Diplomat.

Rayter: Diplomacy of the Great Powers.

Regalia : Trends in Diplomatic Practice.

Kenney A. L. : Diplomacy Old and New. . .

Arun Chaturvedi: Con. Diplomatic law in contemporary Int. relations.

एच. सी. शर्मा : राजनय: सिद्धांत और व्यवहार

अरुण चतुर्वेदी, विमलेन्दु तायल : नये राष्ट्र व अन्तर्राष्ट्रीय विधि

आर.सी. खण्डेलवाल : राजनय के सिद्धांत और व्यवहार

10. संयुक्त राज्य अमेरिका, भारत, चीन एवं पाकिस्तान की विदेश नीति

खण्ड -क

1945 से अन्तर्राष्ट्रीय संबंधों का सिंहावलोकन, विदेश नीति की अध्ययन पद्धतियाँ, विदेश नीति के तत्त्व, विश्वयुद्धों, वैदेशिक सहायता, नाभिकीय अस्त्रों के प्रसार तथा भू-राजनीति के संदर्भ में विदेश नीति, संयुक्त राज्य अमरीका की विदेश नीति, अमरीकी परम्परा व समसामयिक परिवर्तन, गठबंधन, वैदेशिक सहायता का उदारीकरण, आधुनिक प्रवृत्तियाँ।

खण्ड-ब

भारतीय विदेश नीति: निर्धारक तत्त्व, गुटनिरपेक्षता का सिद्धांत व व्यवहार, पश्चिमी देशों से संबंध, राष्ट्रकुल में भूमिका, चीन व अन्य पड़ोसी देशों से संबंध, संयुक्त राज्य अमरीका से संबंधों का बदलता स्वरूप, संयुक्त राष्ट्र संघ व विश्व शांति के संबंध में भूमिका, दक्षिण एशिया में भारत की भूमिका।

खण्ड-ग

चीन जनवादी गणराज्य की विदेश नीति: राष्ट्रीय व विचारधारागत कारक, चीन-अमेरिका संबंध, एशिया, अफ्रीका व लातिनी अमेरिका के प्रति नीति, सोवियत संघ के विघटन का चीन की विदेश नीति पर प्रभाव। पाकिस्तान की विदेश नीति: आधार, चुनौतियाँ एवं प्राथमिकताएँ।

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10. Foreign Policies of USA., India, China & Pakistan

Section-A

An overview of international relation since 1945, Approaches to the study of foreign policies, elements of foreign policy, foreign policy in the context of World Wars, foreign Aid, Nuclear Proliferation and geopolitics, US Foreign Policy: The American tradition &. Contemporary Shifts, alliances, foreign aid liberation, Recent Trends.

Section-B

India's Foreign Policy : Determinants, Theory and Practice of nonalignment; relation with the west; Role in the Commonwealth, relations with China and other neighbours; Changing patterns of relationship with USA, Role in United Nations and World peace, India's role in South Asia.

Section-C

People's Republic of China's Foreign Policy : The National and ideological Components; the Sino-American Relations; policy in Asia, Africa and Latin America, Impact of the collapse of USSR on Chinese foreign policy. Foreign Policy of Pakistan: Determinants, Challenges and Priorities.

Recommended Books:

Black and. Thompson: Foreign Policies in a Changing World.

Macridis: Readings in Foreign Policies.

WW. Rostow: The United States in the World Arena.

George Kennan: Soviet Foreign Policy under Lenin & Stalin.

Warner Levi: Modern China's Foreign Policy.

V.P. Vutt: Chinese 'Foreign Policy.

K.P. Karunakaran : India in World Affairs 1947-50.

K.P. Karunakaran: India in World Affairs 1950-53.

M.S. Rajan: Indian in World Affairs 1954-56.

I.C. Kundra : Indian Foreign Policy 1947-54.

Jawahar Lal Nehru: India's Foreign Policy.

J.D.B. Miller: The Commonwealth in the World.

H.K. Jacobson(ed) : America's Foreign Policy.

एम. एल. शर्मा: अन्तर्राष्ट्रीय संबंध

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D.N. Gupta, Chandarachur Singh: Human Rights Act, Statutes and Constitutional Provisions

Jashal S. Parak Jith, Jashlal Nishtha: Human Rights and Law, APH Publishing Corporation

Subramaniam S.: Human Rights- International, Deep And Deep Publication, New Delhi.

Sen Sankar: Human Rights in Developing Society, APH Publishing Corporation

डॉ० शिवदत्त शर्मा: मानव अधिकार, विधि साहित्य प्रकाश

सुभाष शर्मा: भारत में मानवाधिकार, नेशनल बुक ट्रस्ट इण्डिया

एस. गोपालन: भारत और मानव अधिकार, लोक सभा सचिवालय

एस.एन. पाण्डे: मानवाधिकार संरक्षण अधिनियम एवं नियम, हरि लॉ एजेन्सी

डॉ० जय जय राम उपाध्याय: मानव अधिकार, सेन्ट्रल लॉ एजेन्सी

ब्रज किशोर शर्मा: भारत का संविधान, प्रेंटिस हल ऑफ इण्डिया।

12. अन्तर्राष्ट्रीय संगठन

खण्ड-क

अन्तर्राष्ट्रीय संगठन का सामान्य व आधारभूत विचार, अन्तर्राष्ट्रीय संगठन की परिभाषा, वर्गीकरण, क्षेत्र, प्रयोजन, शक्तियां व विभिन्न दृष्टिकोण, प्रथम विश्वयुद्ध से पूर्व की स्थितियां, लीग व्यवस्था राष्ट्र संघ-उत्पत्ति, अवधारणात्मक व राजनैतिक स्वरूप, प्रसंविदा के प्रावधान: संरचना व कार्य, राजनैतिक व सुरक्षात्मक प्रश्न, आर्थिक व सामाजिक सहयोग, राष्ट्रसंघ प्रयोग का एक मूल्यांकन, दो विश्व युद्धों के मध्य के काल में प्रयास: डम्बरटन ऑक सम्मेलन, माल्टा व सनफ्रांसिस्को सम्मेलन व संयुक्त राष्ट्र संघ की उत्पत्ति

खण्ड - ब

संयुक्त राज्य संघ के मूलभूत सिद्धांत व मुख्य अंग, सुधारों की आवश्यकता, संयुक्त राष्ट्र संघ से संबंधित मूलभूत मुद्दे: नेतृत्व का मुद्दा व प्रतिनिधित्व की समस्या; मतदान के नियम व प्रक्रियाएं, चार्टर में औपचारिक व अनौपचारिक संशोधन, वित्तीय समस्याएँ। विवादों का शान्तिपूर्ण निपटारा: प्रक्रियाएं व पद्धतियाँ, सामूहिक सुरक्षा : चार्टर के प्रावधान व वास्तविक स्थितियां, शान्ति-निर्वहन, सामूहिक सुरक्षा व शान्ति-निर्वहन के विशिष्ट मामलों का अध्ययन।

खण्ड - ग

वैधानिक संगठन: 1945 से पूर्व वैधानिक विकास, अन्तर्राष्ट्रीय विधि के एक प्रलेख के रूप में चार्टर, अन्तर्राष्ट्रीय न्यायालय की भूमिका, अन्तर्राष्ट्रीय विधि आयोग, क्षेत्रीय संगठन: क्षेत्रीय संगठनों के स्वरूप, बहुउद्देशीय क्षेत्रीय संगठन, संयुक्त-राष्ट्र क्षेत्रीय आयोग। नवीन अन्तर्राष्ट्रीय व्यवस्था के विकास, मानव-अधिकारों को प्रथम व मानव-कल्याण के विकास में अन्तर्राष्ट्रीय संगठनों की भूमिका, भारत व विभिन्न अन्तर्राष्ट्रीय संगठन, संयुक्त राष्ट्र संघ में भारत की भूमिका : संघर्षों व विवादों का समाधान, मानव-अधिकारों को प्रश्रय, विउपनिवेशीकरण, शान्ति-निर्वहन, शस्त्र-नियंत्रण व नाभिकीय परिसीमन।

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12. International Organization

Section-A

The General and Basic Assumption of International Organisation Definition, Classification, Extent, Purpose, Powers, Different Approaches to International Organisation; Developments, before the First World War.

The League System.

The League of Nations-Genesis, Nature-Conceptual and Political, Covenant Provisions : Structure and Functions, Political and Security Questions, Economic and Social Cooperation; The league Experiment an Assessment

The Inter War Efforts—The Dumbarton Oaks Conference, Yalta and San Francisco Conference and the genesis of the United Nations.

Section-B

Basic Principles and Major Organs of the United Nations : Need for reforms.

Basic Issues of the United Nations-Membership Issue and Problems of Representation, Voting Rules and Practices, Formal and Informal Character Amendements and Financial Problems. Peaceful settlement of Disputes Procedure and Methods, Collective Security and peace-keeping. Character Provisions and realities, Ce Studies in Collective security and peace-keeping.

Section-C

The legal organisation - Legal Developments before 1945, the charter as in instrument of International Law-Role of International Court of Justice- International Law Commission.

Regional Organisations, Multipurpose Regional Organizations, U.N. Regional Commissions.

Role of International Organisations in the developments of new International Order, promotion of Human Rights, Development of Human Welfare.

India and the various international organisations; India's Role in the United Nations: Resolving, Conflicts and Crises, promotion of Human Rights, decolonization, peace-keeping. Arms Control and Nuclear Proliferation.

Recommended Books:

Appadorai and Arora: India in the World Affairs 1957-58.

Bailey Sydney : The Procedure & the Security Council.

Bailey Sydney : The General Assembly of the UN-A, study of procedure and Practice.

Bannel Roy: International Organisation-Principles & Issues 1977.

Cox Robert (ed.) : Anatomy of influence. Decision-making in international Organisation.

13. दक्षिणी एशिया में शासन व राजनीति

अध्ययन में सम्मिलित देशों में से किसी विशिष्ट देश की राजनीतिक व्यवस्था इन तत्वों की उपस्थिति तथा उनकी तुलनात्मक प्रासंगिकता को ध्यान में रखते हुए सामान्यतः अग्रांकित बिन्दुओं को सम्मिलित किया जायेगा।

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खण्ड-क

राजनीतिक व संविधानिक विकास के प्रमुख सीमा बिन्दु, पारिस्थितिकी व राजनीतिक संज्ञस्कृति : तत्व, प्रकृति व परिवर्तन का क्षेत्र
राजनीतिक व्यवस्थाओं की प्रकृति।

खण्ड-ब

राजनीतिक संस्थाएं व प्रक्रियाएं : राजनीतिक दल, दबाव समूह तथा निर्वाचन, विदेश नीति।

खण्ड : ग

आर्थिक विकास व सामाजिक परिवर्तन, राजनीति का स्वरूप : शैली व निर्धारक तत्व

13. Government and Politics in South Asia

The paper would broadly cover the following topics depending on their Presence in the Political system under study and that also with a comparative relevance.

Section-A

Landmarks in Constitutional and Political development, Ecology and Political culture, Elements, Nature and extent of change.

Nature of political systems.

The outline of the Constitutional frame work.

Section-B

Political Institutions and Processes : Political Parties, Pressure Groups : elections, Foreign policy.

Section-C

Economic Development and Social Change.

Nature of Politics : Style and Determinants.

Recommended Books:

N. Palmer: Indian Political System

Khalid Bin Sayeed : The Political System of Pakistan.

Howard Wriggins : Ceylon-Dilemmas of a New Nation.

Anirudh Gupta: Politics in Nepal.

Morris Jones : Government and Politics of India.

Karl Von Vorys : Political Development in Pakistan.

Mushtaq Ahmed: Government and Politics of Pakistan.

S. U. Kodikara: Indo-Ceyloie Relation since Independence Colombo, 19 .

V.R. Mehta: Ideology: Modernisation and Politics India.

14. भारत में लोक प्रशासन

खण्ड-क

भारतीय प्रशासन का उद्भव एवं विकास, ब्रिटिश प्रभाव व विरासत, सांविधानिक व्यवस्था व भारतीय प्रशासन: संसदीय प्रजातंत्र का कार्य-करण एवं क्षेत्र का विकास, संघवाद।

आर्थिक नियोजन व वित्त आयोग की विशिष्ट भूमिका के संदर्भ में भारतीय प्रशासन,

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केबिनेट सचिवालय तथा गृह, विदेश व वित्त-मंत्रालयों के आन्तरिक संगठन के विशिष्ट संदर्भ में केन्द्रीय प्रशासन का संगठन व कार्यकरण।

सचिवालय तथा सचिवालय-निदेशालय संबंधों के विशिष्ट संदर्भ में राज्य स्तर पर प्रशासन की रूपरेखा का अध्ययन।

खण्ड-ब

भारत में जिला प्रशासन का विस्तृत अध्ययन, संभागीय आयुक्त, जिला कलेक्टर तथा अन्य अधिकारी वर्ग की भूमिका, जिला स्तरीय राजस्व प्रशासन, विकास प्रशासन व पंचायती राज: उभरती हुई प्रवृत्तिया।

भारत में सार्वजनिक उद्यमों का प्रशासन: प्रबंधकीय समस्याओं व संभावनाओं के विभिन्न प्रारूपों का विस्तृत अध्ययन।

भारतीय नौकरशाही: प्रवृत्ति व समस्याएं, भर्ती, प्रशिक्षण, सेवा-शर्तें, कार्मिक-नियोक्ता संबंध, सामान्यज्ञाओं व विशेषज्ञों के मध्य संबंध के विशिष्ट संदर्भ में अखिल भारतीय व राज्य सेवाओं की समस्याएं, भारत में प्रशासन पर नियंत्रण: संसदीय, मंत्रीय व न्यायिक, नागरिक व प्रशासन, लोकपाल व लोक आयुक्त की संस्था।

खण्ड : ग

वित्तीय प्रशासन-बजट का निर्माण, बजट की स्वीकृति व बजट का निष्पादन, वित्त पर संसदीय नियंत्रण, भारत का नियंत्रक व महा लेखा परीक्षक, आर्थिक नियोजन व भारतीय प्रशासन: योजना आयोग का संगठन व भूमिका, राष्ट्रीय विकास परिषद की भूमिका, आर्थिक नियोजन की चुनौति के संदर्भ में प्रशासन में सुधार, भारत में प्रशासनिक सुधारों के लिए प्रयास एवं नीति आयोग।

14. Public Administration in India

Section-A

Evolution of Indian Administration; British influence and its regaci

Constitutional System and Indian Administration : working parliamentary democracy and regional development, Federalism. Indi Administration with social reference to economic planning and role Finance Commission.

Study of organisation and working of the Central Administration with special reference to Cabinet secretariat and working arid internal organisatic of the Ministeries of Home, External Affairs and Finance. Outline study of Administration at the State level with special reference to the Secretariat, Secretarial-Directorate Relationship.

Section-B

A detailed study of District Administration in India, the role of Divisional Commissioner, Collector and other officials, District Level Revenue Administration, Development Administration and Panchayati Raj, The Emerging patterns.

Administration of Public enterprises in India, A detailed study of the various patterns of Management Problems, and prospects.

Indian Bureaucracy: Its nature and problems, recruitment, training, service conditions, employer-employee relations, the problems of All India and State

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Services with special-reference to relationship between generalist and specialist, Control over Administration in India: Parliamentary, Ministerial and Judicial, citizen and Administration, Institution of Lokpal and Lokayukta.

Section-C

Financial Administration-formulation of budget, approval of budget and execution of budget, Parliamentary control over finance, controller and Auditor General of India.

Economic Planning and Indian Administration: Organization and role of Planning Commission in India, role of National Development Council, Administrative improvement in view of the challenges of economics planning, Efforts for Administrative Reforms in India and NITI Aayog.

Recommended Books :

Ashok Chanda: Indian Administration.

V.A. Pai Panadikar: Personnel System for Development Administration. . A.D. Gorwala: Report on Public Administration (Planning Commission 1951).

Paul H. Apple by: Public Administration in India. Report of Survey.

Paul H: Re-examination of India's Administrative system (Government of India 1956).

S. S. Khera: Gov'rnmnt Business (Asia, 1963).

S.S. Khera : District Administration in India (Asia, 1963).

Bailey. D.H. Police and Political Development in India.

Sharma P.D. Police & Political Development in India.

Sharma P.D. Police & Political Order in India.

I.I.P.A. Organistatin of Government of India.

M. Ruthanaswami :Some influences that made the British Admn. System in India.

Dodwoll Cambridge History of India.

K. Santhanam : Union-State Relation in India.

Amal Ray : Inter-Government Relations in India.

Ashok Chanda : Federalism in India.

P. Dwarka Dass : Service Role of High Civil Service in India.

N. C. Roy : The Civil Service in India (Calcutta, 1960).

M. Mutallib : The Union Public Service Commission (IIPA, 1967).

Avasthi & Verma: Aspects of Administration, (Allied, 1966).

John B. Monterio : Curruption (Manaktala, Bombay, 1964).

Paul H. Appleby: Public Administration for a Welfare State.

15. भारत में जिला प्रशासन: पंचायतीराज के विशिष्ट संदर्भ में

खण्ड-क

भारत में जिला प्रशासन का उद्विकास, जिला प्रशासन की विशेषताएं और महत्व; प्राचीन काल से लेकर स्वातंत्रोत्तर काल तक पंचायती राज संस्थाओं की उत्पत्ति व उद्विकास;

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बलवंत राय मेहता समिति का प्रतिवेदन का विभिन्नराज्यां में उसकी क्रियान्विति, विभिन्नराज्यों में पंचायतीराज के विशिष्ट प्रतिमान।

खण्ड—ख

जिला प्रशासन का संगठनात्मक प्रारूप; राजस्व, नियमन व विकास के संदर्भ में जिला कलेक्टर की भूमिका; जिला कलेक्टर का अन्य जिला स्तरीय अधिकारियों से संबंध; राजस्थान में जिला; खण्ड व ग्राम स्तर पर पंचायतीराज संस्थाओं का संरचनात्मक प्रारूप व कार्यकरण।

जिला स्तर पर नियोजन तंत्र तथा नियोजन प्रक्रिया; जिला स्तर पर जन अभियोगों के निराकरण की व्यवस्था; सेवाओं के स्तर के निर्वाह व कानून व व्यवस्था के निर्वहन में संभागीय आयुक्त की भूमिका; जिला प्रशासन व पंचायतीराज संस्थाओं द्वारा सम्पन्न की जाने वाली विकास गतिविधियां।

खण्ड—ग

जिला कलेक्टर व पंचायती राज; पंचायती राज व्यवस्था के अधीन सरकारी व गैर-सरकारी तत्वों के मध्य संबंध; पंचायतीराज संस्थाओं की स्वयत्ता व उन पर नियंत्रण, जिला प्रशासन व पंचायतीराज की उभरती प्रवृत्तियां एवं शासकीय योजनाए। (मनरेगा)

15. District Administration in India with special reference to Panchayati Raj.

Section A

Evolution of District Administration in India; Characteristics and significance of district administration; origin and evolution of Panchayati Raj since ancient are to post-independence; B.R. Mehta Committee report and its implementation in difference states; Different models of Panchayati Raj in various states.

Section B

Organisational structure of District administration; Functions and role of District collectors in Revenue; Regulatory and development field; Relationship of District Collector with district. Level functionaries; Structural patterns and working of Panchayati Raj . institutions in Pijasthan at district, block and village levels.

District planning machinery and planning process; Districts Rural Development Agency; Machinery for the redressal of public Grievances at the district; Role of Divisional Commissioner in maintenance of standards of services, maintenance of law and order, development activities carried out by District Administration Panchayati Raj institution.

Section-C

District collector and Panchayati Raj; official-Non official relationship under Panchayati Raj Systems; Autonomy and control over Panchayati Raj institutions, Problem areas and need for reforms of district administrations and Panchayati Raj institutions; Emerging trends in district administration and Panchayat Raj. Administrative chemes: MGNRGA.

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Recommended Books:

- MG. Shukla: Administrative Problems of Public Enterprises in India.
 D.R. Gadgil : Planning & Economic Policy in India.
 A. Ghosh : New Horizons in Planning.
 B. Mukherjee : Community Development in India.
 M. Bhattacharya : Municipal Government.
 S.S. Khera : District Administration. R.B. Jain and T.N. Chaturvedi : District Administration in India.
 A.D. Gorwala : Report on Efficient Conduct of State Enterprises in India.
 I.I.P. : Report of Seminar on Administration of State Enterprises.
 Malenbaum : Prospects of Indian Development.
 Balvant Rai Mehta Committee Report.
 Report on the Working of Panchayati Raj in India.

16. तृतीय विश्व के देशों में तुलनात्मक शासन व राजनीति**खण्ड - क**

तुलनात्मक शासन व राजनीति के सिद्धांत के सीमा चिह्न, प्रकृति व उप-क्षेत्र। तुलनात्मक पद्धति व उसकी अनुप्रयुक्ति। विकासशील क्षेत्रों की राजनीति के अध्ययन के उपागम : (1) ईस्टन की राजनीतिक व्यवस्था (2) ऑमण्ड का संरचनात्मक प्रकार्यात्मक उपागम और (3) राजनीतिक विकास उपागम तथा उसके पक्ष-पोषक।

खण्ड - ख

विकासशील क्षेत्रों की राजनीतिक का समाजशास्त्रीय संदर्भ : विकासशील समाजों में परिवर्तन व आधुनिकीकरण की भूमिका; परिवर्तन तथा उसके माध्याभूत आधुनिकीकरण का संस्थायीकरण; सामाजिक परिवर्तन व राजनीतिक विकास।

खण्ड - ग

राजनैतिक दल; दबाव व हित समूह। राजनीतिक अभिजन: उनकी भर्ती तथा आधुनिकीकरण व राजनीतिक विकास में भूमिका। नौकरशाही: विकास प्रशासन, उत्प्रेरित परिवर्तन की समस्याएँ। सेना व राजनीतिक विकास। राजनीतिक विकास का आर्थिक संदर्भ। राष्ट्रीय पहचान एवं राजनीतिक एकीकरण की समस्या तथा विदेश नीति।

16. Comparative Government and Politics in Countries of the Third World.**Section-A**

Landmarks in the Development, of the Theory of Comparative Government and Politics—Its nature, and sub-fields. The Comparative Method and its application. Approaches to the study of politics of developing areas (i) Easton's Political approaches (ii) Almond's Structural-Functional analysis and (iii). Political Development framework and its advocates.

Section-B

Sociological context of the politics of developing areas : problem of change and modernization in developing societies role of tradition, ideology and industrialization

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in change; Institutionalization of change and its media modernization; Social change and Political development.

Section-C

Political parties, pressure and interest groups. Political elite: their recruitment and role in Modernization and Political development. Bureaucracy development administration, Problems of induced change. Military and Political Development. The Economic Context. of Political Development. Problem of National Identity and Political Integration and Foreign Policy.

Recommended Books:

Almond and Powell: Comparative Politics, A Development Approach. David B. Apter : The Politics of Modernization.

Joseph La. Palambara and Myron Weinere: Political Parties and Political Development.

Joseph La Palambara (ed): Bureaucracy and Political Development. . Lucian W. Pye : Aspects of Political Development.

Gabriel A. Almond and James S. Coleman (Eds.) : The Politics of Developing Area.

Rajni Kothari : Politics in India.

Philip Mason (Ed.) : Unity and Diversity: India and Ceylon.

17. भारत में राज्य-राजनीति

खण्ड-क

पृष्ठभूमि : ब्रिटिश भारत और देशी रियासतों में राष्ट्रवाद व प्रजातंत्र के विकास की प्रवृत्तियाँ; भाषायायी राज्य : संरचना, गठन व परिणाम।

खण्ड-ख

राज्यों के शासन का संविधान प्रारूप : राज्यपाल का पद, मुख्यमंत्री व मंत्रिपरिषद, राज्य विधान मण्डल। राजनैतिक दल व आम चुनाव; दलीय गठबंधनों का प्रारूप; आम चुनावों में सफलता व क्षति; राज्यों में नेतृत्व के प्रारूप।

खण्ड-ग

चैम्बर्स ऑफ कामर्स व श्रमिक संघों के विशेष संदर्भ में भारत में प्रमुख दबाव समूह; भारत में जनमत; समाचारपत्रों की भूमिका व प्रभाव, राज्य-राजनीति में जाति, धर्म, क्षेत्र व भाषा की भूमिका

17. State Politics in India.

Section-A

Background : Trend in the go'th Of Nationalism and Democracy British, India and Princely States; Linguistic States-Structure-Organization and aftermath.

Section-B

Constitutional Framework of Governance of States : Office of the Governor, Chief Minister and council of Ministers, State Legislature; Political Parties and general

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elections; the pattern of party alliances; gains and short-falls in general elections; Patterns of leadership in states.

Section-C

Major Pressure Groups in India with special reference to Trade Unions Chambers of Commerce; Public opinion in India; the Media its role and impact; Role of Caste, Religion, Region and language in State Politics.

Recommended Books:

Iqbal Narain & Other (Eds.) : State Politics in India.

Ganville Austin: The Indian Constitution ; Comer Stone of a Nation.

VP. Menon : The Story of the Integration of Indian States..

K. Santhanam : Union-State Relations in India. H.M. Jam: State Governments.

A.R. Desai : Social Background of Indian Nationalism.

Harish Chandra : Bharat main Rajyon ki Rajneeti.

C.H. Phillips (Ed.) : Politics and Society in India.

Rajni Kothari & others : Party System and Election Studies.

R.L. Hardgrave : The Dravidian Movement.

Ramkirshan Nair : How the Communists Came to Power in Kerala. .

G.K. Bhargava: After Nehru-India's New Image.

M.A. Jhingiani : Jana Sangh and Swatantra.

E.M.S. Nambodripad : The National Question in Kerala.

L.P. Sinha : The Left in India.

Sission : The Congress Party in Rajasthan.

18. भारत में निर्वाचनिक राजनीति

खण्ड-अ

राष्ट्रीय राजनीतिक दल-उद्भव आम चुनाव कार्यक्रमों का प्रारूप; संरचना और संगठन। क्षेत्रीय राजनीतिक दल : उद्भव; विगत सोलह आम चुनावों के माध्यम से कार्यक्रमों में परिवर्तन का प्रारूप; संरचना और संगठन एवं निर्वाचन आयोग की बदलती भूमिका

खण्ड - ब

राजनीतिक दल और आम चुनाव; गठबंधनों का प्रारूप; आम चुनावों के माध्यम से दलों की सफलता व क्षति।

खण्ड - स

चैम्बर ऑफ कॉमर्स व श्रम-संगठनों के विशेष संदर्भ में भारत में दबाव सूह; भारत में लोकमत; लोकमत के निर्माण व अभिव्यक्ति में मीडिया की भूमिका।

18. Electoral Politics in India.

Section A

National Political Parties : Origin, the pattern of programmes and general elections; structure and organization and Changing role of Election Commission of India.

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Regional Political Parties. Their origin, the change in pattern of their programme through the sixteen general elections-structure and organization.

Section B

Political Parties and general election, the pattern of alignments, gains and shortfalls through the general elections.

Section C

Major pressure groups in India with a special reference to Trade Unions, Chamber of Commerce, Public opinion in India, the role of media in its formation and expression.

Recommended Books:

- Myron Weiner-Party System in India.
 Myron Weiner-Politics of Scarcity.
 Myron Weiner-State Politics in India.
 L.P. Sinha-The Left in India.
 VM. Sirsikar-Political Behaviour in, India.
 R.L. Hargrav-The Dravidian Movement.
 Richard L. Park & Tinker-Leadership and Political Institution in India. .
 S.V Kogekar and Richard L. Park-Reports on the Indian General Elections.
 G.D. Over street & Marshall Windnuller-Communism in India.
 S.L. Popali-National Politics and 1957 Elections in India.
 M. Pattambhiram-General Elections in India, 1967.
 Rajni Kothari-Caste in Indian Politics.
 Rajni Kothari-Politics in India-
 Subhash C. Kashyap-Politics of Defection.
 Ramdas G. Bhjatkal (Ed.)-Political Alternatives in India.

19. राजनीतिक समाजशास्त्र

खण्ड - क

राजनीतिक समाजशास्त्र का परिचय: राजनीति के सामाजिक आधार के अध्ययन के रूप में राजनीतिक समाजशास्त्र, राजनीतिक समाजशास्त्र का विकास, राजनीतिक व्यवहार के विश्लेषण के लिए प्रतिमान। मानकात्मक उपागम, व्यवस्था उपागम।

खण्ड - ख

पारसन्स और ईस्टन (सामान्य व्यवस्था सिद्धांत), कार्ल डॉयच (सूचना सिद्धांत), आमण्ड (राजनीतिक संस्कृति), सामाजिक और राजनीतिक संरचना : राजनीतिक-एक सामाजिक उप-व्यवस्था के रूप में; राज-व्यवस्था की संस्थागत अभिव्यक्ति : राज्य, सरकार और राष्ट्र सरकार के प्रकार : पर आधारित प्रारूप और नौकरशाही राजनीतिक व्यवहार : सामाजिक स्तरीकरण और राजनीतिक सहभागिता (अभिजनों के विशेष संदर्भ में), राजनीतिक समाजीकरण, दलीय राजनीति (मिशेल्स, डूवरजर और डाहल का योगदान), भारत में मतदान, राजनीतिक और सामाजिक परिवर्तन; आधुनिकीकरण : परिभाषा

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औरउपागम (लर्नर, आप्टर, लेवी और हंगिटन के विशेष संदर्भ में भारत में परम्परा और आधुनिकीकरण, संचार और आधुनिकीकरण : संचार, परिभाषा, कार्य और प्रभाव, संचार की कार्यनीतियां, राष्ट्र निर्माण और राष्ट्रीय एकीकरण (भारत के विशेष संदर्भ में))

खण्ड - ग

आधुनिक राजनीतिक विश्लेषण की प्रविधियां : मानकीय और अनुभवपरक शोध; सर्वेक्षण शोध के तत्व; पेनल अध्ययन;

विषय विश्लेषण, गेलप पोल, समुच्चय विश्लेषण; भारत में राजनीतिक समाजशास्त्र; शोध का सर्वेक्षण और नवीन प्रवृत्तियां

19. Political Sociology

Section-A

Introducing Political Sociology : Political Sociology as Study of 1 Social bases of Politics. Growth of Political Sociology. Models for the Analysis of Political Behaviour. Normative Approach, System Approach.

Section-B

Parsons and Easton (General systems), Karl Deutsch (Information theory), Almond (Political Culture) Polity and Social Structure : Polity as a Social Sub-System. institutional manifestations of Polity : State, Government and Nation. Forms of Government: Topology based on Legitimacy Bureaucracy. Political Behaviour.: Social Stratification and Political Participation (with special reference to Elites) : Political Socialization. Party Politics (contributions of Michels, Durveger and Dahl). Voting in India. Political and Social Change : Modernization : Definition and approaches (esp. Lerner, Apter, Levy and Huntington). Traditional and Modernity in India. Communication and Modernization: Communication, Definition, function and effects, Strategies of Communication. Nation-Building and National Integration (with special reference to India).

Section-C

Methodology of Modern Political Analysis: Normative and Empirical Research. Elements of Survey Research Panel studies. Content Analysis, Gallup Polls aggregate analysis.

Political Sociology in India: Survey of Research and Current Trends.

Recommended Books:

S.M. Lipset: Political Man.

K.W. Deutsch: The Nerves of Government

W.J.M. Mackenzie: Politics and Social Science.

Robert Dahl : Modern Political Analysis.

H. Euler (Ed.) : Political Behaviour.

H. Euler : Behavioural Persuasion in Politics.

Rajni Kothari : Politics in India.

G.E. Almond : Comparative Politics-A Development Approach. .

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- W. Korfhauer : Politics of Mass Society.
 H. Hyman : Political Socialization and Political Development.
 D. Lerner : The Passing of Traditional Society.
 Rajni Kothari (Ed.) : Caste in Indian Politics.
 Marion J. Levy. : Modernization and the Structured Societies.
 David Apter : The Political of Modernization.
 Robert Michels : Political Parties.
 Maurice Duverger : Political and Parties.
 Eric. A. Hordiner (ed.) : Politics and Society.
 T.B. Bottomore : Elites and Society.
 L.T. Rudolph & Sussan Rudolph : The Modernity of Tradition.
 Owen M. Lynch : The Politics of Untouchability.
 Myron Weiner: Party Politics in India.

20. महिला, शासन एवं राजनीति

खण्ड-क

राजनीतिक सिद्धान्त में लैंगिक विषय, सेक्स एवं जेन्डर, समाजवादी, मार्क्सवादी एवं उग्र नारीवाद, नवीन नारीवादी सिद्धान्त। भारत में महिला आन्दोलन का इतिहास।

खण्ड-ख

महिला एवं शासन: शासन एवं लैंगिक (जेन्डर) संरचनाएँ, शासन में लैंगिक विषय एवं सुशासन में महिलाओं की भूमिका। राजनीतिक सहभागिता एवं महिलाएँ: स्थानीय स्वशासन में महिलाओं की सहभागिता। स्थानीय शासन में लैंगिक अंकेक्षण एवं लैंगिक बजट निर्माण।

खण्ड-ग

महिला एवं राजनीति: संसद एवं विधान सभा में राजनीतिक प्रतिनिधित्व में लिंग असंतुलन, मतदान व्यवहार एवं चुनाव प्रक्रिया का लैंगिक परिप्रेक्ष्य, राजनीति में महिलाओं की सहभागिता के अवसर एवं बाधाएं। भारत में महिला एवं आरक्षण

20. Women, Governance and Politics

Section-A

Issues of Gender in Political Theory, Sex and Gender, Liberal, Socialist, Marxist, Radical Feminism, New Feminist Schools. History of the Women's Movement in India.

Section-B

Women and Governance: Governance and Gender Structures; Gender Issues in Governance and Role of Women for Good Governance; Women's Participation in Local Self Governance; Gender Auditing, and Budgeting in Local Governance.

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Section-C

Women and Politics: Gender Imbalance in Political Representation in Parliament and Legislative Assembly; Gender Perspectives of Voting Behaviour and Electoral Process; Opportunities and Constraints to Women's Participation in Politics. Women and Reservation in India.

Recommended Books :

Ambedkar, S. N. and Nagendra, Shilaja, Women Empowerment and Panchayati Raj. Jaipur: ABD Publishers. (2005)

Brush, Lisa D., Gender and Governance. New Delhi: Rawat Publications. (2007)

Jha, Ashok Kumar, Women in Panchayat Raj Institutions. New Delhi: Anmol Publications Pvt.Ltd. (2004)

Jha, Deepika, Women in World Politics. New Delhi: Pearl Books. (2010)

Nandal, Roshini, Women Development and Panchayati Raj. Rohtak: Spellbound Publications Pvt. Ltd, (1996)

Saxena, Alka, Role of Women in Reservation Politics. New Delhi: Altar Publishing House. (2011)

Saxena, Alka, Situational Analysis of Women in Politics. New Delhi: Altar Publishing House. (2011)

Saxena, Alka, Women and Political Leadership. New Delhi: Altar Publishing House. (2011)

Panda, Smita Mishra (ed.), Engendering Governance Institutions: State, Market and Civil Society. London: Sage Publications. (2008)

Singh, Narpat, Changing Status of Women. Delhi: Vista International Publishing House. (2008)

Singh, Preeti, Women and Politics Worldwide. New Delhi: Axis Publications. (2010)

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SYLLABUS

M.A. Drawing & Painting

Annual Scheme

M.A. Previous Examination	2023
M.A. Final Examination	2024

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M.A. Drawing and Painting

Scheme of Examination

M.A. Previous

Theory (Student should opt any two papers out of three mentioned below)

Paper –I: History of Indian Painting

Paper – II: History of Western Art

Paper – III: History of Oriental Art

Note : The paper consist of three parts :-

Part –I: Carries 20 marks and consist of 10 short type questions of 2 mark each.

Part –II: Carries 20 marks and consist of 4 compulsory questions of 5 marks each to be answered in 60-80 words each.

Part –III: Carries 60 marks divided into three sections 3 questions of 20 marks each with internal choice. Candidates are required to attempt three questions selecting one question from each section. The word limit for each answer will be 700-800 words.

Practical (Student should opt any two papers out of three mentioned below)

Paper A : Landscape Painting

Paper B : Print Making

Paper C : Relief Mural Art

M.A. Final

Theory (Student should opt any two papers out of three mentioned below)

Paper –IV: Brief Study of Eastern and Western Aesthetics

Paper –V: Brief History and Philosophy of Modern Art

Paper –VI: Brief Study of Art Trends in Post Modern Era

Note : The paper consist of three parts :-

Part –I: Carries 20 marks and consist of 10 short type questions of 2 mark each.

Part –II: Carries 20 marks and consist of 4 compulsory questions of 5 marks each to be answered in 60-80 words each.

Part –III: Carries 60 marks divided into three sections 3 questions of 20 marks each with internal choice. Candidates are required to attempt three questions selecting one question from each section. The word limit for each answer will be 700-800 words.

Practical

Paper D : Study from Life Human Body

Paper E : Creative Composition

SCHEME OF EXAMINATION

Each Theory Paper	3 hrs. duration	100 Marks
Landscape	6 hrs. duration	80 Marks
Print Making	15 hrs. duration	80 Marks
Relief Mural Art	15 hrs. duration	80 Marks
Study from Life Human Body	15 hrs. duration	100 Marks
Creative Composition	15 hrs. duration	100 Marks
Submission of Practical Examination		

1. The number of papers and the maximum marks for each paper/practical shall be shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in the theory part as well as in the practical part (wherever prescribed) of a subject/paper separately.

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2. A candidate for a pass at each of the Previous and the Final Examinations shall required to obtain (i) atleast 36% marks in the aggregate of all the papers prescribed at the examination, provided
3. that if a candidate fails to secure atleast 25% marks in each individual paper at the examination, and also in the test dissertation/Survey report/field work, wherever prescribed, he shall be deemed to have failed at the examination and notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination. No division will be awarded at the Previous Examination. Division shall be awarded at the end of the Final Examination on the combined marks obtained at the Previous and the Final Examinations taken together as noted below.
- First Division 60% of the aggregate marks taken together.
Second Division 48% of the Previous and the Final Exam.
All the rest will be declared to have passed the examination.

M.A. Previous

Time : 3 hrs. Duration

Theory Paper (Any two of the following)

Paper –I: History of Indian Painting	100 Marks
Paper – II: History of Western Art	100 Marks
Paper – III : History of Oriental Art	100 Marks

Note : The paper consist of three parts :-

Part –I: Carries 20 marks and consist of 10 short type questions of 2 mark each.

Part –II: Carries 20 marks and consist of 4 compulsory questions of 5 marks each to be answered in 60-80 words each.

Part –III: Carries 60 marks divided into three sections 3 questions of 20 marks each with internal choice. Candidates are required to attempt three questions selecting one question from each section. The word limit for each answer will be 700-800 words.

Practical Paper (Any two of the following) :

(a) Landscape Painting	80 Marks
(b) Print Making (Linocut, Colograph and Etching)	80 Marks
(c) Relief Mural Art	80 Marks
Submission of Work	40 Marks

Note : Art Department should offer only two option from the theory papers listed above according to the existing facilities available. A Department will have to seek special permission to provide more than two options from the theory papers listed above it.

- (i) There are more than five students offering a paper of papers different than the two opted by the Department.
- (ii) The Department has additional facilities and arrangement for staff to offer more than two options from the theory papers.

Paper I : History of Indian Painting

Time : 3 hrs. Duration

100 Marks

Section – A

Prehistoric Rock Paintings, Proto Historic Art: Sculpture, Pottery and Seal of Mohanjo- Daro and Harappa, Jogi Mara. Ajanta, Bagh, Badami, Sigiriya

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Section – B

Pal, Apbhransh Painting, Mughal School, Rajasthani Schools & its Sub Schools – Mewar, Jaipur, Bundi, Kishangarh, Kota, Bikaner and Jodhpur.
Pahari Schools – Basohali and Kangra Paintings.

Section –C

Central Indian Painting and Deccan Painting, Kalighat Painting, Company School. Raja Ravi Varma

Schools of Arts (established by Britishers – Madras School, Calcutta School and J.J. School) Bengal School (The Indian Renaissance) Artists.

Jamini Roy, Amrita Shergil, Progressive Artist group, Mumbai, Madras Group, Calcutta Group, Delhi Shilpi Chakra

Books recommended :

1. 'कला विलास' – आर.ए. अग्रवाल, डी.एस.ए. बुक्स इन्टरनेशनल, मेरठ।
2. भारतीय चित्रकला – वाचस्पति गैरोला, मित्रा प्रकाशन प्रा.लि., इलाहाबाद, 1963।
3. भारतीय चित्रकला का संक्षिप्त इतिहास – वाचस्पति गैरोला, इलाहाबाद, 1985।
4. भारतीय चित्रकला– राय कृष्णदास, इलाहाबाद, 1996।
5. Indian Painting - Percy Brown, Calcutta, 1918.
6. Indian Painting - Douglas barrett & Basil Gray, Geneva, 1963.
7. Kangra Valley Paintings - M.S. Randhawa, New Delhi, 1954.
8. Mughal Paintings - Dr. A.K. Das
9. Centres of Pahari Paintings - Chandramani Singh
10. A Brief Study of Indian Painting – Dr. L.C. Sharma, Goyal Publishing House, Meerut, 1997

Paper II : History of Western Art

Duration: 3 hrs.

100 Marks

Section - A

Prehistoric and Proto-historic cave and rock shelter paintings, Egyptian Painting and Sculpture and Greek Painting & Sculpture

Section - B

Roman and Etruscan Art, Byzantine painting and Romanesque Art. Gothic Art, Early and High Renaissance

Section - C

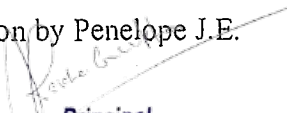
Mannerism, Baroque and Rococo Styles of Painting.

Books Recommended :

1. पश्चिम की कला – अशोक, संजय पब्लिकेशन
2. मध्यकालीन योरोपीय कला –डॉ. राजेन्द्र वाजपेयी, साहित्य निकेतन, कानपुर, 1989।
3. ग्रीक कला – डॉ. राजेन्द्र वाजपेयी, साहित्य निकेतन, कानपुर, 1972।
4. Dictionary of Twentieth Dynasties Art - Phaidon
5. Janson's History of Art: The Western Tradition (8th Edition) 8th Edition by Penelope J.E. Davies (Author)


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Paper – III: History of Oriental Art

Duration : 3 hrs.

100 marks

Section – A

Painting during Six Dynasties and Buddhist Painting in China, Buddhist Painting in Japan during the Asuka and Nara periods, Sui and Tang Dynasties in China, Chinese pottery.

Section – B

Painting in China during the Five Dynasties, Sung Yuan and Ming Dynasties.
Landscape painting, Nature Painting, Ink Painting, Bamboo Painting, Scrolls and Screen Painting in China and Japan.

Section - C

Painting during Heian, Kamakura and Muromachi period to the end of Edo period in Japan.
Persian painting upto Safawi period.

Books Recommended :

1. जापानी चित्रकला – राजेन्द्र वाजपेयी
2. चीनी चित्रकला – अशोक अग्रवाल
3. The Arts of Japan - Hygo Manlerbeg.
4. Japanese Painting - Akiyama Terukazu.
5. Royal Persian Manuscripts - Slaart Cary Welch
6. History of Far Eastern Art - Sherman Lee
7. The Court Paintings of the Grand Moguls, London, 1921

Practical

Paper A : Landscape Painting size ½ Imp. Media in any medium

Exam Duration 6 Hours (2 days) 80 Marks

Landscape Painting can be done in realistic, creative or in any style.

Examination should be conducted on the spot for two days with 3 hours sitting per day.

Landscape painting form sight in water colour with proper handling of medium and perspective
Landscape of Lanes, Cityscapes, skyscapes and hillsapes should be painted. Study of Bridges, lakes and ground and tree with special effects of environment and also effects of light & shadows.

Paper B : Print Making (Linocut/Colograph/Etching)

Exam Duration 15 hours (3 days) 80 Marks

Note: The examination will be conducted in three days with five hours duration on each day with a break of one hour after 2½ hours size of the Linocut and Etching graphic print should not exceed 8x10. Candidates will submit their preliminary sketches and blocks with the final prints. In case of colograph the size of print should be 12"x20".

Paper C: Relief Mural Art

Exam Duration 15 hours (3 days) 80 Marks

Size : 24"x30" Any Medium

In examination the surface (Plyboard) will be provided in examination

Submission of Work : 40 Marks

Every candidate (Previous year) to submit the following work:-

- (i) Landscape (water colour) 10 plates
- (ii) Graphic Art size 8"x10" (a) Linocut 3 plates (b) Colograph 3 plates (c) Etching 3 plates
- (iii) Relief Mural 8 plates
- (iv) A Sketch book containing not less than 50 sketches size ¼ Imp.


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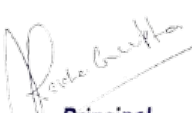
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- (v) Marks on the submission work will be of the candidate internally by the subject teacher (internal). The work of the candidate will be retained in the Department for one month after the declaration of the result and then returned to the candidate

General Instructions :

- (a) Candidate should pass in practical as well as in the theory papers separately.
(b) Practical Examination should be arranged one month before the commencement of theory examination.
(c) There should be 9 hours for each practical and 6 hours for each theory paper plus 2 hours for sketching in a week.
(d) The practical answer book shall be examined by 6 hours by one external and internal examiner appointed on the recommendation of the Head of Department as per existing practice.
(e) The departments should also arrange for an Educational tour to ancient and modern art centres like Ajanta, Ellora, Elephanta, Khajuraho, Mahabalipuram, National Exhibitions, Modern Art Galleries, Art Colleges and places suitable for outdoor sketching.
(f) Minimum three demonstration should be arranged by the subject expert during the session for each practical paper.


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M.A. Final

Scheme of Examination

Theory Papers : Any two from the following

Duration : 3 hours each

Paper – IV: Brief Study of Eastern and Western Aesthetics	100 Marks
Paper –V: History and Philosophy of Modern Art	100 Marks
Paper –VI: Brief Study of Art Trends in Post Modern Era	100 Marks

Note : The paper consist of three parts :-

Part –I: Carries 20 marks and consist of 10 short type questions of 2 mark each.

Part –II: Carries 20 marks and consist of 4 compulsory questions of 5 marks each to be answered in 60-80 words each.

Part –III: Carries 60 marks divided into three sections 3 questions of 20 marks each with internal choice. Candidates are required to attempt three questions selecting one question from each section. The word limit for each answer will be 700-800 words.

Practical:

Paper D: Study from life human body	80 Marks
Paper E: Creative Composition	80 Marks
Submission of Practical Work	40 Marks

Paper – IV: Brief Study of Eastern and Western Aesthetics

Duration : 3 hrs.

(100 marks)

Section – A

Concept of Indian Aesthetics in perspective of Indian Philosophy and Religion

Natya Shastra - Rasa Siddhant, Bhatt Lollat, Shankuk, Abhinav Gupta and Dhvani Siddhant by Anandvandhan

Shilp Shastra : Chitra Sutra of Vishnu Dharmottar Puran – Indian Concept of Inter-relationship between Fine Art, Kamsutra – Shadang, Chitra Lakshan and Samrangan Sutradhar. Anand Coomaraswami, Ravindra Nath Tagore and Nihar Ranjan Roy

Section – B

Plato, Aristotle, Augustine, Leonardo-da-Vinci, Baumgarten, Kant, Hegal.

Section – C

Tolstoy, Singmund Freud, Croce, S.K. Langer, R.A. Richards, Clive Bell, Rogear Fry. Herbert Read

Books Recommended :

1. The Hindu View of Art - Mulk Raj Anand
2. Art and Aesthetics - Rabindranath Tagore (Orient Longmas), Calcutta, Bombay, Madras, New Delhi, 1961.
3. Christian and Oriental Philosophy of Art - A.K. Coomaraswamy.
4. Transformation of Nature by Art - A.K. Coomaraswamy.
5. Comparative Aesthetics - Dr. K.C. Pande, Chaukhamba, Varanasi, 1959.
6. सौन्दर्य AESTHETICS – Rajendra Vajpayee, Kanpur, 1985
7. Fundamental Questions in Aesthetics – P.C. Chatterjee, IIAS. Simla. 1968

Paper- V : History and Philosophy of Modern Art

Time : 3 hrs. Duration

100 Marks

Section A

The turning point in the 19th century. Neoclassicism, Romanticism and Realism, Impressionism and Post-Impressionism

Section B

Fauvism and Cubism. Expressionism, Post Cubistic art movements – Futurism, Constructivism etc.

Section C

Dadaism and Surrealism , Abstract Art and other art trends of Post Modern era like – Installation Art, New Media Art, Performance, Site Specific Art

Books Recommended :

1. आधुनिक चित्रकला का इतिहास – आर.वी. सांखलकर, राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर
2. मॉडर्न आर्ट – राजेन्द्र वाजपेयी, कानपुर, 1984
3. न्यू आर्ट ट्रेण्ड्स : डॉ. कृष्णा महावर, हिन्दी ग्रन्थ अकादमी, जयपुर
4. Dictionary of Twentieth Dynasties Art - Phaidon
5. The History of Impressionism - John Rewalts
6. Modern Art - Rajendra Bajpai
7. Masters of Modern Art - Alfred H. Bars
8. Modern Movements Art - R.H. Wilenski
9. Story of Modern Art - Sheldon Cheney
10. New Media in Art : Michael Rush, Publisher : Thomas & Hudson.

Paper – VI : Brief Study of Art Trends in Modern and Post Modern Era.

Time : 3 hrs. Duration

100 Marks

Section – A

Cubism and other significant post Cubistic Art Movements.

Modern Art after 1945 – Abstract Expressionism, Abstract Impressionism, Pop Art, Neo Realism, Optical Art etc.

Section – B

Conceptual Art, Avant-de-Garde, New Media Art (Video Art, Internet Art, Digital Art) , Artist in Residence Programs, Site Specific Art, Performance Art, Interactive Art, Nouveau Art.

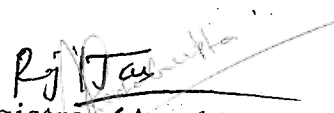
Section – C

Installation Art, Assemblage Art, Happening Art, Graffiti, Environmental Art, Land Art. Public Art. Popular Art, Pseudo Art, Fluxus Art, Fusion Art and other Experimental Arts (Innovative).

Books Recommended :

1. New Media in Art : Michael Rush, Publisher : Thomas & Hudson.
2. Art Since 1900 (Modernism, Anti Modernism, Post Modernism) : Hal Foster, Rasatind Krauss
3. Art : 21 (Art in twenty first Century) : Megybeth Sollins
4. न्यू आर्ट ट्रेण्ड्स : डॉ. कृष्णा महावर, हिन्दी ग्रन्थ अकादमी, जयपुर

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Practical

Practical : 80 Marks

Paper D Study from Life Human Body

Full figure Media oil water colour, Soft Pastel, Charcoal

Duration 15 hours

Size Imperial

Two sittings every day of 2 ½ Hours each with a break of 1 hours in between for three day.

Max. Marks 80

Paper E Creative Composition

Duration : 15 hrs.

Max. Marks 80

Two sittings every day of 2 ½ Hours each with a break of 1 hours in between for three day. Size of the paper Imperial.

The candidate will prepare a composition on a given subject. Preliminary sketch of the final composition will be done and submitted after the first sitting which will be attached to the final composition.

Submission of work

Max. Marks 40

Every candidate will have to submit the following work one month before the commencement of the annual examination (Final)

- (a) Full Figure 18 plates
- (b) Composition 10 plates
- (c) A Sketch book containing not less than 50 sketches size ¼ Imp.

Marks on the submission work will be awarded internally by the subject teacher (internal). The work of the candidate will be retained in the Department for one month after the declaration of the result and then returned to the declaration of the result and then returned to the candidate.

General Instructions :

- (a) Candidate should pass in practical as well as in the theory papers separately.
- (b) Practical Examination should be arranged one month before the commencement of theory examination.
- (c) There should be 9 hours for each practical and 6 hours for each theory paper plus 2 hours for sketching in a week.
- (d) The practical answer book shall be examined by one external and one internal to be appointed on the recommendation of the Head of Department as per existing practice.
- (e) The departments should also arrange for an Educational tour to ancient and modern art centres like Ajanta, Ellora, Elephanta, Khajuraho, Mahabalipuram, National Exhibitions, Modern Art Galleries, Art Colleges and places suitable for outdoor sketching.
- (f) Minimum three demonstration should be arranged by the subject expert during the session for each practical paper.

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SYLLABUS

B.Sc. PART-III

Examination-2024

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University of Rajasthan
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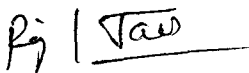
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Scheme of Examination B.Sc. (Pass Course) Part-III

The number of paper's and the maximum marks for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/paper. Wherever prescribed separately. Classification of successful candidates shall be as follows :

First Division 60%	}	of the aggregate marks prescribed at (a) Part first Examination excluding those obtained in the compulsory subject (b) Part Second Examination (c) Part Third Examination taken together.
Second Division 48%		


All the rest will be declared to have passed the Examination. If they obtain a minimum pass marks in each subject viz 36% No division shall be awarded at the Part First and Part Second Examinations:

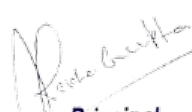

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Additional Optional Subjects ;		
1.	Textile Craft	74-75
2.	Garment Production and Export Management	76-79
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PHYSICS

Scheme

Paper I	Exam: 3 hours duration	Min Pass marks: 12	Max. Marks : 33
Paper II	Exam: 3 hours duration	Min Pass marks: 12	Max. Marks : 33
Paper III	Exam: 3 hours duration	Min Pass marks: 12	Max. Marks : 34
Practical	Exam: 4 hours duration	Min Pass marks: 18	Max. Marks : 50

Paper I: Quantum Mechanics and Spectroscopy

Work Load: Two hours Lecture per week

Scheme of Examination: First question will be of nine marks comprising of six short answer type parts each with answer not exceeding half a page. Remaining four questions will be set with one question from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying three marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

Unit - I : Evolution of quantum physics

1. Difficulties of classical mechanics to explain: the black-body emission spectrum, specific heat of solids. Plank quanta concept and radiation law, Photo electric effect and Einstein's explanations. Compton effect, De-Broglie hypothesis, diffraction and interference experiments of particle (Davisson-Germier experiment).
2. Uncertainty principle: position and momentum, angle and angular momentum, energy and time. Application of uncertainty principle: (i) Ground state energy of hydrogen atom, (ii) ground state energy of simple harmonic oscillator. (iii) Natural width of spectral lines, (iv) Non-existence of electron in nucleus.
3. Operators: linear operators, product of two operators, commuting and non-commuting operators. simultaneous eigen functions and eigen values. orthogonal wavefunctions. Hermitian operators. their eigenvalues. Hermitian adjoint operators.

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eigenvalues and eigenfunctions; expectation values of operators: position, momentum, energy; Ehrenfest theorem and complementarity, Concept of group and phase velocity, wave packet, Gaussian wave packet, bra-ket notation.

Unit – II : Schrödinger wave equation and its solutions

1. Schrödinger wave equation: general equation of wave propagation, propagation of matter waves, time dependent and time-independent Schrödinger equation, wavefunction representation (ψ), physical meaning of ψ , properties and conditions on ψ , postulates of wave mechanics, operators, observable and measurements; probability current density.

2. Time independent Schrödinger equation, stationary state solution, one dimensional problem: particle in one dimensional box, eigenfunctions and eigenvalues, discrete energy levels, generalization into three dimension and degeneracy of energy levels, concept of a potential well and barrier, step potential, penetration through rectangular barrier, reflection and transmission coefficients, barriers with special shapes (graphical representation), quantum mechanical tunneling (alpha decay).

Unit – III : Schrödinger equation solutions in special cases

1. Symmetric square well potential, reflection and transmission coefficients, resonant scattering; Bound state problems: particle in one dimensional infinite potential well and finite depth potential well, energy eigenvalues and eigenfunctions, transcendental equation and its solution; Simple harmonic oscillator, Schrödinger equation for simple harmonic oscillator and its solution, eigenfunction, eigenvalues, zero point energy, quantum and classical probability density, parity, symmetric and antisymmetric wave functions with graphical representation.

2. Schrödinger equation in spherical coordinates, Schrödinger equation for one electron atom in spherical coordinates, separation into radial and angular variables, solution of radial equation and angular equation, qualitative discussion of spherical harmonics, series solution and energy eigenvalues, stationary state wavefunction. Wave-functions of H-atom for ground and first excited states, average radius of H-atom, Bohr correspondence principle, orbital angular momentum and its quantization, commutation relation, eigenvalues and eigenfunctions.

UNIT IV: H-atom, Atomic and Molecular spectroscopy

1. Energy level derivation for H-atom, quantum features of hydrogen spectra and hydrogen like spectra, Stern-Gerlach experiment, electron spin, spin magnetic

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moment, spin-orbit coupling, qualitative explanation of fine structure, Franck-Hertz experiment, Zeeman effect, normal Zeeman splitting, Qualitative understanding about Stark effect.

2. Absorption and emission spectroscopy, its block diagram, brief explanation about function of each elements and its limitations; single beam spectrophotometer.

3. Molecular spectroscopy: concept of rigid rotator, rotational energy levels, rotational spectra, selection rules, intensity of spectral lines, isotopic effect; Vibrational energy levels, vibrational spectra, selection rules, isotopic effect, effect of anharmonicity in vibrational spectra, vibrational-rotational spectra of CO and HCl molecules.

Reference books

1. J. Griffiths, Introduction to Quantum Mechanics, 2nd edition.

2. R. Shankar, Principles of Quantum Mechanics, 2nd edition.

3. Arthur Beiser, Perspective of modern Physics, 6th edition.

4. AK Ghatak and S Lokanathan, Quantum Mechanics: Theory and application.

5. HS Mani, GK Mehta, Introduction to modern Physics.

6. C.N. Banwell and E.M. McCash, Fundamental of Molecular Spectroscopy, 4th edition.

7. H.E. White, Intoduction to atomic physics,

Paper II: Nuclear and Particle Physics

Work Load: Two hours Lecture per week

Scheme of Examination: First question will be of nine marks comprising of six short answer type parts each with answer not exceeding half a page. Remaining four questions will be set with one question from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying three marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

UNIT - I

Properties of Nucleus : Discovery of Nucleus, Rutherford Scattering, Constituents of the Nucleus, Mass, Charge, Size, Nuclear Density, Charge Distribution, Hotstadier's experiment.

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Nuclear Angular momentum, Nuclear Magnetic Dipole Moment, Electric Quadrupole Moment, Spin, Isospin, Wave Mechanical Properties: Parity and Statistics, Classification of Nuclei, Mass Defect and Binding Energy, Packing Fraction, Mass Spectrograph.
Nuclear Forces: Properties of Nuclear Forces, Yukawa Meson Theory, Nuclear Potential.
Nuclear Models: Segre Chart, Liquid Drop Model, Semi Empirical Mass Formula, Condition of Stability, Fermi Gas Model, Evidence for Nuclear Shell Structure, Nuclear Magic Numbers and Basic Assumptions of the Shell Model.

UNIT - 2

Radioactive Decays: Alpha Decay-Basics of α -Decay Processes, Theory of β -Emission Spectrum, Gamow Factor, Geiger Nuttal Law, Range of Alpha Particles, Beta Decay- Energy Kinematics for β -Decay, β -Decay Spectrum, Positron Emission, Electron Capture, Pauli's Neutrino Hypothesis.
Gamma Decay- Gamma Ray Emission and Kinematics, Internal Conversion
Applications of Radioactivity
Nuclear Fission and Fusion: Nuclear Fission, Spontaneous Fission and Potential Barrier, its Explanation by Liquid Drop Model, Chain reaction, Controlled chain reaction, Four Factor Formula, Nuclear Reactors, Classification of Nuclear Reactor, Uncontrolled Chain Reaction, Nuclear Fusion. Energy released in Nuclear Fusion, Fusion in stars.
Nuclear Reactions: Types of Reactions, Conservation Laws, Kinematics of Reactions, Q-Value, Threshold Energy, Reaction Rate, Reaction Cross-Section.

UNIT - 3

Interaction of Nuclear Radiation with Matter: Energy Loss by Heavy Charged Particles in Matter, Interaction of Electrons with Matter, Range of Charged Particle, Bremsstrahlung, Cherenkov Radiation, Gamma Ray Interaction With Matter.
Radiation Detectors: Gas filled detector, Avalanche, Geiger Discharge, Ionization Chamber, Proportional Counter, Geiger Muller Counter, Current mode and Pulse Mode Operation of Detector.
Particle Accelerators: Ion source, Van-de-Graff Accelerator (Tandem Accelerator), Linear Accelerator, Cyclotron, Synchrocyclotron, Betatron, Proton Synchrotron

UNIT - 4

Elementary Particles: Necessity of high energy to discover elementary constituents, historical introduction to discovery of elementary particles (electron, positron, neutrinos).

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strange mesons, charm quark, intermediate vector bosons, bottom quark, top quark and Higgs boson) Elementary particles and their quantum numbers (charge, spin, parity, isospin, strangeness, etc.), elementary particles included in the standard model.

Fundamental Interactions : Four types of fundamental forces. Symmetries and Conservation Laws, Discrete symmetries C, P, and T invariance. Application of symmetry arguments to particle reactions. Parity non-conservation in weak interaction, CP violation.

Quark Model : Flavor symmetries, Gellmann-Nishijima formula, the eightfold way, Quark model. Octet Diagram for Mesons and Baryons, Concept of Quark model, the November Revolution, Baryon Decuplet, Color Quantum Number and Gluons.

Suggested Books:

1. Nuclear and Particle Physics, W. E. Burcham and M Jobs, Addison Wesley Longman Inc.
2. Nuclear and Particle Physics, Brian R Martin, John Wiley & Sons.
3. Introduction to Nuclear and Particle Physics, Das and Ferbal, World Scientific.
4. Elements of Nuclear Physics, Walter E. Meyerhof, McGraw-Hill Book Company.
5. Introductory Nuclear Physics, Kenneth S. Krane, John Wiley & Sons.
6. Introduction to Elementary Particles, David J. Griffiths, John Wiley & Sons.
7. Radiation Detection and Measurement, G.F. Knoll (John Wiley & Sons)
8. Introduction to Nuclear and Particle Physics, V. K. Mittal, R. C. Verma, S. C. Gupta, PHI
9. Concepts of Modern Physics, A. Beiser, McGraw-Hill Book Company.

Paper III: Solid State Physics

Two hours Lecture per week

Scheme of Examination: First question will be of ten marks comprising of five short answer type parts each with answer not exceeding half a page. Remaining four questions will be set with one question from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying three marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

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Unit I

Bonding in Solids and Crystal structure:

Force between atoms. Ionic bonds, Covalent and metallic bonds, Vander waal's and Hydrogen bonding. Periodicity in lattices, Basis, lattice point and space lattice, Translation vectors, Unit and primitive cell, Crystal systems, Packing fractions for Simple Cubic (SC), Body Centred Cubic (BCC), Face Centred Cubic (FCC) and Hexagonal lattice structures, Bravais space lattices.

Crystallography and Diffraction:

Direction, planes and miller indices in a crystal lattice, Reciprocal lattice and its significance, Conversion of SC and FCC structures in reciprocal lattice frame, Concept of crystalline, polycrystalline and amorphous materials, X-ray diffraction by solids: Laue and Braggs equation, Study of crystals by X-rays: FWHM, Sherrer formula and Lattice Constants (for simple cubic structure), Electron and Neutron diffraction (qualitative).

Unit II

Band theory of solids:

Formation of bands, Periodic potential and Bloch Theorem, Number of states in the bands, Kroning Penny model, Brilliuon zones, Crystal momentum and physical origin of effective mass, Negative Effective Mass and Holes, Energy dispersion relations: weak and tight binding.

Semiconductors:

Energy band Structures in Insulators, Conductors, Semiconductors. Concept of Direct and Indirect band gap in semiconductors. Generation and recombination of charge carriers, Mobility of charge carriers, Hall Effect in semiconductors: Hall coefficient, Mobility, Charge carrier concentration, Conductivity and Hall angle.

Unit III

Thermal properties of Materials:

Elastic waves, Phonon, Phonon dispersion relations in monoatomic and diatomic linear lattice. Lattice heat capacity, Classical theory of specific heat, Dulong-Petit's law, Einstein and Debye's theory of specific heat of solids and limitations of these models. concept of Thermoelectric Power.

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Electrical Properties of Materials:

de-Lorentz theory, Sommerfeld's Model, Thermal conductivity, Electrical conductivity, Widemann-Franz relation, Thermionic Emission, Escape of electrons from metals, Hall Effect in Metals, Density of states.

Unit IV

Magnetic Properties of Materials:

Classification of Magnetic Materials. Origin of Atomic Magnetism, Classical Langevin Theory of dia - and Paramagnetic Domains. Quantum theory of Paramagnetism. Curie's law, Weiss's Theory of Ferromagnetism. Concept of Domain Wall, Magnetostriction, Heisenberg's Exchange Interaction, Relation between Exchange Integral and Weiss Constant.

Superconductivity:

Experimental features of superconductivity: Critical Temperature, Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. Idea of BCS theory (No derivation); Cooper Pair and Coherence length. Josephson Effect (No derivation)

Reference Books

1. Introduction to Solid State Physics--- Charles Kittel (Wiley Publication)
2. Elementary Solid state Physics----M. Ali Omar (Pearson Education)
3. Elements of X-ray diffraction---B. D. Cullity (Prentice Hall)

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Teaching	Practicals	Min. Pass Marks
Max. Marks	4 hrs/week	18
50	Duration 5 hrs.	

Total number of experiments to be performed by the students during the session should be 16 selecting any 8 from each section.

Section-A

1. Determination of Planck's constant by photo cell (retarding potential method using optical filters, preferably five wave length).
2. Determination of Planck's constant using solar cell.
3. Determination of Stefan's constant (Black body method)
4. Study of the temperature dependence of resistance of a semi-conductor (four probe method).
5. Study of Jodine spectrum with the help of grating and spectrometer and ordinary bulb light.
6. Study of characteristics of a GM counter and verification of inverse square law for the same strength of a radioactive source.
7. Study of β -absorption in Al foil using GM Counter.
8. To find the magnetic susceptibility of a paramagnetic solution using Quinck's method. Also find the ionic molecular susceptibility of the ion and magnetic moment of the ion in terms of Bohr magneton.
9. Determination of coefficient of rigidity as a function of temperature using torsional oscillator (resonance method).
10. Study of polarization by reflection from a glass plate with the help of Nicol's prism and photo cell and verification of Brewster law and law of Malus.
11. e/m measurement by helical Method.
12. Measurement of magnetic field using ballistic galvanometers and search coil. Study of variation of magnetic field of an electromagnet with current.
13. Measurement of electric charge by Millikan's oil drop method.

Section-B

1. Study of a R-C transmission line at 50 Hz
2. Study of a L-C transmission line
 - (i) at fixed frequency.
 - (ii) at variable frequency.
3. Study of resonance in an LCR circuit (using air core inductance and damping by metal plate)

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- (i) at fixed frequency by varying C, and
(ii) by varying frequency.
4. Study of the characteristics of junction diode & Zener diode.
 5. Study of
 - (i) Recovery time of junction diode and point contact diode.
 - (ii) Recovery time as a function of frequency of operation and switching current.
 6. To design Zener regulated power supply and study the regulation with various loads.
 7. To study the characteristics of a field effect transistor (FET) and design/study amplifier of finite gain (10).
 8. To study the frequency response of a transistor amplifier and obtain the input and output impedance of the amplifier.
 9. To design and study of an R-C phase shift oscillator and measure output impedance (frequency response with change of component of R and C).
 10. To study a voltage multiplier circuit to generate high voltage D.C. from A.C.
 11. Using discrete components, study OR, AND, NOT logic gates, compare with TTL integrated circuits (I.C.'s).
 12. Application of operational amplifier (OP-AMP) as : Minimum two of the following exercises—(a) Buffer (for accurate voltage measurement) (b) Inverting amplifier (c) Non Inverting amplifier (d) Summing amplifier.

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2. CHEMISTRY Scheme

Max Marks: 150

	Duration (hrs)	Max. Marks	Min. Pass Marks
Paper I	3	33	
Paper-II	3	33	36
Paper-III	3	34	
Practical	5	50	18

Note: Ten (10) questions are to be set taking two (02) questions from each unit. Candidates have to answer any 5 questions selecting at least one question from each unit.

CH-301 Paper-I : Inorganic Chemistry (2 hrs or 3 periods/ week)

Unit-I

Hard and Soft Acids and Bases (HSAB):

Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

Unit-II

Metal-ligand bonding in Transition Metal complexes:

Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal-field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

Magnetic properties of Transition Metal Complexes:

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of μ_s , and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.

Unit-III

Electron spectra of Transition Metal Complexes:

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series. Orgel-energy level diagram for d^1 and d^9 states, discussion of the electronic spectra of $(Ti(H_2O)_6)^{3+}$ complex ion.

Thermodynamic and Kinetic Aspects of Metal Complexes:

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

Unit-IV

Organometallic Chemistry:

Definition, nomenclature and classification of organometallic compounds. Preparation,

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properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn and Ti, a brief account of metallocenes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.

Unit-V

Bioinorganic Chemistry:

Essential and trace elements to Biological processes, metalloproteins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+} . Nitrogen fixation.

Inorganic Polymers:

Silicones and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes.

CH-302 Paper-II : Organic Chemistry (2 hrs or 3 periods/week)

Unit-I

Nuclear Magnetic Resonance (NMR) Spectroscopy:

Proton magnetic resonance ($^1\text{H-NMR}$) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin splitting and coupling constants, areas of signals. Interpretation of NMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromoethane, ethyl acetate, toluene and acetophenone. Problems pertaining to the structure elucidation of simple organic compounds using NMR data.

Organic Synthesis via Enolates: Acidity of α -hydrogens in reactive methylene compounds, alkylation of diethyl malonate and ethyl acetoacetate. Claisen condensation, Keto-enol tautomerism in ethyl acetoacetate. Synthetic applications of ethyl acetoacetate and malonic ester.

Unit-II

Heterocyclic Compounds

Introduction: Molecular orbital diagram and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.


Introduction to condensed five- and six-membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher-indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis, Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.


Unit-III

Carbohydrates

Classification and nomenclature, Monosaccharides, mechanism of osazone formation. Epimers, anomers and mutarotation. Interconversion of glucose and fructose, chain lengthening and chain

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shortening of aldoses. Erythro and threodiastereomers. Conversion of glucose into mannose. Configuration of monosaccharides. Determination of ring size of monosaccharides. Formation of glycosides, ethers and esters. Cyclic structure of D(+)-glucose and fructose. Structures of ribose and deoxyribose. Nomenclature and structure of disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose); Glycosidic linkage.

Unit-IV

Amino Acids, Peptides, Proteins and Nucleic Acids

Classification, structure and stereochemistry of amino acids. Acid-base behaviour, isoelectric point and electrophoresis. Preparation and reactions of α -amino acids.

Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end-group analysis, selective hydrolysis of peptides. Classical peptide synthesis. Solid-phase peptide synthesis.

Nucleic acids - Introduction, constituents of nucleic acids - nucleosides and nucleotides.

Unit-V

Organosulphur Compounds : Nomenclature, structural features, methods of formation and chemical reactions of thiols, sulphonic acids, sulphonamides and Sulpha drugs: sulphaguanidine, sulphadiazine (sulphapyrimidine), sulphamethoxazole, sulphacetamide.

Synthetic Polymers : Addition or chain-growth polymerization. Free radical and ionic polymerization. Ziegler-Natta Catalyst Condensation or step-growth polymerization. Polyesters, polyamides, phenol-formaldehyde resins, urea-formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubber.

Synthetic Dyes : Colour and constitution (electronic concept). Classification of dyes. Chemistry and synthesis of methyl orange, congo red, malachite green, crystal violet, phenolphthalein, fluorescein, alizarin and indigo.

CH-303 Paper III: Physical Chemistry (2 Hrs. or 3 periods/week)

UNIT-I

Elementary quantum Mechanics:

Black-body, radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Bohr's mode of hydrogen atom (no derivation) and its defects. Compton effect.

De Broglie hypothesis, the Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of

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the wave function, postulates of quantum mechanics, particle in a one dimensional box.

Schrodinger wave equation for H-atom, separation into three equations (without derivation), quantum numbers and their importance, hydrogen like wave functions, radial wave functions, angular wave functions.

UNIT-II

Molecular orbital theory:

Basic ideas-criteria for forming M.O. from A.O. construction of M.O's by LCAO- H_2^+ ion calculation of energy level from wave functions, physical picture of bonding and antibonding wave functions, concept of σ , σ^* , π , π^* orbitals and their characteristics. Hybrid orbitals - sp , sp^2 , sp^3 , calculation of coefficients of A.O.'s used in these hybrid orbitals.

Introduction to valence bond model of H_2 , comparison of M.O. and V.B. models.

UNIT-III

Spectroscopy

Introduction: Electromagnetic radiation, spectrum, basic features of different spectrometers, statement of the Born-Openheimer approximation, degrees of freedom.

Rotational Spectrum: Diatomic molecules, Energy levels of a rigid rotator (semi-classical principles), selection rules, spectral intensity, using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotator, isotope effect.

Vibrational Spectrum: Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

Raman Spectrum: Basic principles and applications, concept of polarizability, pure rotational and pure vibrational Raman Spectra of diatomic molecules, selection rules.

Electronic Spectrum: Concept of Potential Energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Frank Condon principle. Qualitative description of σ , π and n M.O. their energy levels and the respective transitions.

UNIT-IV

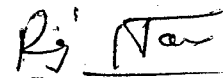
Photochemistry


Interaction of radiation with matter, difference between thermal and photochemical processes.

Laws of photochemistry: Grothus-Draper law, Stark -Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

Physical Properties and Molecular Structure

Optical activity, polymerization - (Clausius-Mossotti equation), orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment temperature method and refractivity method, dipole moment and structure of molecules, magnetic properties-paramagnetism, diamagnetism and ferromagnetic.


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UNIT-V

Solutions, Dilute Solutions and Colligative Properties:

Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient.

Dilute solution, colligative properties, Raoult's law, relative lowering of vapor pressure, molecular weight determination. Osmosis, law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression in freezing point. Thermodynamic derivation of relation between molecular weight and elevation of boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.

Practical: CH-304: Laboratory Course – III

(6 hrs/week)

INORGANIC CHEMISTRY

Synthesis and Analysis of:

- Potassium trioxalatoferrate (III), $K_3[Fe(C_2O_4)_3]$
- Bis(dimethylglyoximate) nickel (II) complex, $[Ni(DMG)_2]$
- Tetraamminecopper (II) sulphate, $[Cu(NH_3)_4]SO_4$
- Potassium *cis*-diaquabis(oxalato)chromate (III) dihydrate, $K[*cis*-Cr(H_2O)_2(C_2O_4)_2] \cdot 2H_2O$

Instrumentation

Calorimetry

- Job's
 - Mole-ratio method
- Adulteration-Food stuffs
Effluent analysis water analysis

Solvent Extraction

Separation and estimation of Mg (II) and Fe (II)

Ion Exchange Method

Separation and estimation of Mg (II) and Fe (II)

ORGANIC CHEMISTRY

Laboratory Techniques

Steam Distillation

Naphthalene from its suspension in water
Clove oil from Clove
Separation of *o*- and *p*-nitrophenols

Column Chromatography

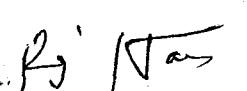
Separation of fluorescein and methylene blue
Separation of leaf pigments from spinach leaves
Resolution of racemic mixture of (+) mandelic acid

Qualitative Analysis

Analysis of an organic mixture containing two solid components using water, $NaHCO_3$, for separation and preparation of suitable derivatives.

Synthesis of Organic Compounds

- Acetylation of salicylic acid, aniline, glucose and hydroquinone.


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Benzoylation of aniline and phenol

(b) Aliphatic electrophilic substitution
Preparation of iodoform from ethanol and acetone

(c) Aromatic electrophilic substitution

Nitration

Preparation of m-dinitrobenzene

Preparation of p-nitroacetanilide

Halogenation

Preparation of p-bromoacetanilide

Preparation of 2, 4, 6-tribromophenol

(d) Diazotization / coupling

Preparation of methyl orange and methyl red

(e) Oxidation

Preparation of benzoic acid from toluene

(f) Reduction

Preparation of aniline from nitrobenzene

Preparation of m-nitroaniline from m-dinitrobenzene.

Stereochemistry: Study of Organic Compounds via Models

R and S configuration of optical isomers.

E, Z configuration of geometrical isomers.

Conformational analysis of cyclohexanes and substituted cyclohexanes.

PHYSICAL CHEMISTRY

Electrochemistry

(a) To determine the strength of the given acid conductometrically using standard alkali solution.

(b) To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically.

(c) To study the saponification of ethyl acetate conductometrically.

(d) To determine the ionization constant of a weak acid conductometrically.

(e) To titrate potentiometrically the given ferrous ammonium sulphate solution using $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ as titrant and calculate the redox potential of $\text{Fe}^{2+}/\text{Fe}^{3+}$ system on the hydrogen scale.

Refractometry, Polarimetry

(a) To verify the law of refraction of mixture (e.g. of glycerol and water) using Abbe's refractometer.

(b) To determine the specific rotation of a given optically active compound.

Molecular Weight Determination

(a) Determination of molecular weight of a non-volatile solute by Rast method/Beckmann freezing point method.

(b) Determination of the apparent degree of dissociation of an electrolyte (e.g. NaCl) in aqueous solution at different concentrations by ebullioscopy.

Colorimetry

(a) To verify Beer-Lambert law $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ and determined the concentration of the given solution of the substance.

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University of Rajasthan
Syllabus: B.Sc. Part-III (Pass Course)
Zoology
(2022-2023)

Scheme:
Max. Marks: 100

Min. Pass Marks: 36

Paper I	: 3 Hrs duration	33 Marks
Paper II	: 3 Hrs duration	33 Marks
Paper III	: 3 Hrs duration	34 Marks
Practicals	: 4 Hrs. duration	50 Marks

NOTE:

1. There will be two parts of every theory question paper with total duration of 3 hours. First part of question paper will comprise question No. 1 containing 9 (Paper I & II) or 10 (Paper III) very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, i.e., three from each unit /section out of which candidate will be required to attempt any 4 question selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

PAPER –I: Z-301

STRUCTURE AND FUNCTIONS OF CHORDATE TYPES

NOTE:

1. There will be two parts of this theory question paper with total duration of 3 hours. First part of question paper will comprise question No. 1 containing 9 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part i.e. three from each unit /section, out of which candidate will be required to attempt any 4 question selecting at least one question from each unit/section. Each question will carry 6 marks
2. The candidate has to answer all questions in the main answer book only.

Section – A

Chordates

1. Comparison of habit, external features and anatomy of *Herdmania* and *Branchiostoma* (excluding development).
2. Ascidian tadpole larva and its metamorphosis.
3. Affinities of Hemichordata, Urochordata and Cephalochordata
4. Habit, habitat and salient features of *Petromyzon*, Ammocoete larva.

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Section – B

Structure, organs and Systems: Brain, endoskeleton, Digestive, Circulatory, Respiratory, Excretory, Nervous & Reproductive

Pisces- Labeo
Amphibian- Frog
Reptile- Varanus
Aves- Pigeon
Mammal- Rat

Section – C

Chordate Adaptations

1. Pisces: Scales and fins, migration and parental care.
2. Amphibia: Parental care.
3. Reptilia: Poisonous and non poisonous snakes, poison apparatus.
4. Aves: Flight adaptations, types of feather, bird migration.
5. Mammals: Adaptive radiation, dentition.

PAPER –II: Z-302

ECOLOGY, ENVIRONMENTAL BIOLOGY AND EVOLUTION

NOTE:

1. There will be two parts of this theory question paper with total duration of 3 hours. First part of question paper will comprise question No. 1 containing 9 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part i.e. three from each unit /section, out of which candidate will be required to attempt any 4 question selection at least one question from each unit/section. Each question will carry 6 marks
2. The candidate has to answer all questions in the main answer book only.

Section – A

Ecology

1. Basic concepts in ecology, its meaning and history.
2. Concepts of limiting factors.
3. Ecosystem: Biotic and abiotic factors.
4. Ecosystem: Production, consumption and decomposition in an ecosystem: Concepts of food-chain, food web, trophic structure, ecological pyramids
5. Biogeochemical cycles of O₂, CO₂, H₂O, N, P and role of microbes.
6. Ecosystem: Homeostasis, functional aspects, productivity concepts and determination, ecotone, edge effects, niche.
7. Population ecology: Density and methods of its measurement, natality, mortality, age ratio and distribution, pyramids, fluctuations, biotic potential, dispersal, growth forms, population interactions and propagation, brief idea of demography.
8. Community ecology: Characteristics of natural communities, structure, composition, stratification.
9. Ecological succession: Types and patterns, concept of climax, details of xerosere and hydrosere successions.

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10. Habitat ecology: Brief account of fresh water, marine, terrestrial and estuarine water ecosystems.
11. Ecology and human future: Growth rate role of human kind in modifying natural communities in term of public health and welfare with respect to use of pesticides, conservation and pollution.

Section – B

Environmental Biology

1. Environment and its concepts, hydrosphere, lithosphere and atmosphere.
2. Natural resources: Conservation and management of natural resources: Renewable (forest, wildlife, water) and non renewable (soil, minerals and energy).
3. Environmental pollution: General outline and various types of pollution of water, air, and soil. Sources and remedies for noise, radiation.
4. Green House effect, Ozone layer depletion, El-Nino and La Nina effects.
5. Basic concepts of bioaccumulation, biomagnifications, biodegradation of pollutants.
6. Impact of urbanization: Development and distribution of urban centers, factors, problems and solutions of urbanization, fauna of oriental region.
7. Wildlife conservation: Vanishing and threatened animals and plants with special reference in Rajasthan, Wildlife management efforts by Government and non Government organization.
8. Space ecology: Space ecosystem, space problems and their solutions, colonization.

Section - C

Evolution

1. Darwinism and Neo Darwinism, Lamarckism and Neo Lamarckism, natural Selection.
2. Variation, Isolation, Mutations.
3. Concept of Species and Speciation.
4. Adaptations (Desert, freshwater, Deep Sea and Flight), Mimicry.
5. Polymorphism: population genetics, Genetic drift and Hardy-Weinberg Law.
6. Evolution Man, Phylogeny of Horse.
7. Zoogeography: Principles and concepts of Parallelism, endemism etc. and factors influencing animal distribution.
8. Zoogeographical realms and faunal peculiarities, evolution of realms, plate tectonics and continental drifts and Island Zoogeography.

PAPER –III: Z-303

APPLIED ZOOLOGY, ETHNOLOGY AND BIostatISTICS

NOTE:

1. There will be two parts of this theory question paper with total duration of 3 hours. First part of question paper will comprise question No. 1 containing 10 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus.
Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part i.e. three from each unit /section, out of which candidate will be required to attempt any 4 question selecting at least one question from each unit/section. Each question will carry 6 marks
2. The candidate has to answer all questions in the main answer book only.

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Section – A

Applied Zoology

Principles and Practices of the following:

1. Vermiculture.
2. Sericulture (including ericulture).
3. Lac culture.
4. Apiculture.
5. Prawn culture.
6. Poultry keeping.

Economic Importance of the following:

1. Protozoa.
2. Corals and coral reefs.
3. Helminthes.
4. Arthropods; Insects and their management
5. Mollusca: Outline idea of pearl culture.

Section – B

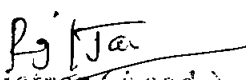
Ethology

1. Introduction and history of Ethology.
2. Concepts of Ethology : Fixed action pattern, sign stimulus, innate releasing mechanism, action specific energy, motivation imprinting and learning.
3. Pheromones and their role in alarm spreading
4. Societies: Characteristics and advantage with special reference to honey bee & deer.
5. Biological rhythms and biological clocks.
6. Methods of studying animal behavior.

Section – C

Biostatistics

1. Introduction, scope and application of Biostatistics.
2. Understanding the concepts of descriptive and inferential statistics.
3. Frequency distribution.
4. Graphical and tabular presentation of data.
5. Mean, median, mode and their significance.
6. Standard deviation, standard error and their significance.
7. Hypothesis: Null and alternative; Student's t- test.


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Syllabus: B.Sc. Part-III (Pass Course)

Zoology Practical

(2022-2023)

Min. Marks: 18

4 Hrs. / Week

Max. Marks: 50

I. Anatomy:

Any edible fish (*Wallago, Labeo*): External features, general viscera, afferent and efferent branchial blood vessels, eye muscles and their innervations, brain, cranial nerves and internal ear.

II. Study of the following through Permanent Slide preparations:

Striped muscle fibers; Smooth muscle fibers, scales of edible fish, hair of man, balled film of any vertebrate.

III. Study of Microscopic Slides: Whole mounts of oral hood, velum and pharyngeal wall of *Amphioxus*; T. S. of *Amphioxus* through various regions; tadpole larva of *Ascidia*; whole mounts of *Salpa*, *Doliolum* and *Oikopleura*, V. S. of skin of fish, T. S. body of fish through various regions, V. S. of skin of bird, V. S. mammalian skin, T. S. mammalian liver, kidney, stomach, intestine, bone, spinal cord, lung, duodenum, pancreas, testis and ovary.

IV. Study of Museum Specimens: *Ascidia*, *Ciona*, *Botryllus*, Ammocoete larva, *Petromyzon*, *Myxine* or *Bdellostoma*, *Zygaena (Sphyrna)*, *Torpedo*, *Chimaera*; *Acipenser*, *Amia* or *Lepidosteus*, *Labeo*, *Clarias*, *Anguilla*, *Hippocampus*, *Exocoetus*, *Echeneis*, any flat-fish, Protopterus, *Ichthyophis* or any blind-worm, *Proteus*, *Ambystoma*, Axolotl, Siren, *Alytes*, *Hyla*, *Testudo*, *Chelone*, and Fresh Water Tortoise, *Sphenodon*, *Hemidactylus*, *Phrynosoma*, *Draco*, *Chameleon*; *Eryx*, *Hydrophis*, *Naja*, *Viper*, *Crocodylus*, *Alligator*, *Archaeopteryx*, any Running Bird, *Pavo cristatus*, *Choriotis nigriceps*, *Ornithorhynchus*, *Tachyglossus*, *Didelphys*, *Macropus*, Bat, *Loris*, Scaly anteater.

V. Osteology: A comparative study of articulated and disarticulated bones of skull, vertebrae, limb bones and girdles of any amphibian, reptile, bird and mammal with the help of models/ charts/ artificial skeleton/bones.

VI. Environmental Biology:

Analysis of Environment:

1. Soil pH
2. Water analysis: pH, alkalinity, acidity, dissolved O₂ and free CO₂, Salinity (Chloride).
3. Qualitative estimation of zoo-plankton in given sample of water.

VII. Ethology:

1. Study of any stored insect pest (food preference and response to light)
2. Antennal grooming in cockroach.
3. Chemical communication: Ants/earthworm.
4. Visit to a Zoo/ Museum of Natural History /Wild life Sanctuary and/or Study of local faunal biodiversity (Candidates are expected to submit a detailed report of such visit).

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VIII. Biostatistics:

1. Construction of frequency table, bar diagram, line diagram, histogram, frequency polygon and pie chart.
2. Exercises on mean, median and mode (direct, short-cut and step-deviation methods).
3. Standard deviation and standard error.

B.Sc. Part - III

Scheme of Practical Examination and Distribution of Marks

Time: 4 Hrs.

Min Pass Marks: 18

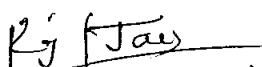
Max. Marks: 50


	Regular	Ex. /N.C. Students
1. Anatomy	6 (4+2)	7 (5+2)
2. Permanent Preparation	5	6
3. Environmental Biology	5	5
4. Ethology	3	5
5. Biostatistics	5	6
6. Identification and comments on Spots (1 to 8)	16	16
7. Viva Voce	5	5
8. Class Record	5	-
	50	50

Notes:

1. With reference to anatomy and study of museum specimens, candidates must be well versed in the study of various systems with the help of charts/models/CD-ROMs, multimedia computer based simulations including computer assisted learning (CAL) and other softwares.
2. With reference to permanent preparations and microscopic slides, in case of non-availability, the exercise should be substituted with diagrams, photographs, models, charts, etc.
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
6. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.

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Recommended Books:

1. Ahsan J and Sinha SP: A Hand book on Economic Zoology. 9th edition S. Chand & Co. Ltd., 1981.
2. Alcock J: Animal Behavior: An Evolutionary Approach. Sinauer Associates 2013.
3. Animal Societies and Evolution. Scientific American Publications.
4. Alexander R. M: The Chordates, Cambridge University Press. 1975.
5. Bailey NTJ: Statistical Methods in Biology. English Universities Press, 1964.
6. Breed MD and Moore J: Animal Behavior. Academic Press. 2015.
7. Grizimek's Encyclopedia of Ethology.
8. Gurumani N: An Introduction to Biostatistics. MJP Publishers, 2011.
9. Hand book of Ethological Method. Laharen Publications Garland STPM Press.
10. Kotpal RL: Modern Text Book of Zoology: Vertebrates. Global Media Publications 2010.
11. MacFarland D: Animal Behavior: Psychobiology, Ethology and Evolution 3rd edition Longman 1998.
12. Mahajan BK: Methods in Biostatistics. 7th edition Jaypee Publishers, 2010.
13. Manning A, Dawkins MS: An Introduction to Animal Behavior. Cambridge University Press 2012.
14. Mathur R: Animal Behavior. Rastogi Publications 2010.
15. Odum: Fundamentals of Ecology. Thomson Books/Cole 2005.
16. Odum: Ecology: A Bridge Between Science and Society Sinauer Associates 1997.
17. Prasad SN and Kashyap V: A Textbook of Vertebrate Zoology. 13th edition Wiley Eastern Ltd. 2011.
18. Primrose S. B. and. Twyman R. M: Principles of Gene Manipulation and Genomics. John Wiley & Sons, 2013.
19. Rana S. V. S: Environmental Studies. 4th edition. Rastogi Publications 2012.
20. Rastogi VB Organic Evolution 6th edition Kedar Nath Ram Nath Publications, Meerut, Delhi. 1993.
21. Rastogi VB and Jayaraj MS Animal Ecology & Distribution of Animals Kedar Nath Ram Nath Publications, Meerut, Delhi, 1983.
22. Sharma P. D: Environmental Biology and Toxicology. 3rd edition Rastogi Publications, 2013
23. Sunder Rao PSS and Richard J: Introduction to Biostatistics and Research Methods .PHI Publishers, 2012.
24. Sharma P. D: Ecology and Environment. 12th revised edition, Rastogi Publications 2014-2015.
25. Werlace RA: Animal Behavior. Good Year Publishing Co., Inc.
26. Young JZ: The Life of Mammals. Oxford University Press 1970.
27. Young JZ: The life of Vertebrates. 2nd edition Oxford University Press. London 1962.

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BOTANY
B. Sc. Part III (Pass Course Syllabus)

Scheme

Min. Pass Marks : 36

Paper I

3 hrs. duration

Max Marks: 100

Max. Marks 33

Paper II

3 hrs. duration

Max. Marks 33

Paper III

3 hrs. duration

Max. Marks 34

Practical Min. Marks: 18

4 hrs, duration

Max. Marks 50

3 hours

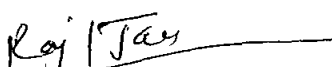
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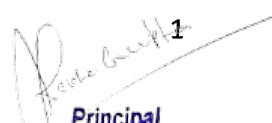
Duration of examination of each theory paper-

Duration of examination of practicals-

Note:

1. There will be 5 questions in each paper. All questions are compulsory. Candidate has to answer all questions in the main answer book only.
2. Q.No. will have 20 very short answer type Questions(not more than 20 words) of half marks each covering entire syllabus.
3. Each paper is divided into four units. There will be one question from each unit. These Q.No. 2 to 5 will have internal choice.


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Paper I

PLANT MORPHOLOGY AND ANATOMY

(2 hrs /week)

Unit-1

The basic body plan of flowering plant-modular type of growth. Diversity of Plant form in annuals, biennials and perennials; branching pattern; monopodial and sympodial growth; canopy architecture; meristematic, simple, complex and secretory tissues, tissue systems.

Unit-2

The Shoot system: The shoot apical meristem and its histological organization; vascularisation of primary shoot in monocotyledons and dicotyledons; cambium and its functions; formation of secondary xylem; a general account of wood structure growth rings; sapwood and heartwood; secondary phloem-structure and function; periderm. Anomalous secondary growth.

Unit-3

The Leaf; origin, development, arrangement and diversity in size and shape; Stomata-Structure and types, stomatal index, vascularisation of leaf-nodal structure and venation. Senescence and abscission.

The root system: Root apical meristem; differentiation of primary and secondary tissues and their functions; structural modification for storage, respiration, reproduction and root- microbe interaction.

Unit-4

Morphology and anatomy of seed (monocotyledons and dicotyledons). Significance of seed-suspended animation; dispersal strategies. Vegetative propagation.

Suggested readings :

Cutter, E.G. 1969. Part I Cells and Tissues. Edward Arnold, London.

Cutter, E.G. 1971. Plant Anatomy : Experiment and interpretation, part-II, organs. Educated Arnold; London.

Esau, K. 1977. Anatomy of Seed Plants, 2nd edition, John Wiley & Sons, New York.

Fahn, A. 1985. Plant Anatomy, Pergamon Press, Oxford.

Hartman, H.T. and Kestler, D.E. 1976. Plant Preparation : Principles and of India Pvt. Ltd., New Delhi.

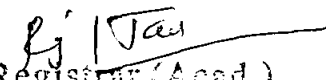
Manseth, J.D. 1988. Plant Anatomy. The Benjamin/Cummings Publishing Co. Inc. Menlo Park, California, USA.

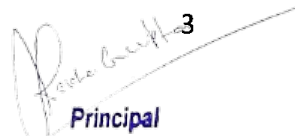
Raven, P.M. Evert, R.F. and Eichien; S.E. 1999. Biology of Plants, W.H. Freeman and Co. Worth Publishers, New York.

Thomas, P. 2000. Trees Their National History. Cambridge University Press, Cambridge.

Suggested Laboratory Exercises:

1. Study of any commonly occurring dicotyledonous plant to understand the body plan and modular type of growth.
2. Life forms exhibited by flowering plants (by visit to a forest or a garden).
3. L.S. of shoot tip to study the organization of meristem and origin of leaf primordia.
4. Monopodial and sympodial types of branching in monocots & dicots.
5. Anatomy of primary and secondary growth in monocots and dicots using hand out sections of sunflower, maize, cucurbit stem and roots.
6. Anomalous secondary growth in stem: *Salvadora*, *Bignonia*, *Bougainvillea*, *Bauhinia*, *Nyctanthes*, *Leptadenia*, *Dracena*.
7. Study of diversity in leaf shape and size. Internal structure of leaf-Dorsiventral and isobilateral leaves; study of stomatal types.
8. Examination of seed (monocot and dicot). Structure, seed viability test.
9. Specimen study of modifications of plant parts for Vegetative reproduction.


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Paper-II
Ecology & Economic Botany
(2 hrs /week)

Unit-1

Plants and Environment: Atmosphere (four distinct zone viz, stratosphere, troposphere, mesosphere and thermosphere). Adaptation (Morphological, anatomical and physiological responses) of plants to water (Hydrophytes and Xerophytes).

Light (global radiation, photosynthetically active radiation. Zonation in water body: littoral, limnetic and profundal zones; photoperiodism, heliophytes and sciophytes)

Temperature (Raunkier's classification of plants: megatherm, mesotherm, microtherm, heikistotherm; themoperiodicity and vernalisation).

Soil (soil profile, development-weathering and maturation). Soil texture, soil types, role of pH, organic matter, soil water, soil nutrients. Interactions among organisms (neutralism, amensalism, allelopathy), competition, predation, parasitism, protocoooperation, mutualism. Environmental protection act.

Unit-2

Community, Ecosystem and Phytogeography: Community characteristics: stratification, life forms and biological spectrum, frequency density and cover. Ecological succession: types (primary and secondary) mechanism nudation, migration, ecesis, reaction and climax: xerosere, hydrosere,

Ecosystems: Structure-abiotic and biotic components, trophic level, food chain, food web, ecological pyramids, energy flow (Box and Pipe model of Odum). Biogeochemical cycles of carbon, and phosphorus, Vegetation types of Rajasthan, Endangered plants of Rajasthan.

Unit-3

Basic concept of center of origin of cultivated plants. Food plants-rice, wheat, maize, potato, sugarcane. Vegetables : General account with a note on radish, onion, garlic, cabbage, spinach, cauliflower, cucumber, tomato, lady finger and pea. Fruits: General account with a note on apple, banana, ber, mango, mulberry, jamun, watermelon, muskmelon, guava and orange. Vegetable oil: groundnut, mustard and coconut.

Unit-4

Spices: General account with an emphasis on those cultivated in Rajasthan

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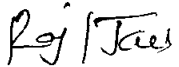
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(*Cumin, Capsicum, Coriander*). Beverages: Tea and coffee. Medicinal plants: General accounts with an emphasis on plant species cultivated in Rajasthan (*Senna, Isabgol, Safedmusli*). Fibers: Cotton and jute. Wood: General account of sources of firewood, timber and bamboos; Rubber. Ethnobotany: a general account.

Practical Exercises:

1. Study frequency and density, abundance of plant species of campus vegetation by quadrat method.
2. Variation in soil moisture in relation to depth.
3. To estimate bulk density of grassland and woodland soil.
4. To estimate the porosity of grassland and woodland soil sample.
5. To determine moisture content of grassland and woodland soil.
6. To measure dissolved oxygen content in polluted and unpolluted water samples.
7. To measure temperature of different water bodies.
8. Water holding capacity of the soil.
9. Find out pH of soil sample by Universal Indicator method.
10. Find out pH of water sample by pH meter.
11. Find out transparency of a waterbody by Sechhidisk.
12. Study morphology (external and internal) of hydrophytes (*Hydrilla* stem, *Typhaleaf* and *Nymphaea/Eichhorniapetiole*) and xerophytes (*Calotropis, Capparis* and *Casuarina* stem, *Nerium* leaf) with special reference to their adaptations.
13. Study following specimen with special reference to:
 1. Botany of the economically important part.
 2. Processing, if any involved.
 3. Specimen of cereals, pulses, spices beverage (tea & coffee) beans, sugar, oil seeds (mustard, groundnut).
14. Study of starch grain in potato and pea. Histochemical test Cellulose, lignin, starch, fat, protein and tannin.
15. Submit 5 specimens of locally important medicinal plants.


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Paper-III

Angiosperm- Taxonomy and Embryology

(2 hrs /week)

Unit-1

Introduction of Taxonomy, Units of classification, Concept of genus and species. Botanical Nomenclature, International Code of Botanical Nomenclature.

Taxonomic literature: Floras, Gardens, Herbaria, Monographs, Icones, Library.

Types of systems of Classification: Bentham and Hooker's, Engler and Prantle's system.

Diversity of flowering plants illustrated by members and economic importance of the following families: Ranunculaceae, Brassicaceae, Papaveraceae, Malvaceae, Fabaceae, Caryophyllaceae and Apiaceae.

Unit-2

Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Lamiaceae, Chenopodiaceae, Euphorbiaceae, Liliaceae, Arecaceae and Poaceae.

Unit-3

Ontogeny of the flower parts-development and variations. Structure of anther, microsporogenesis, Tapetum types and functions, development of male gametophyte, structure of pollen grains.

Types of ovule, Megasporogenesis, development of female gametophyte(Embryosac). Pollination, Pollination types, Fertilization, double fertilization, significance of double fertilization.

Unit-4

Development of dicot and monocot embryo. Formation of embryo. Types of Embryo. Endosperm, Types of Endosperm, Endosperm haustoria, Polyembryony, Induced polyembryony, Parthenocarpy, Apomixis and adventive embryony.

Suggested Laboratory Exercises

(A) Taxonomy:

(I) The following genera are suitable for study of families:

1. Ranunculaceae-*Ranunculus*, *Delphinium*.
2. Fabaceae-*Pisum sativum*, *Cassia* and *Acacia*.
3. Apiaceae:*Coriandrum*
4. Convolvulaceae-*Ipomea*, *Jacquemontia*.
5. Apocynaceae-*Catharanthus*, *Thevetia*
6. - Asclepiadaceae-*Calotropis*.
7. Lamiaceae-*Ocimum*, *Salvia*.
8. Euphorbiaceae-*Euphorbia pulcherrima*, *Ricinus*.
9. Acanthaceae-*Adhatoda*.
10. Asteraceae-*Helianthus*
11. Rubiaceae-*Hamelia*
12. Poaceae-*Triticum*

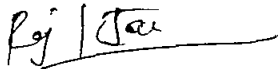
(II) Types of Inflorescence and Fruits:

(III) Embryology

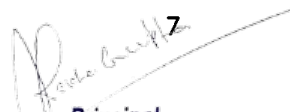
1. T. S. of anther, to study the wall layers and pollen sac with pollen grains.
2. Study the various types of ovule, draw the diagrams.
3. Study the various types of placentations.
4. Study the germination of pollen grain *in situ* and observe the path of pollen tube.
5. Study of various stages of embryo (*Raphanus* fruit)

Suggested Readings:

1. Taxonomy of Angiosperms-V.N. Nair (1995) TMH Publishing Company Limited, New Delhi


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2. Introduction to the Principles of Plant Taxonomy V.V.Sivarajan (1984) Oxford & IBH Publishing Co. Pvt.Ltd., New Delhi.
3. Plant Taxonomy-SushellaM.Das (2003) Dominant Publishers and Distributors, New Delhi.
4. Plant systematics. Gurcharan Singh (2001) Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Trivedi, P.C.: N. Sharma and J.L. Sharma (2003) Structure, Development and Reproduction in Flowering Plants. Ramesh Book Depot, Jaipur.
6. Bhojwani, S.S. and Bhatnagar, S.P. (2000) The embryology of Angiosperms 4th Edition Vikas Publishing House, New Delhi.
7. An Introduction to the Embryology of Angiosperm. Maheshwari, P.(1950) New Delhi.
8. Recent Advances in the Embryology of Angiosperms. Ed. Maheshwari, P.(1963) New Delhi.

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BOTANY PRACTICAL EXAMINATION B.Sc PART-III

SKELETON PAPER

M.M. 50

TIME: 4 Hours

S.No.	Practical	Regular	Ex/NC
1	(a) Plant Taxonomy Describe vegetative and reproductive parts of flower in semi-technical language. Give floral diagram and floral formula and identify the family giving reasons. (b) Comment on the embryological exercise.	7 3	7 3
2	(a). Anatomical exercise on anomalous secondary growth. (b). Anatomy of root/leaf/study of stomatal types	5 5	5 5
3	(a) Ecological exercise based on quadrat method/Exercise related to soil (b) Ecological Anatomy (c) Histochemical Test / Economic Botany	3 4 3	3 4 3
4	Comment upon spots (1-5).	10	15
5	Viva- Voce	5	5
6	Practical record	5	-
	TOTAL	50	50

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5. Geology

Scheme :
Min. Pass Marks : 36
Paper-I : Stratigraphy and geology of India :
Paper-II : Economic Geology & Mineral Economics :

Max. Marks : 100

Marks : 50

Marks : 50

Marks : 50

Practical Marks : 50

PAPER-I : Stratigraphy and Geology of India

Section-A

Stratigraphy and its relation with other branches, aims and principles of stratigraphy, environment of deposition facies, Lithology, Homotaxis and contemporaneity.

Standard stratigraphical scale.

Imperfection in geological records, principles of correlation.

Palaeogeography of India in Perno-carboniferous period, Physiographic subdivisions of India.

Stratigraphical divisions in India and their equivalents.

Section-B

Stratigraphy, distribution, lithology, structure, correlation and Mineral riches of the following: Archaeans, cuddapahs and the Vindhya with special reference to Rajasthan.

Distribution, succession, climate, sedimentation, correlation, fossil content and mineral resources of the Gondwana Supergroup.

Section-C

Triassic Period : Triassic of Spiti—lithology, succession and fossil content.

Jurassic Period : Jurassic of Kachchh, Western Rajasthan—Bagh Beds and Lameta Ghat Series—lithology, succession and fossil content.

Deccan traps—origin, composition, distribution and age; Intertrappean beds—succession, lithology fossils content and distribution.

Tertiary Period : Subdivisions, lithology, distribution, succession, and fossils.

Siwalik Supergroup—distribution, lithology, depositional environment and fossils; typical vertebrate fossils.

Pleistocene of Assam. Peninsular India and Kashmir Pleistocene and Recent glaciation.

Tectonic frame work of India.

Practical

Neat drawing of the standard stratigraphical scale, showing against each division or division of the typical lithographic units, the type fossils, the faunal assemblages, their population and ranges etc.

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Syllabus : B.Sc. Part-III.

Neat drawings of the paleogeographical maps of India during Permo- Carboniferous period. Plotting of various geological formation in outline map of India.

Neat drawing of the structural and tectonic map of India.

Identification and description of the following rocks: Banded Hematite, Quartzite, Khondalite, Charnockite, Gondite, Vindhyan Sandstone, Products Limestone, Barakar Sandstone, Golden Oolite, Dhosa Oolite, Nummulitic Limestone, Fenestella Shale, Gondwana Shales with plant impressions.

PAPER-II : Economic Geology and Mineral Economics

Note : The paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all, selecting at least one question from each section.

Section-A

Economic Geology and its relationship with various branches of Geology, Magma and its relationship with mineral deposits, Ore and gangue minerals. Historical development of Economic Geology, Processes, of Mineral formation : Magmatic, Hydrothermal, Contact metasomatic, Evaporation, Oxidation and supergene enrichment, Sedimentation, Mechanical concentration, Residual concentration and Metamorphism.

Section-B

Classification of mineral deposits : outlines of Lindgren's and Bateman's classification, Important ores, Composition physical properties, mode of occurrence, association, origin, distribution in India & uses of the following metals, gold, silver, copper, lead iron, manganese, chromium and aluminum. Examples from Indian stratigraphic record. Environmental implications of exploitation of mineral resources.

Section-C

Important industrial minerals : Model of occurrence, physical properties, chemical composition and distribution in India—Refractory, Abrasives, Ceramics, Cement, Gemstones, Glass, Paint, and Fertilizers.

Coal, petroleum and radioactive minerals : their occurrences, distribution and origin-oil traps.

Building stones : characters, distribution and mode of occurrence.

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Mineral wealth of Rajasthan.

Strategic, Critical & essential minerals; National Mineral policy; Conservation and substitution.

Mineral concession rules; marine mineral resources; and Law of Sea.

Practical

Drawing of neat diagram depicting the following :

(a) Gossan Oxidation zone and supergene enrichment zone.

(b) Structural traps for oil accumulations.

(c) Stratigraphical trap for oil accumulation.

Systematic study, identification, description, mode of occurrences and uses of the following minerals -

Haematite, magnetite, limonite, siderite, pyrites, pyrrhotite, pyrolusite, psilomilane, chromite, ilmenite, wolframite, chalcophyrite, Cuprite, malachite, azurite, galena, sphalerite, cassiterite. Magnesite, bauxite, beryl, realgar, orpiment, stibnite, molybanite, cinabar, barite, Pitchbende, asbestos, muscovite, graphite, sillimanite, Kyanite, zircon, clays, garnet, corundum, gypsum, talc, apatite, rock phosphate, calcite, coal and its varieties.

In an outline map of India plotting of occurrence of the following minerals :

Copper ore, Pb-Zn Ag ore, Chrome ore, Manganese ore, Aluminum ore, Atomic minerals, rock-phosphate, Mica, diamond, Iron, ore, coal, Gold :

Distribution of important minerals in the outline map in Rajasthan. Plane table and chain survey.

Field training : Field work for at least 10 days duration at the places of geological interest pertaining to the theory papers in the states of Rajasthan/Gujarat/Madhya Pradesh and report thereon along with the submission of field specimens.

Book Recommended :

1. Batman, A.M. : Introduction to economic mineral deposits.
2. Wadia, M.D. : Minerals of India, Book Trust of Publ.
3. Rao, T.C. and Gokhle, K.V.G.K. : Ore deposits of India, their distribution and processing.
4. Krishna Swamy, S. : India's Economic Oxford & I.B.H. Publishing Co., New Delhi.

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6. MATHEMATICS

B.Sc. Part III

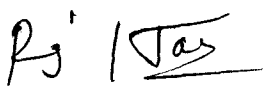
Teaching : 3 Hours per Week per Theory Paper.


Examination Scheme :

	Min.Pass Marks		Max. Marks
	Science – 54		150
	Arts – 72		200
		Duration	Max.Marks
Paper – I	Algebra	3 hrs.	40 (Science) 53 (Arts)
Paper – II	Complex Analysis	3 hrs.	40 (Science) 53 (Arts)
Paper – III	Mechanics	3 hrs.	40 (Science) 54 (Arts)
Practical		2 hrs.	30 (Science) 40 (Arts)

Note:

1. Common paper will be set for both the Faculties of Social Science and Science. However, the marks obtained by the candidate in the case of Faculty of Social Science will be converted according to the ratio of the maximum marks of the papers in the two Faculties.
2. Each candidate is required to appear in the Practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the Principal in consultation with Local Head/Head, Department of Mathematics in the college.
3. An Internal/external examiner can conduct Practical Examination of not more than 100 (Hundred) Candidates (20 Candidates in one batch).
4. Each candidate has to pass in Theory and Practical examinations separately.


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Paper -I : Algebra

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks: 40 (Science)
53(Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE Question from each Unit. All questions carry equal marks.

Unit 1: Definition and simple properties of Groups and Subgroups. Permutation group, Cyclic group. Cosets, Lagrange's theorem on the order of subgroups of a finite order group.

Unit 2: Morphism of groups, Cayley's theorem. Normal subgroups and Quotient groups. Fundamental theorems of Isomorphism.

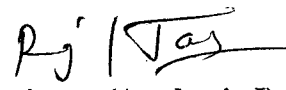
Unit 3: Definition and simple properties of Rings and Subrings. Morphism of rings. Embedding of a ring, Integral domain and field. Characteristics of a Ring and Field.


Unit 4: Ideals and Quotient Ring. Maximal ideal and Prime ideal. Principal Ideal domain. Field of quotients of an integral domain. Prime fields. Definition, Examples and Simple properties of Vector spaces and Subspaces.

Unit 5: Linear combination, Linear dependence and Linear independence of vectors. Basis and Dimension. Generation of subspaces. Sum of subspaces. Direct sum and Complement of subspaces. Quotient space and its dimension.

Reference Books:

1. Joseph A. Gallian, Contemporary Abstract Algebra (4th Edition), Narosa Publishing House, New Delhi, 1999.(IX Edition 2010).
2. S Lang, Introduction to Linear Algebra (2nd edition), Springer, 2005.
3. Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007.
4. S. Kumaresan, Linear Algebra- A Geometric Approach, Prentice Hall of India, 1999.
5. Kenneth Hoffman, Ray Alden Kunze, Linear Algebra 2nd Ed., Prentice-Hall Of India Pvt. Limited, 1971.


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Paper – II: Complex Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks:

40 (Science)

53 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Complex plane. Connected and Compact sets. Curves and Regions in complex plane. Jordan curve Theorem (statement only). Extended complex plane. Stereographic projection. Complex valued function – Limits, Continuity and Differentiability. Analytic functions, Cauchy-Riemann equations (Cartesian and polar form). Harmonic functions, Construction of an analytic function.

Unit 2: Complex integration, Complex line integrals, Cauchy integral theorem, Indefinite integral, Fundamental theorem of integral calculus for complex functions. Cauchy integral formula, Analyticity of the derivative of an analytic function, Morera's theorem, Poisson integral formula, Liouville's theorem.

Unit 3: Taylor's theorem. Laurent's theorem. Maximum modulus theorem.

Power series – Absolute convergence, Abel's theorem, Cauchy-Hadamard theorem, Circle and Radius of convergence, Analyticity of the sum function of a power series.

Unit 4: Singularities of an analytic function, Branch point, Meromorphic and Entire functions, Riemann's theorem, Casorati-Weierstrass theorem.

Residue at a singularity, Cauchy's residue theorem. Argument principle. Rouché's theorem. Fundamental theorem of Algebra.

Unit 5: Conformal mapping. Bilinear transformation and its properties. Elementary mappings: $w(z) = \frac{1}{2} \left(z + \frac{1}{z} \right)$, z^2 , e^z , $\sin z$, $\cos z$, and $\log z$.

Evaluation of a real definite integral by contour integration.

Analytic continuation. Power series method of analytic continuation.

Reference Books:

1. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (Eighth Edition), McGraw – Hill International Edition, 2009.
2. Joseph Bak and Donald J. Newman, Complex analysis (2nd Edition), Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997.

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Paper – III: Mechanics

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks: 40 (Science)
54 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Velocity and acceleration – along radial and transverse directions, along tangential and normal directions. S.H.M., Hooke's law, motion along horizontal and vertical elastic strings.

Unit 2: Motion in resisting medium– Resistance varies as velocity and square of velocity. Work and Energy. Motion on a smooth curve in a vertical plane. Motion on the inside and outside of a smooth vertical circle. Projectile.

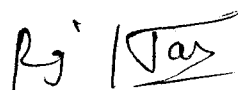
Unit 3: Central orbits – p-r equations, Apses, Time in an orbit, Kepler's law of planetary motion. Moment of inertia – M.I. of rods, Circular rings, Circular disks, Solid and Hollow spheres, Rectangular lamina, Ellipse and Triangle. Theorem of parallel axis. Product of inertia.


Unit 4: Equilibrium of coplanar force, moments and friction.

Unit-5: Virtual work and Catenary.

Reference Books :

1. I.H. Shames and G. Krishna Mohan Rao, Engineering Mechanics: Statics and Dynamics (4th Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2009.
2. R.C. Hibbeler and Ashok Gupta, Engineering Mechanics: Statics and Dynamics (11th Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi.
3. S.L. Loney - An Elementary Treatise on the Dynamics of a Particle and of Rigid Bodies, Kalyani Publishers, New Delhi.
4. J.L. Synge & B.A. Griffith - Principles of Mechanics, Tata McGraw-Hill, 1959.


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Practical**Teaching: 2 hours per week per batch not more than 20 students.****Examination:****Duration: 2 Hours**

Scheme	Science	Arts
Max.Marks	30	40
Min.Pass Marks	11	15

Distribution of Marks:

Two Practicals one from each group

10 Marks each	=	20 Marks	(13 Marks each)	26
Practical Record	=	05 Marks		07
Viva-voce	=	05 Marks		07
Total Marks	=	30 Marks		40

The paper will contain TWO practicals. The candidates are required to attempt both practicals.**Practicals with Computer Programming in C Language.****Group A:**

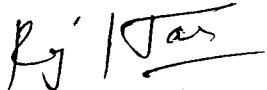
1. Solution of algebraic and transcendental equations by Bisection method, Regula-falsi method and Newton-Raphson method.
2. Solution of Initial value problems by Euler's method and Runge-Kutta(third and fourth order) method.


Group B:

1. Matrix operations: addition, subtraction, multiplication, Rank of a matrix, inverse of a matrix.
2. Solution of linear algebraic equations by Gauss elimination method, Matrix method, Gauss Jordan method.

Note:

1. Each Candidate (Regular/non-Collegiate) has to prepare his/her practical record.
2. Each Candidate has to pass in Practical and Theory examinations separately.


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7. ECONOMICS

B.Sc. Part III

Scheme:	Min. Pass Marks	Max. Marks
Arts	72	200
Science	54	150
Paper-I	3 hours duration	Arts 100 Science 75
Paper- II	3 hours duration	Arts 100 Science 75

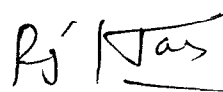
Note:


1. There shall be two papers in each class. Each paper shall have 3 questions from every unit. In Addition to these nine questions (3 questions for each unit) there shall be one multiple choice/objective type/ short answer question in each of the two papers
This question shall be compulsory.
2. The student shall be required to attempt five questions in all in each paper selecting atleast one question from each unit and one compulsory multiple choice/objective type/ short answer question
3. The multiple choice/ objective type/short answer questions shall consist of 20 questions in B.A. Examination and 15 questions in B. Sc. Examination of one mark each.

ECONOMICS

Note: There will be two papers of Economics. Each paper shall consist of three parts. Part A shall contain question No.1 consisting of very shot type –X (Ten) question. The candidate is required to answer each question in 20 words. Part –B shall contain question No 2 consisting of V (five) questions. The candidate is required to answer each question in 100 words. Part C shall contain three essay type questions (one from each section) with internal choice. A candidate will be required to attempt five questions in all. All questions of part A and part B are compulsory while rest 3 questions are to be attempted from parts C selecting one question from each section. All question carry equal marks.

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Paper 1: Introduction To International Trade, Development And Public Economics

Section – A

Features of International Trade, Gains from Trade. Trade Theories: Adam Smith, Ricardo, Harberler, Mill and H O Theory (Elementary treatment). Free Trade and Protection, foreign Exchange Market and Exchange Rate. Balance of Trade And Finance of payment: Definition And Structure, International Monetary Fund, WTO scope and Impact.

Section –B

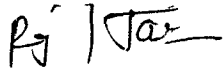
Economic Growth and Development: Factors affecting Economic Growth, Measures of Development , Lewis Theory of Unlimited Supply of Labor, Balanced V/S Unbalanced Growth Model, Harrod Domer and Solow Models, Concept of Poverty and Inequality. International Bank for Reconstruction and Development, Asian Development bank.


Section – C

Nature and Scope of Public Finance. Role of Government in the Economy. Public Goods and Private Goods. Theory of Maximum Social Advantage, Optimal Budgeting. Public Revenue: Canons of Taxation, Impact, Incidence and Shifting of Taxation. Direct and Indirect Taxation, GST, Public Expenditure: Canons of Public Expenditure, Classification and Effects on Production and Distribution. Public Debt: Meaning Objectives and Burden Theories. Fiscal Policy: Meaning, Objectives and Anti-Inflationary Policy.

Books Recommended :

1. R.N Musgrave and P.B Musgrave. Public Finance in Theory & Practice, McGraw Hill Publication.
2. S. Ganguly, Public Finance, The World Press Pvt. Ltd.
3. H.L. Bhatia, Public Finance, Vikas Publishing House Pvt. Ltd.
4. John Callas and Philip Jones, Public Finance and Public Choices, Oxford University Press.
5. D. Salvatore: International Economics.
6. K.C Rana And K.N Verma: International Economics. (Hindi/English Edition)
7. B.O. Souderton & G. Reed: International Economics.
8. Michael P. Todaro, Economic development, Macmillan.
9. A.P Thirlwal, Growth and Development, Macmillan.
10. Debraj Ray, Development Economics, Oxford University Press.
11. S.k. Misra and V.K Puri, Economics of Development and Planning Theory Himalya Publishing House.


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Paper –II (a): Application of Mathematics in Economics

Section – A

Differential Calculus and integral Calculus: Application in Economics: Matrix and Determinants: Solution of Simultaneous Equations: Mixima and Minima: Convexity and Concavity.

Theory of Consumer Behaviour Nature of a Utility function: Properties of an Indifference Curve. Maximization of Utility. Demand Functions. Ordinary and Compensated, Price and Income Elasticity, Elasticity Relation in demand Analysis, Slutsky Equation in two Commodity Case, Elasticity Form and Important Results: Income and Leisure – Derivation of Labour Supply Function and its Properties.

Section –B

Theory of firm: Production Function- Properties of a Well Behaved and Homogenous Production Functions- Cobb- Douglas and CES Production Functions: Product Curves: Output Elasticity of Factor input; Properties of an Isoquant; Elasticity of Substitution of a Homogeneous Production Function –Linearly Homogeneous and Cobb-Douglas Production Functions : Optimization Behaviour of a Firm – Constrained Cost Minimization, Constrained Output Maximization and Profit Maximization; Input Demand Functions Properties and Derivation of Producer's Input Demand functions ; Cost Functions- Properties and Derivation of Short Run and Long Run Cost functions; Consumer's and Producer's Surplus.

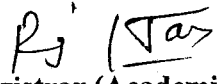
Section-C


Linear Programming: Graphical and Simplex Method (Maximization Problem Only): Input Output Analysis: Concepts of Static, Dynamic, Closed and Open Input – Output Models, Hawkins-Simon Conditions of Viability, Determination of Gross Output, and Value Added in Open Input –Output Model; Theory of Games: Two-person Constant Sum Games, Zero-Sum Game, Maximin and Minimax, Dominant Strategies and Saddle Point Solution; First Order Difference Equation- Cobweb Model.

Note: Use of Non-programmable Calculator is permitted

Books Recommended :

1. J.M. Henderson and R.L. Quandt: Micro Economic Theory: A Mathematical Approach, McGraw- Hill London.
2. RGD Allen. Mathematical Economics, McMillan
3. B.C. Mehta: Mathematical Economics: Micro Economic Models, Sultan Chand & Sons, New Delhi.
4. Alpha C Chiang: Fundamental Methods of Mathematical Economics. McGraw-Hill, Kagakusha. Tokyo.


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Paper- II (b): Environmental Economics

Section –A

Environmental Economics: An Introduction; Review of Microeconomics and Welfare Economics; The Theory of Externalities: Pareto Optimality and Market Failure in the Presence of Externalities; Property Rights and the Coase Theorem; Sustainable Development: Concepts and Measurement.

Section-B

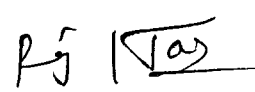
Development and Environment: The Environment Kuznets Curve; Trade and Environment; Environmental Problems; Trans-boundary Environmental Problems: Global Warming and Climate Change; Methods of Environment Valuation: Hedonic Pricing, Contingent Valuation Method and Travel Cost Method.


Section-C

International Environmental Policy: Conventions and Treaties, UN Effort to Protect the Environment, Stockholm, Rio, Johansberg, Agenda 21, OECD Environmental Committee Report, Kyoto, Convention on Biodiversity, Paris Climatic Conventions; Environmental Governance in India; WTO and Environment.

Recommended Books:

1. Charles Kolstad, Intermediate Environmental Economics, Oxford University Press. 2nd Edition, 2010
2. Robert N. Stavins (ed.), Economics of the Environment: selected Readings, W.W.Norton, 5th edition, 2005.
3. Roger Perman, Yue Ma, James McGilvray and Michael Common, Natural Resource and Environmental Economics, Pearson Education/ Addison Wesley, 3rd edition, 2003.
4. Maureen L. Cropper and Wallace E. Oates, 1992, "Environmental Economics: A Survey", Journal of Economic Literature, Volume 30, pp. 675-740.


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Paper-II (C): Economy of Rajasthan

Section-A

Position of Rajasthan in Indian Economy: Population, Area, Agriculture, Industry and Infrastructure. Population: Size and Growth, District Wise Distribution of Rural and Urban Population, Demographic Features, Occupational Structure and Human Resource Development (Literacy, Health and Nutrition Indicators). Natural Resources Endowments: Land, Water, Livestock and Wild Life, Minerals and Mineral Policy of the State. State Domestic Product: trends and Composition. Agriculture: land Reforms, Land Utilization, Cropping Pattern, Production and Productivity, Agriculture Finance, Marketing and Insurance, Importance of Livestock and Animal Husbandry, Dairy Development Programmes, Famines and Droughts in Rajasthan.

Section-B

Infrastructure in the State (Irrigation, Power, Road), Industrial Development of the State (Agricultural and Mineral Based Industries, Small Scale and Cottage Industries, Export Based Units, Rajasthan Handicrafts). Growth Centres and Development of Industrial areas. Enterprises in Rajasthan. Role of Different Corporations in Industrial Development (RIICO, RFC & RAJSICO), Industrial Finance, Service Sector: Education, Health, Tourism Development in Rajasthan.

Section-C

Economic Planning and Development in Rajasthan. Constraints in The Economic Development of Rajasthan. Special Area Development Programmes in Rajasthan. Woman Empowerment and Child Development. Problems of Poverty and Unemployment in Rajasthan. Panchayati Raj and Rural Development in Rajasthan. Budgetary Trends in Rajasthan. Centre State Financial Relations.

Books Recommended:

1. Economic Review, Directorate of Economics And Statistics, Department of Planning, Rajasthan Jaipur. (Hindi & English.)
2. Statistical Abstract Directorate Of Economics And Statistics. Department of Planning, Rajasthan Jaipur.
3. लक्ष्मीनारायण नाथूराम का राजस्थान की अर्थव्यवस्था, रमेश बुक डिपो, जयपुर।

8. Geography.

Scheme of Examination

Faculty	Min. Pass Mars	Max. Marks
Arts/Social Science	72	200
Science	54	150
Paper I	World Regional Geography	Arts 75 Science 50
Paper II	Geography of India	Arts 75 Science 50
Practical	18	Arts 50 Science 50

Notes

1. Students are permitted to use the stencils, simple calculator and log tables wherever needed in both theory and practical examinations.
2. There will be a common paper for Arts and Science.
3. Q.1 will be compulsory and will cover the entire course of the paper.

Q.No. 1 of 20% marks of the maximum marks to be set in two parts.

(a) Part (a) will have ten items for locating on a map (to be supplied by examination centre) carrying 10% marks of the maximum marks and candidates shall attempt any five items.

(b) Part (b) will have 10 short answer questions carrying 10% marks of the maximum marks and candidates shall attempt any five items.

4. Remaining 9 questions carrying equal marks will be set with three questions from each section of the syllabus.

5. Candidate will attempt 5 questions in all including question No. 1 selecting at least one question from each section.

6. Practical examination will be conducted by the board of examiners.

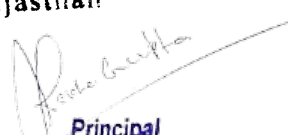
7. The candidate will have to pass in theory and practical separately.

8. The non-collegiate candidates will have to attend a practical training camp of 48 hours at a college affiliated to the University of Rajasthan, Jaipur notified by the University from time to time in which Geography subject is taught on payment of fee fixed by the University. The candidates appearing at examination from any examination centre located in Jaipur City will attend the practical camp at the University Post Graduate Department on payment of fee fixed by the University. The candidate will procure Certificate of successful completion of practical training camp from the College/Department of Geography and produce the same at the time of practical examinations.

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Paper I: World Regional Geography

Section A

Asia: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General. Regional Study of South-East and South-West Asia.

Europe: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General ; Regional Study of British Isles, France and Germany.

Section B

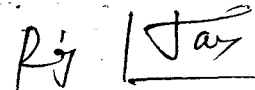
North and South America: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General; Regional Study of New England and Brazil.

Section C

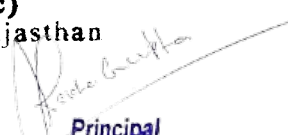
Australia and New Zealand: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of Australia and New Zealand In General.

Recommended Readings:

- Cole, J., 1996. A Geography of the World's Major Regions, Routledge, London.
Deblin, H.J., 1994, Geography : Regions and Concepts, John Wiley, New York.
Dickenson, J.P. et al. 1996. The Geography of the Third World, Routledge, London.
Gourou, P., 1980. The Tropical World, Longman, London.
Jackson, R.H. and Hudman, L.E., 1991. World Regional Geography : Issues for Today, John Wiley, New York.
Kolb, A., 1977. East Asia - Geography of a Cultural Region, Methuen, London.
Minshull, G.N., 1984 Western Europe, Hodder & Stoughton, New York.
Patterson, J.H., 1985. Geography of Canada and the United States. Oxford University Press.
Songquiao, Z., 1994. Geography of China, John Wiley, New York.
Ward, P.W. and Miller, A. 1989. World Regional Geography : A Question of Place. John Wiley, New York.


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Paper II: Geography of India

Section A

India in the context of South and Southeast Asia, geological structure, physiographic divisions, climate seasons, mechanism of Indian monsoon, major climatic regions; vegetation, major soils and regions, drainage system, water resources and irrigation projects; forests, mineral and power resources: their utilization policy and conservation strategies.

Section B

Agriculture: typology, major crops, changing pattern of crops, agricultural growth during plan periods and green revolution, livestock resources and their development, industrial growth and development; industrial localization with reference to iron and steel, cotton, textile, cement and chemical industries, industrial regions; population growth, distribution, problems, policy implication, trends of urbanization and human resource development.

Section C

Regional disparities in economic development, planning and economic regions of India, multilevel planning, problems and prospects of linking of rivers, environmental issues in India, transport development: rail, road, air and waterways, foreign trade: challenges and prospects.

Recommended Readings:

- Gautam, Alka, 2010: Geography of India. Rastogi Publications, Meerut.
Gopal Krishnan, R. 2001: Geography of India, Jawahar Publishers & Distributions, New Delhi, 2nd Edition
Khullar, D.R. 2006. India: a comprehensive Geography: Kalyani Publishers, New Delhi
माथुरिया, सी. 1999: आधुनिक भारत का वृहत भूगोल। साहित्य भवन प्रब्लिकेशन्स, आगरा।
Sdasnyuk, G. and Sengupta, 1968: Economic Regionalisation of India, Census of India Publication, New Delhi.
Singh, G. 1998: A Geography of India, Atma Ram & Sons, Delhi, Sixth Edition
Singh, R.L. (ed.) 1971: India: A Regional Geography. NGSI, Varanasi.
Spence, G.F.K. and Learmonth, A.T.A. 1967: India and Pakistan, Land, People and Economy, Methuen and Co., London.
Tiruba, K. 2000: Geography of India, Rawat Publications, Jaipur 2nd Edition (India)
विद्यार, आर.सी. 2012: भारत का भूगोल। प्रथम पुस्तक भवन, इलाहाबाद।

Practicals

Scheme of Examination

Min. Pass Marks: 18

Written test
Field survey and viva voce
Record and viva voce

Bifurcation of Marks
24
10+04
08+04

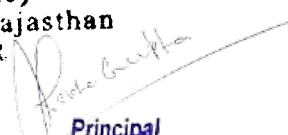
Max. Marks: 50

Time
3 hrs.
2 1/2 hrs.

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- N.B. 1. There shall be 6 questions in written paper selecting at least two questions from each section. Candidates are required to attempt 3 questions selecting 1 question from each section. All questions carry equal marks.

SYLLABUS

Section A

Definition, classification, uses and characteristic of map projection: (graphical constructions).

Conical projections:

1. with the one standard parallel
2. with two standard parallels
3. Bonne's
4. Polyconic

Cylindrical projections:

1. Equidistant
2. Equal Area
3. Mercator's, Universal Transverse Mercator (UTM)
4. Gall's Stereographic

Section B

Zenithal Projections: (Only Polar Case)

1. Equidistant
2. Equal Area
3. Gnomonic
4. Stereographic
5. Orthographic

Three dimensional diagrams: sphere, block pile, cube.

Section C

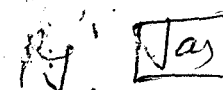
Plane table surveying: Equipments, procedure, traversing – open and closed traverse, methods- radial and intersection, concept of resectioning.

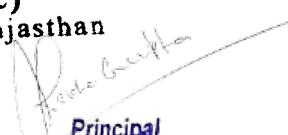
Height calculation using Indian pattern clinometer.

Recommended Readings:

- चीहान, पी.आर. 2005: प्रायोगिक भूगोल। वसुन्धरा प्रकाशन, गोरखपुर।
- Raisz, F. 1962: General Cartography. John Wiley and Sons, New York. 5th edition
- Rampal, K.K. 1993: Mapping and Conflation: Methods and Techniques Concept Publishing Company, New Delhi (Reprint 2009)
- Robinson, A.H. et al. 2004. Elements of Cartography. John Wiley & Sons, Inc., New York (Sixth Edition)
- Singh, L.R. 2006: Practical Geography. Prayag Pustak Publisher, Allahabad U.P.
- Singh, R.L. and Singh, R.P. 1991: Elements of Practical Geography. Kalyani Publishers, New Delhi (Reprint 2002)

सर्वाधिकार सुरक्षित। प्रकाशक: श्री. जयदेव शर्मा, 1/1, बंगला, जयपुर।


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9. STATISTICS

Subject: Statistics

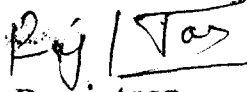
Marks Scheme


Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Sample Survey	50 mark	65 marks
Paper II	Design of Experiment and Computational Techniques	50 mark	65 marks
Paper III	Practical based on Paper I,II	50 mark	70 marks
Total		150	200

Note:

In each of the Question Papers, 10 (ten) questions will be set having 2 having 2(Two) from each unit. Candidates have questions in all, taking not more than one from each unit.

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Subject: Statistics

Paper -I (Sample Surveys)

(Also common with Subject- Applied Statistics)

Unit-I

Concepts of population and sample, need for sampling, census & Sample surveys. Advantages of sample survey over complete enumerations. Principle steps in a sample survey. Principles of sample survey, Sampling and non-sampling errors.

Unit-II

Probability and non-probability sampling: Methods of drawing a random sample from finite population, accuracy and precision of an estimator. Simple random sampling with and without replacement, probability of selecting any specified unit in the sample, simple random sampling of attributes, size of simple random sample for a specified precision.

Unit-III

Stratified random sampling: Meaning and advantages of Stratified Random Sampling, Estimation of the population mean and its variance. Optimum and proportional allocation and their comparison with SRS & SRS WOR.

Unit-IV

Systematic Sampling: Meaning and sample selection procedures, advantage and disadvantages, variance of the estimated mean. Comparison of systematic with (i) SRSWOR and (ii) stratified random sampling. Cluster sampling (of equal size): Meaning, advantages and disadvantages, estimation of population mean.

Unit-V


Ratio Method of estimation (first approximation only): Meaning, bias of ratio estimators, variance, efficiency of ratio estimate with SRSWOR estimate. Regression method of estimation (first approximation): Meaning, Simple Regression Estimate, expected value and variance of simple regression estimate. Comparison with SRSWOR and ratio estimators.


REFERENCES:

1. Des Raj(2000) : Sample Survey Theory. Narosa Publishing House.
2. Murthy, M.N.(1967): Sampling Theory and Methods. Statistical Publishing Society, Calcutta.
3. Singh, Daroga and Chaudhary. F.S.(1989): Theory and Analysis of Sample Surveys Designs. Wiley Eastern Ltd.
4. Sukhatme et al. (1984): Sampling Theory of Surveys with Applications. Indian Society of Agricultural Statistics
5. Goon A.M, Gupta M.K. Das Gupta B (1986) : Fundamentals of Statistics. Vol II World Press Kolkata
6. Gupta S.C. , Kapoor V.K. Fundamentals of Applied Statistics. Sultan Chand & Sons. New Delhi

ADDITIONAL REFERENCES:

Sampath S. (2000) Sampling Theory and Methods Narora Publishing House


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Subject: Statistics

Paper II

Design Of Experiments and Computational Techniques (Also common with Subject- Applied Statistics)

Unit-I

Analysis of Variance: Linear model & its different types (only introduction). Analysis of Variance technique. ANOVA for one-way and two-way classified data (with one observation per cell & fixed effects model); Least Square Estimates of Sum of squares, Effects of violations of basic assumptions of ANOVA; Transformations, Critical Difference.

Unit-II

Design of Experiments: Need for design of experiments, fundamental principles of design of experiments, Uniformity Trials, Choice of size and shape of plots, Basic designs (with one observation per cell & fixed effects model)-Completely randomized design(CRD), Randomised block design(RBD)-Their advantages and disadvantages & usage. Efficiency of RBD over CRD.

Unit-III

Latin square design (LSD)- Analysis; least square estimates; expectation of sum of squares; efficiency of LSD over CRD & RBD, Missing plot technique- Estimation of single missing value in RBD & LSD. Factorial experiments- 2^2 , 2^3 experiments, illustrations, main effects, interaction effects & their analysis.

Unit-IV

Computer Application and Data-Processing: Basics of Computer: Operations of a computer, Different units of a computer system like central processing unit, memory unit, arithmetic and logical unit, input unit, output unit etc. Hardware including different types of input, output and peripheral devices, Software, system and application software, number systems, Operating systems, packages and utilities, Low and high level languages, Compiler, Assembler, Memory- RAM, ROM, unit of computer memory (bits, bytes).

Unit-V

Network - LAN, WAN, internet, intranet, basics of computer security, virus, antivirus, firewall, spyware, malware etc. Basics of Programming: Algorithm, Flowchart, Data, Information, Database, overview of different programming languages, frontend and backend of a project, variables, control structures, arrays and their usages, functions, modules, loops, conditional statements, exceptions, debugging and related concepts.

REFERENCES :

1. Das M.N. & Giri N.C. (1986) : Design and Analysis of Experiments Springer Verlag
2. Goon A.M, Gupta M.K. Das Gupta B (1986) : Fundamentals of Statistics. Vol-II World Press Kolkata
3. Gupta S.C., Kapoor V.K. Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi
4. Nagpal D.P. Computer Fundamentals, Wheeler Publishing, New Delhi
5. Norton Peter - Peter Norton's Introduction of Computers, Tata McGraw hills
6. Stallings, Operating Systems PHI

ADDITIONAL REFERENCES

1. Kaupthone G.H. (1963) : The Design and Analysis of Experiments, Wiley Eastern
2. Cochran W.G. & Cox G.M. (1957) : Experimental Design, John Wiley and Sons

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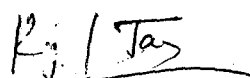
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Subject: Statistics

Paper III Practical Paper

(Also Common with Subject- Applied Statistics)

1. To draw a SRS with and without replacement to obtain an estimate of the population total along with the estimates of their variances. Comparing the efficiency of SRSWR with SRSWOR. Finding of confidence interval for the population mean.
2. To draw all the possible samples by SRS-technique and that to show that expected value of the sample mean equals the population mean to show expected value, $E(\bar{S}^2) = S^2$ in SRSWOR.
3. Stratified sampling (i) estimate the sample sizes by (a) proportional allocation (b) Neyman optimum allocation (ii) estimate the mean to the population under the above scheme (iii) calculation of the sampling variance (iv) Comparison of efficiencies of the allocation scheme amongst themselves as well as with SRS.
4. Systematic sampling
5. Cluster sampling.
6. Ratio & Regression methods of estimation.
7. Analysis of one way classification (CRD).
8. Analysis of two way classification (RBD).
9. Analysis of LSD.
10. Efficiency of RBD over CRD.
11. Efficiency of LSD over CRD & RBD.
12. Analysis of 2^2 & 2^3 factorial design.
13. Construction of Flowcharts and Algorithms for Statistical Problems


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10. APPLIED STATISTICS

Subject: Applied Statistics

Marks Scheme

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Sample Survey	50 mark	65 marks
Paper II	Design of Experiment and Computational Techniques	50 mark	65 marks
Paper III	Practical based on Paper I,II	50 mark	70 marks
	Total	150	200

Note:

In each Theory Question Papers . 10 (ten) questions will be set having 2 having 2(Two) from each unit. Candidates are questions in all, taking not more than one from each uni

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Subject: Applied Statistics

**Paper -I
(Sample Surveys)**

(Course Contents are same as that of Subject- Statistics)

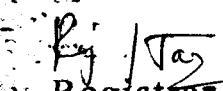
**Paper II
Design Of Experiments and Computational Techniques**


(Course Contents are same as that of Subject- Statistics)

**Paper III
Practical Paper**

(Course Contents are same as that of Subject- Statistics)

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11 Psychology

B.Sc. Part III

SCHEME OF EXAMINATION:

Faculty	Max. Marks	Min. Passing Marks
Arts	200	72 (Th.54 Pr.18)
Science	150	54 (Th.36 Pr.18)

Paper	Nomenclature	Duration	Max. Marks	
			Arts	Science
I	Positive Psychology	3 Hrs.	75	50
II	Psychological Testing and Assessment	3 Hrs.	75	50
	Practical	3 Hrs.	50	50

NOTE:-


1. There will be three papers in Psychology. Each paper will be of 3 hours. There will be a common paper for Arts and Science. In I and II Papers there will be 3 Sections A, B and C and will cover the entire course content of the paper.


Section-A Will contain 10 questions of 20 words each. Each question will be of 1.5 marks for Arts students and 1 mark for Science students. Thus, Part-A will be of 15 marks for Arts students and of 10 marks for Science students.

Section-B Will contain 7 questions of 50 words each, out of which students are required to attempt 5 questions. Each question will be of 3 marks for Arts students and of 2 marks for Science students. Thus, Part-B will be of 15 marks for Arts student and of 10 marks for Science students.

Section-C Will contain 3 long questions each with internal choice. Each question will be of 15 marks for Arts students and 10 marks for Science students. Thus, Part-C will be of 45 marks for Arts students and 30 marks for Science students.

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For clarification the distribution of marks is tabulated as below:-

Arts			
Section	No. of Questions	Marks	Total
A	10	1.5	15
B	5 (out of 7)	03	15
C	3 (with Internal Choice)	15	45
Total marks			75
Science			
Section	No. of Question	Marks	Total
A	10	01	10
B	5 (Out of 7)	02	10
C	3 (with internal choice)	10	30
Total Marks			50

2. Use of simple calculator will be allowed for statistical portions of all papers.

Paper I -Positive Psychology

Section A

1. Introduction : Definition, Goals and Assumptions of Positive Psychology; Relationship with other Branches of Psychology
2. Happiness: Meaning; Hedonic and Eudaemonic Viewpoint; Positive and Negative Affect; Theoretical Viewpoints; Determinants and Sources; Authentic Happiness; Enhancement of Happiness and Wellbeing.
3. Positive Cognitive States and Processes: Self-Efficacy, Optimism, Hope, Mindfulness, Flow and Spirituality.

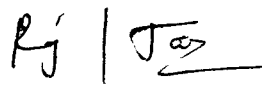
Section B


4. Virtues and Strengths of Character: Classification and Measures of Human Strengths, Gallup's Clifton Strength Finder; VIA Classification; Identifying Personal Strengths.
5. Resilience: Meaning and Sources; Developmental and Clinical Perspective; Successful Aging and Growth through Trauma.
6. Self-Regulation and Self-Control: Meaning and Theories; Planning for Self-Regulation Success; Self-Regulation Problems – Goal Conflict, Goal Difficulty and Goal Disengagement.

Section C

7. Mental Health and Well-Being: Subjective Well-Being and Life Satisfaction, Social Well-Being and Psychological Well-Being, Complete State Model.
8. Emotional Intelligence: Meaning, Components and Theories; Enhancement of Emotional Intelligence.
9. Pro-Social Behavior: Empathy, Altruism, Gratitude and Forgiveness.

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Books Recommended:

- Snyder, C.R. & Lopez, S.J.(2007). *Positive Psychology*. New Delhi: Sage.
- Snyder, C.R. & Lopez, J.(2005). *Handbook of Positive Psychology*. New York: Oxford.
- Baumgardner, S. & Crothers, M. (2019). *Positive Psychology* . Noida: Pearson Education India.

Paper II - Psychological Testing and Assessment

Section-A

1. Psychological Testing and Assessment:- Definition, Difference between Testing and Assessment , Tools of Psychological Assessment Interview, Case History Data, behavioral Observation, Computers as tools.
2. Psychological Test: Nature, Functions and Uses of Psychological Test, Problem of test
Administration, History of Psychological Testing, Characteristics of good Psychological test
3. Psychological Test Development:- Conceptualization, Test Construction, Item analysis.

Section-B

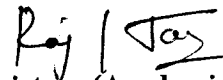
4. Reliability: Meaning, Types and Methods of Calculating Reliability.
5. Validity: Meaning, Types and Methods of Calculating Validity.
6. Norms: Meaning and Types of Norms.

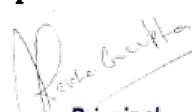
Section-C

7. Types of Psychological Tests: Group and Individual, Verbal, Non-verbal and Performance Test, Self-Report Inventories, Projective Techniques, Ethical Consideration in Assessment
8. Application of Psychological Testing: Educational, Counseling and Guidance, Clinical and Organizational Setting.
9. Assessment of Personality- Big Five, 16 PF, MMPI, TAT and Rorschach. Test. Assessment of Intelligence- Binet, WAIS, SPM.

Books Recommended:


- Anastasi, A. (1997). *Psychological testing*. New York: MacMillan Co.
- Chadha, N.K. (2009). *Applied Psychometry*. New Delhi: Sage.
- Kaplan, R.M. & Saccuzzo, D.P. (2009). *Psychological Testing and Assessment*. New Delhi: Cengage Learning.
- Cohen, R.J, Swerdlik, M. & Struman, E.D. (2015). *Psychological Testing and Assessment*. New Delhi: McGraw Hill.
- अरुण कुमार सिंह (2002) : मनोविज्ञान में मापन एवं मूल्यांकन, नई दिल्ली मोतीलाल बनारसीदास।



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Practical

1. Measurement of Subjective Wellbeing
2. Measurement of Forgiveness
3. Measurement of Emotional Intelligence
4. Measurement of Hope
5. Measurement of Resilience
6. Measurement of Intelligence (SPM)
7. Personality Assessment through HSPQ
8. Reaction Time
9. Mullar Lyer Illusion
10. Measurement of Level of Aspiration


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12. ELECTRONICS

Scheme :

Min Pass. Marks : 36

Max. Marks-100

Paper-I	3 hrs.	33
Paper-II	3 hrs.	33
Paper-III	3 hrs.	34
Practical Min. Pass. Marks: 18	5 hrs.	50

Paper-I-Communication and Radio Electronics

Note: The paper will be divided into five units. Two questions will be set from each unit. Five questions are required to be attempted in all. The candidate is required to attempt one question from each unit.
Max.Marks : 33 Time: 3 hrs.

Unit-1

Modulation

Need of a carrier frequency, AM, FM, PM, AM side bands, power consideration, Collector and base modulations, SSB transmission FM by reactance variation using Semiconductor devices. The Armstrong FM system. Block diagram of AM and FM transmitters: Merits of FM transmission over AM transmission.

Unit-2

Demodulation:

Demodulation of AM signals, Square law demodulation. Linear envelope detection AGC demodulation of FM signals. Amplitude limiter: Foster seeley frequency discriminator and ratio detector.

Unit-3


Transmission lines and Associated distributive parameters


Propagation of voltage and current waves on the line (Differential equations and their solution). Characteristic impedance. Propagation constant and losses, Reflection coefficient, Standing wave ratio (SWR), resonant $\lambda/4$ and $\lambda/2$ lines

Unit-4

Impedance matching and Radiation of EM Waves

Single stub matching, Smith chart and its uses. Elementary idea of transmission of microwave signal and wave guides. Dipole antenna Radiation resistance and directivity of an antenna. Radiation from a quarter wave monopole or half wave dipole linear arrays. Propagation of EM wave in space. Types of wave propagation through ionosphere, Critical angle ground wave range. Skip distance and skip zone. Different layers in ionosphere


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Unit-5

Radio Receivers and Tape Recorders

AM radio receiving systems. Superheterodyne, FM receivers and their measurements. Stereo transmission and reception. Characteristics of various types of recording tapes. Recording head, Principles of recording playback and erasing tape transport system Hi-Fi and stereophony recording tune-table.

Reference Books suggested

1. Gordon J. King, The Hi-Fi and taperecorder handbook. N Butter-worths, London.
2. G.K. Mithal-Elements of Electronics, Khanna Publishers, Delhi.
3. Handbook of Electronics by Kumar & Gupta-Pragati Prakashan, Meerut.
4. Electromagnetic waves and radiative systems-E.L. Jordan.
5. Electron tube circuits-Sammuel Seeley.

Paper-II : Television Electronics .

Note : The paper will be divided into five units. Two questions will be set from each unit. Five questions are required to be attempted in all. The candidate is required to attempt one question from each unit.

Max. Marks-33

Time : 3 Hrs.

Unit-1

Picture scanning, Broadcast channels, Frequency band and resolution, camera tubes, Block diagram of transmitter and explanation of each block, colour transmission.

Television receiver : Scanning sequence and interlacing, synchronization and blanking.

Unit-2

Block diagram of colour and monochrome receivers and explanation of each block.

Sound system, Transient response of TV receivers.

Mosaic, Exhaust and activation schedule performance tests. Theory of operation, characteristics of the Mosaic, potential distribution of the mosaic. The Mosaic under the influence of a height in age. The formation of the video signal. Line sensitivity.

Black spot performance of the Iconoscope. Limiting sensitivity.

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Syllabus : B.Sc. Part-III

Depth of focus. Pick-ups for motion picture films. The type RCA.
9SK1A iconoscope.

Limiting sensitivity of pick-up devices. The two sided target.
Low velocity scanning. The orthicon. The image iconoscope multi-
stage. Image multiplier pick-up tubes, signal multiplication image
orthicon. Performance of the image orthicon.

Unit-4

The Isocon. Photoconductive pick-up tubes. The storage tube.
The monoscope. Conclusion.

Requirement of the Kinescope. Construction of the Kinescope
bulbs, round glass tubes, metal tube-bulbs, rectangular tubes. The
electron gun. The fluorescent. Screening procedure. Metal backing
of Kinescope screens. Processing of the Kinescope. Tests and per-
formance. Contrasts. Direct view Kinescope. Projection Kinescope.

Unit-5

Colour signals. Colour addition. Definition of colour TV sig-
nals. I, R- Y. and GY signal, desaturated colours, the transmitted
chrominance signal. Matrix circuits. Colour subcarrier frequency.
Colour synchronization. Colour pleased composite video signal wave-
forms. Vector addition of colour signals. Colour picture tubes.

Reference Books suggested

1. M. Glasford : Fundamentals of television engineering.
2. M. Kive-Television simplified 6th edition.
3. B. Goobi-Basic television principles and servicing.

Paper-III-Electronic Instruments and Measurements.

Note : The paper will be divided into five units. Two questions will
be set from each unit. Five questions are required to be attempted in
all. The candidate is required to attempt one question from each unit.
Max. Marks : 34 Time : 3 hrs.

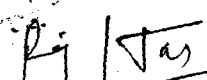
Unit-1


Measuring and test instruments, Fabrication Technique

AC Voltmeter, ammeter, Ohm meter (Shunt and series type).
Multimeter, Analog and digital voltmeter, Watt meter, Frequency
meter, Q meter, C.R.O. as test instrument.

Fabrication of PN Junction Diode, PNP transistor, Fabrication
of an I.C. transistor. Equivalent circuit, integrated diode. Inte-
grated capacitor, junction capacitor, thin film capacitor. Inte-
grated resistor, Thin film resistor. Three pin regulators. Timing
concept and timer 555.

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Unit-2

Power Electronics

Silicon controlled rectifier (SCR), working of SCR, Equivalent circuit of SCR, V-I characteristic of SCR, SCR Half wave and full wave rectifier. Applications of SCR. The triac, Triac construction and operation, Triac characteristics, Application of Triac, The Diac, Application of Diac, Unijunction Transistor (UJT). Equivalent circuit of UJT, Characteristics of UJT, Application of UJT.

Unit-3

Tape Recorder:

Mechanism of Recording, various head of the tape recorder, Record/Play back head, Erase head, High frequency erase head, low frequency erase, Bulk erase, Practical Tape recorder, Tape machines, Fault finding in the tape recorder, Care and maintenance.

Unit-4

Transducer

Classification, Strain gauge, Displacement transducers, capacitive transducers, Photoelectric, Piezoelectric and temperature transducers, Self generating Inductive Transducer, Linear variable Differential Transformer (LVDT),

Unit-5

Thermal and optical transducer

Resistance thermometer: Thermocouple, thermistors and their applications.

Optical transducers—Vacuum phototube, Gasfilled phototube, Photomultiplier tube, Photoconductive cell, Photovoltaic Cell. Various Types of Microphones.

Reference Books Suggested

1. Electronic Circuits—Discrete and Integrated, Shilling and Belon, McGraw Hill.
2. J. Glaser and J. Subak Sharpe, Integrated Circuit Engineering Addison Westley 1978.
3. Principle of Electronics, V.K. Mehta.
4. Basic Electronics & Solid State, B.L. Theraja.
5. Radio & Television, N.G. Goyal and S.K. Mukherjee.

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Syllabus : B.Sc. Part-III

Experiments For Practical Work

Note : A candidate has to perform at least sixteen experiments including eight experiments from each section 'A' and 'B'. In practical examination, the candidate will be required to perform two experiments : one from section 'A' and the other from section 'B'. The distribution of Marks will be as follows -

Time duration-5:00 hrs Expts. (Two)-30 (15 for each expt.) marks	
Viva Voce	10 marks
Practical record	10 Marks
Total	50 marks.
	Max. Marks-50

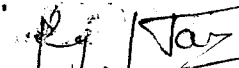
Section-A

1. To design and study free running multivibrator (transistorised) of given frequencies.
2. To design active band pass filter of given cut off frequencies and study its frequency response.
3. To study regulated power supply using a Zener diode and an electronic SCR voltage regulator.
4. To design and study thyatron sawtooth wave generation.
5. To design and study single stage RC coupled transistor amplifier of given cutoff frequencies and mid frequency gain.
6. To design and study UJT sweep circuit.
7. To design and study Hartley oscillator (transistorised) of given frequencies.
8. To design and study pulse coincidence circuit using ICs.
9. To design and study a precision timer circuit using IC 555 chip.
10. To design and study clipping and clamping circuits.

Section-B

1. To study binary adder and subtractor.
2. To study AM signals.
3. To study Darlington pair.
4. To study fourier analysis of square and clipped sine wave.
5. To study Variable reactance modulator.
6. To find out CMRR of differential amplifier.
7. To study the characteristics of SCR.
8. To design and study a precision linear gate using operational amplifier and FET.
9. To find out solutions of simple problems using analog computer.
10. To design and study voltage comparator using operational amplifier.

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13. ENVIRONMENTAL SCIENCE

B.Sc. Part III


Scheme:
Theory

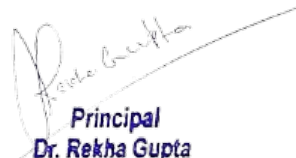
Max Marks: 100		Min. Marks:36
Paper 1	3 hours duration	Max Marks:50
Paper 2	3 hours duration	Max Marks:50
Practical	4 hours duration	Min. Marks:18 Max Marks:50

Note:

1. Two types of Question papers for each theory paper will be applicable. Total duration of 3 hours for each paper. One question paper will comprise of the objective questions and the other will be of descriptive type question.
2. Descriptive type question paper (to be given during 1st 2 hours of examination) will have 9 questions,3 from each section out of which a student is supposed to attempt 4 questions selection at least 1 from each section. This portion of the paper will carry maximum 30 marks. Each descriptive question will be of 7.5 marks.
3. The objective question paper will be given after 2 hours of commencement of descriptive type paper and will have 35 questions of the objective type. This portion of the paper will carry 20 marks. The objective type questions will be of the following types:
 - Multiple choice type questions :20 questions of ½ marks each.
 - Fill in the blanks/one word/true or false type questions:10 questions of ½ mark each.
 - Very short answer type questions:5 questions of 1 mark each

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Paper –I Environmental Management and Planning

Section –A

1. Air Pollution Abatement; Study of metrological parameters.
2. Vertical motion of air, and atmospheric stability;
3. Wind direction, frequency, and lapse rates.
4. Temperature inversion
5. Dispersal of pollutants in the air
6. Air pollution with respect to distance from source of emissions of pollutants

Section-B

1. Types of pollutant sampling and measurement.
2. Ambient air sampling
3. Collection of Gaseous air pollutants
4. Collection of particulate pollutants
5. Stack sampling
6. Analysis of air pollutants, SO_x, NO_x, CO₂, CO and SPM.

Section-C

1. Control methods; source correction method
2. Cleaning of Gaseous effluents
3. Air pollution control equipments, Gravitational settling chambers, cyclone separators, Fabric filters, Electrostatic precipitators, wet samplers.
4. Control of gaseous air pollutants; SO_x
5. Control of gaseous air pollutants; NO_x and CO

Suggested Readings:

- ❖ Baldwin, J.H.1985.Environmental Planning and Management. International Book Distribution, Dehradun
- ❖ Bandhu, D. and Ramnath, N.L.1982.Education for Environmental Planning and observation. Natraj publishers, Dehradun.
- ❖ Cornwell, D.A and Davis, M.L.2000.Introduction to Environmental Engineering. McGraw Hill. International Edition.
- ❖ De Nevers, N.L.2000.Pollution Control Engineering. McGraw Hill. International Edition.Mexico.
- ❖ Environmental Management and Planning
- ❖ Liu, D.H.F. and Liptak, B.G.2000.Air Pollution. Lewis Publishers. Washington, D.C.
- ❖ Mohan, I, 1989.Environmental pollution and Management, Ashish Publishing House, New Delhi.

- ❖ Pillai, K.M.1987, Water Management and Planning. Himalaya Publishing House, New Delhi.
- ❖ Reible, D.D.1998.Fundamentals of Environmental Engineering. Lewis Publishers. Washington, D.C.
- ❖ Sapru, R.K.1990.Environmental planning and Management in India. Ashish Publishing House, New Delhi.
- ❖ Singh, P.1985.Environmental pollution and Management .ChughPublications,Allahbad

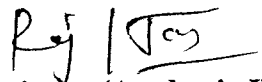
Paper-II Environmental Impact Assessment and Sustainable Development


Section-A

1. Basic Concepts of Sustainable Development
2. Sustainable Industrialization.
3. Sustainable Agriculture
4. Sustainable Tourism
5. Sustainable Mining
6. Sustainable Transportation and Sustainable housing
7. Environmental awareness Programs
8. Role of National and International Organizations in Conservation of Environment
9. Role of Media in Environmental Conservation
10. Significance of International Conference on Human Environment, Stockholm, 1972; Earth Summit, Rio de Janerio, 1992; EarthSummit – II, Johannesburg, 2002; Earth Summit-III-2012.

Section-B

1. Environmental Impact Assessment, Processes in different developing and Developed Countries.
2. Environmental Impact Assessment: Methods; Adhoc, Simple Checklists, Overlays, Matrices, Networks.
3. Environmental Economics
4. Environmental Management Systems (EMS)
5. Environmental Policy of India
6. Environmental policy of Rajasthan.


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Section-C

1. Concept of Environmental Audit
2. Setting up of an Audit programme.
3. Environmental Audit process.
4. Benefits of Environmental audit
5. Various methods of Environmental audit
6. Environmental Laws- Indian Forest Act,1927, (The air prevention and control of pollution) Act, 1981, The Water (prevention and control of pollution) Act, 1974, The Wildlife Protection Act, 1972, Forest Conservation Act, 1980, The Environmental (Protection) Act, 1986, The Biodiversity Act, 2002.

Suggested Readings:

- ❖ Canter, L.W.1997. Environmental Impact Assessment. McGraw Hill, New York
- ❖ Clarck, B.D., Biset, R. and Wathern, P.1980. Environmental Impact Assessment,Mansell, London.
- ❖ Davies, G.S. and Mueller, F.G.1983.A handbook on Environmental Impact Assessment for use in developing countries.UNEP, Nairobi. WCESD.1987.Our Common Future oxford university press. Oxford U.K.Archibugi,F and Nijkamp.P.1989.Economy and Ecology; Towards Sustainable Development.Kluwer Academic Publishers.London.
- ❖ Shashtri, S., Bakre, P.P.and Khan, T.I.1996. Industry, Environment and Law,RBSApublishers,Jaipur
- ❖ Wathersn, P.1998.Environmental Impact Assessment Theory and Practice.UnwinHyman.London.


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Suggested field and laboratory exercises :

It will be divisible into two parts:


Part A – 25 Marks – Field Report


Part B – 25 Marks – Experiments

Part – A: A candidate is supposed to write a field reports on some environmental problems based upon his/her personal observation. It may be a case study of river, mining, deforestation, and desertification, suffering of human beings due to local environmental pollution, textile or some other Industries. Report is to be written on the basis of analysis carried out in laboratories and personal observations. A presentation will be made on the day of practical examination.

Part- B: Industrial Pollution based experiments:

1. Estimation of SPM around Industries.
2. Estimation of SO_x around
3. Estimation of NO_x
4. Estimation of CO and CO₂.
5. Impact of air pollutants from Industries on Soil.
6. Impact of air pollutants from Industries on vegetation.


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TEXTILE CRAFT

B.Sc. Part III

SCHEME: BA/B.Com PART-III

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	
	Paper -II	3Hrs	30	22
2. Practical:	Paper -I	3Hrs	35	
	Paper-II	3Hrs	35	25
3. Submission:	Paper -I		35	
	Paper-II		35	25

Paper-I : Weaving Theory II

UNIT-I


1. Types of Spinning: Mechanical and Chemical
Mechanical spinning process: picking, ginning, combing/carding, drawing etc. Types of chemical spinning-melt spinning, dry spinning and wet spinning.
2. Types of Yarns: Simple and Fancy
Simple yarn: single and double/plied/folded yarn
3. Calculation of resultant count for folded yarn


UNIT-II

1. Manmade and Synthetic fibres
Man-made fibres: Basic methods of producing rayon fibre, Different types of man-made fibres
Synthetic fibres: Different types of synthetic/chemical fibre, method of their production, properties of polyester fibre, nylon fibre, glass fibre.
2. Silk and Wool
Production, spinning, properties and uses of silk, different types of silk
Classification of wool, wool spinning process, difference between woollen and worsted fabric
3. Concept of Mixing and Blending, Basic difference between mixing and blending.
Concept of Staple and Filament fibre; difference between staple fibre and filament fibre

UNIT-III

- 1 Derivatives of Twill weave: Broken weave, Herringbone weave and Diamond weave
- 2 Towel weaves: Huckaback and Honeycomb; quality of yarn and weave selected for towels
- 3 Concept of shedding mechanism; Dobby and Jacquard shedding mechanism


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Paper-II: Dyeing Theory II

UNIT-I

1. Dye molecule; Concept and Importance of Chromophores and Auxochrome in a dye
2. Objectives of Fabric finishes; different mechanical and chemical fabric finishes; Determinants of finishes
3. Different types of natural and synthetic dyes.

UNIT-II

4. Method of direct printing: Screen printing; colour preparation and screen preparation
5. Discharge and Resist printing; different styles of discharge and resist printing
6. Factors affecting colour fastness: composition of fibre, chemical structure of dye, techniques of dyeing/printing, addition of other useful additives

UNIT-III

7. Importance of fabric finishes
8. Different types of chemical finishes- crease resistant finish, water proof finish, fire proof finish, moth proofing finish and absorbency finish.
9. Determinants of fabric finishes.

Practical (Paper-I)

1. Concept of yarn twist(S twist and Z twist) and plied yarn(single and double yarn)
2. Calculation of Ends and Picks per inch in given piece of fabric
3. Towel weaves preparation using paper strips

Practical (Paper-II)

1. Screen preparation (simple tracing method)
2. Table cover preparation by screen printing

Submission (paper-I)

1. Assessment of yarn and fabric samples
2. Assessment of weave samples

Submission (paper-II)

1. Assessment of samples
2. Any one article using screen printing

Practical Examination Scheme:

Major Problem: 20 Marks

Minor Problem: 15 Marks

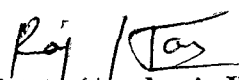
Reference books:

Booth, J.E. (1996) Principles of Textile Testing, 1st edition, CBS publishers & distributors PVT.Ltd. New delhi

Sahnai, V.A. (1980) Technology of Dyeing, Sevak publications. Mumbai

Sahnai, V.A. (1979) Technology of printing, Sevak publications. Mumbai

Sahnai, V.A. (1999) Technology of finishing, Sevak publications. Mumbai


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GARMENT PRODUCTION & EXPORT MANAGEMENT

B.Sc. Part III

PAPER – 1 : APPAREL TECHNOLOGY

B.A./B.Com. – M.M 40

B.Sc.- M.M. 50

Hrs. – 3

OBJECTIVES:

1. To create awareness on the basics of Fashion
2. To study the psychological effects of clothing on the individual in social situation.
3. To develop understanding of manufacturing technology of the garment Industry.
4. To understand the fundamental concepts of dyeing and printing.

SECTION-A : INTRODCUTION TO FASHION

1. Fashion terminology, sources of fashion, factors influencing fashion.
2. Fashion forecasting and fashion cycle.
3. India and international fashion designers (five each).
4. Sociological and psychological significance of clothing.

SECTION-B : MANUFACTURING TECHNOLOGY

5. Product development, design development, developing a sample garment.
6. Apparel production
 - I. Costing a garment
 - II. Purchasing pattern making
 - III. Production scheduling
 - IV. Spreading and cutting procedure
 - V. Contracting
 - VI. Garment assembly
7. Introduction to industrial machines-
 - I. cutting : round , straight and band
 - II. fusing: collars, facing
 - III. sewing: chain stitch, lock stitch, button hole, blind stitching
8. Use of components and trims –
 - (i) Performance and properties of components and trims.
 - (ii) labels and motifs
 - (iii) linings and interlinings
 - (iv) face, braids, elastics
 - (v) fasteners; loops
 - (vi) seam binding and tapes
 - (vii) shoulder pads, eyelets

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SECTION –C : DYEING AND PRINTING

Application of design:

7. i. Printing methods – block, screen, stencil, roller.
ii. Styles of printing – direct, discharge and resist.
8. Dyeing – introduction to natural and synthetic dyes (acid, basic, sulphur, vat, reactive and direct dyes)
9. Stages of dyeing : Fiber, yarn and fabric

References:

1. Rouse Elizabeth, 1999, Understanding Fashion, Blackwell science.
2. Carr Harold and John pomerory, 1996. Fashion design and product development. Blackwell science.
3. Jain Ruby and Rathore Girja, Design, Fashion and Garment Production, CBH publication Jaipur 2019.

PAPER- II : INTERNATIONAL MARKETING

B.A./ B.Com.- M.M. 40

B.Sc. – M.M. 50

Hrs. -3

OBJECTIVES:

1. To study the importance of marketing to the global economy
2. To develop insight into the development of marketing strategies for international markets
3. To Identify business opportunities in an international business environment

SECTION –A

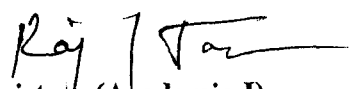
1. International Marketing: nature and scope of international marketing.
2. International marketing v/s domestic marketing.
3. Importance of international marketing.
4. Problems and challenges of international marketing.
5. Selection of agents.


SECTION – B

6. Identification of markets for readymade garments.
7. Market entry conditions.
8. Channels of distribution.
9. Direct and indirect export
10. Trade fair and Exhibitions.

SECTION – C

11. Pricing, role of price and non price factors, factors influencing pricing, price quotation, information needed for export pricing.
12. Role of trading and export houses.


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13. Institutional segments and packaging for exports: packing material, boxing and pressing department, machinery and equipments used in packaging department.
14. Quality control
15. Labeling and consumer protection meaning and its role.

References :

1. R. K. Kothari, B. S. Rathore, P. C. Jain (2009) International Marketing (2009) 1st ed. Ramesh Book Depot, Jaipur, New Delhi
2. R. Kothari and P. C Jain (2009) International Management 1st ed. Ramesh Book Depot, Jaipur, New Delhi
3. M. J. Methew International Marketing (Procedures and practices) 1st ed. RBSA publishers, Jaipur

PRACTICAL – 1 : APPAREL PRODUCTION

B.A/B.Com.-M.M.60

B.Sc.-M.M. 25

Hrs.- 4

OBJECTIVES :

1. To develop basic adult drafts of bodice, sleeve and collar.
2. To develop various patterns of textile techniques
3. Guidance for preparation of portfolio

CONTENT

1. Prepare an adult's bodice and sleeve block.
2. Sketching and designing of men/women garments (5 each)
3. To prepare with specific details of necklines and sari blouses. (20)
4. To identify patterns and its application for women designer dress on fashion figures:
5. Types of patterns include –
 - I. Structural
 - II. Geometrical
 - III. Stripes and plaids
 - IV. Floral
6. Design and prepare an adult dress for fashion shows.

Examination Scheme:

B.A.\B.Com. -Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

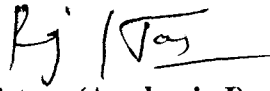
Internal :-10

B.Sc:-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5


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PRACTICAL – II : DYEING AND PRINTING

B.A./B.Com.-M.M. 60

B.Sc.- M.M. 25

Hrs.- 4

OBJECTIVES:

1. To learn the various types of skills in dyeing
2. To develop various textile printing techniques
3. Guidance of practical knowledge of export houses

Contents

1. Prepare and article of each: Tie and dye, stencil printing, block printing and batik
2. Field trips to Export houses and mass production centers.
3. Exhibition ;

References:

1. Bhargava, Ritu, 2005, fashion illustration and rendering, Jain Publications Pvt. Ltd. New Delhi.
2. Ireland, fashion designing drawing and presentation.
3. Prayag: Technology of textile printing.
4. Shenai: Technology of dyeing

Examination Scheme :

B.A.\B.COM:-Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

Internal :-10


B.SC:-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5


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Geology and Mining.

Scheme:

Theory: Max Marks 100 Minimum Pass marks: 36

Paper I: Mineral Resources— 3 hrs duration Max Marks 50

Paper II: Mineral Exploration & Mining Geology 3 hrs duration Max Marks 50

Practical (one) 4 hrs duration Max Marks 50

Paper I: Mineral Resources

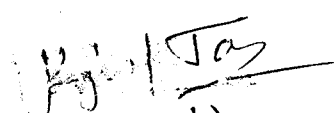
Note: The paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all, selecting at least one question from each section.


Section –A

Economic Geology: Definition; Magma and its relationship with mineral deposits. Ore and gangue minerals. Processes of Mineral formation: Magmatic, Hydrothermal, Contact metasomatic, Evaporation, Oxidation and supergene enrichment, Sedimentation.

Section –B

Classification of mineral deposits: outline of Lindgren's and Bateman's classification, Important ores, Composition physical properties, mode of occurrence, association, origin, distribution in India & uses of the following metals: copper, lead, iron, manganese, and aluminum.


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Section –C

Important industrial minerals: Mode of occurrence, Physical properties, chemical composition and distribution in India-Refractory, Abrasives, Ceramics, cement and Fertilizers.

Coal, petroleum and radioactive minerals: their occurrences & distribution in India and origin.

Paper II: Mineral Exploration & Mining Geology

- Note: The paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all, selecting at least one question from each section.

Section-A

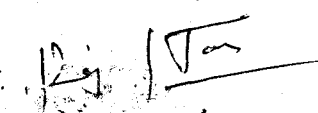
Ore reserves and resources: definition and outline of classification of mineral reserves and resources. Methods of ore reserve estimation; concept of sampling, Assaying, bore hole drilling

Section-B

- Outline of geophysical and geochemical exploration. Explosives: types, storage and precautions in handling of explosives; blasting: various patterns of blast holes and methods of their charging and blasting.

Section-C

Elements of mining: Factors controlling selection of open cast and underground mining. Alluvial and opencast Mining methods. Underground mining methods


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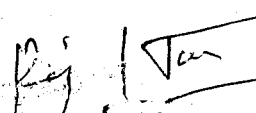
with special referees to sub -level stoping Coal mining methods: room and pillar method, long wall method.


Practical

Systematic study, identification, description, mode of occurrence and uses of the following minerals: haematite, magnetite, limonite, siderite, pyrite, pyrrhotite, pyrolusite, Psilomelane, chromite, ilmenite, wolframite, chalcopyrite, cuprite, malachite, galena, sphalerite, magnesite, bauxite, realgar, orpiment, stibnite, cinnabar, asbestos, graphite and other important industrial minerals.

In an outline map of India plotting of occurrence of important ore minerals
Plane table and prismatic compass survey

Geological field work and collection of samples. Visit of at least one open cast mine.


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BIO-TECHNOLOGY

14. Bio Technology

Paper – I : Animal Cell Biotechnology & Environmental Biotechnology
Max. Marks–50

Section – A

General metabolism

Special secondary metabolites/products (Insulin, Growth hormone, Interferon, plasminogen activator, factor VIII etc.)

Expressing cloned proteins in animal cells. Over production and processing of chosen protein.

The need to express in animal cells

Production of vaccines in animal cells

Production of monoclonal antibodies

Growth factors promoting proliferation of animal cells (EGF, FGF, PDGF, IL-1 IL-2, NGF, erythropietin etc.)

Bioreactors for large-scale culture of cells.

Transplanting cultures cells.

Section – B

Renewable and no-renewable resources

What is renewable should be bioassimilable/biodegradable

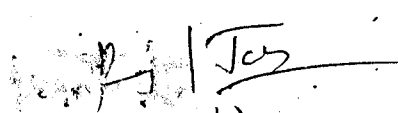
Major consumer items: Food, fuel and fibres

Conventional fuels and their environmental impacts;

- Firewood
- Coal
- Animal oils
- Plant and animal
- Gas

Modern fuels and their environmental impacts:

- Methogenic bacteria and biogas
- Microbial hydrogen production
- Conversion of sugars to ethanol. The gasohol experiment.
- Solar energy converters—Hopes from the photosynthetic pigments


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Syllabus : B.Sc. Part III

- Plant based petroleum industry?
- Cellulose degradation for combustible fuel

Section - C

Biotechnological inputs in producing good quality natural fibres
Transgenic sheep and transgenic plants
Microbiological quality of food and water
Treatment of municipal waste and industries effluents
Degradation of pesticides and other toxic chemicals by micro-organisms
Thuringiensis toxin as a natural pesticide
Biological control of other insects swarming the agricultural fields
Enrichment of ores by microorganisms
Biofertilizers, Nitrogen fixing microorganisms enrich the soil with assimilable nitrogen.

Paper—II : Plant Biotechnology

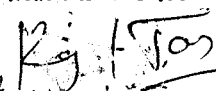
Max.Marks—50


Section—A

Introduction to in vitro methods. Terms and definitions. Use of growth regulators.
Beginning in-vitro cultures in our country (Over and ovule culture, in vitro-pollination and fertilization.
Embryo culture, embryo rescue after wide hybridization and its applications
Introduction to the processes of embryogenesis and organogenesis and their practical applications.
Clonal multiplication of lite species (Micropropagation) exillary bud, shoot-tip and meristem culture.

Section -B

Haploids and their applications, Somaclonal variations and applications (Treasure your exceptions).
Endosperm culture and production of triploids.
Practical applications of tissue and organ culture (summarizing the practical applications of all above mentioned techniques).
Single-cell suspension cultures and their applications in selec-


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tion of variants/mutants with or without nutagen treatment (of haploid culture preferably).

Introduction to protoplast isolation: Principles and applications.

Testing of viability of isolated protoplasts.

Various steps in the regeneration of protoplasts.

Somatic hybridization-an introduction.

Section -C

Various methods for fusing protoplasts. Chemical, electrical.

Use of markers for selection of hybrid cells.

Practical applications of somatic hybridization (hybrids vs cybrids)

Use of plant cell, protoplasts and tissue culture for genetic manipulation of plants. Introduction to *A. tumefaciens*.

Tumor formation on plants using *A. tumefaciens* (Monocots vs Dicots)


Root-formation using *A. rhizogenes*.

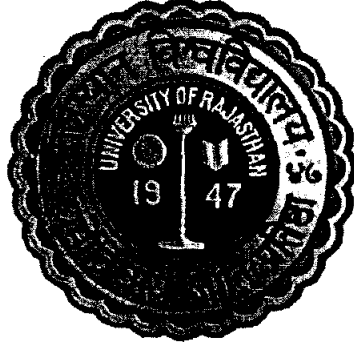
Practical application of genetic transformation.

Practical-Based on theory syllabus

Max.Marks-50


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SYLLABUS

B.Sc. PART-II

Examination-2024

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**Scheme of Examination
B.Sc. (Pass Course) Part-II**

The number of paper and the maximum marks for each paper together with the minimum marks required for a pass are shown in the scheme of examination against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/paper. Wherever prescribed separately. Classification of successful candidates shall be as follows:

First Division 60% } of the aggregate marks prescribed at (a) Part first
Second Division 48% } Examination excluding those obtained in the
compulsory subject (b) Part Second Examination (c)
Part Third Examination taken together.

All the test will be declared to have passed the Examination, if they obtain a minimum pass marks in each subject viz 36%. No division shall be awarded at the Part First and Part Second Examinations :

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Jaipur

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3.	Zoology	18 - 27
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5.	Geology	36 - 39
6.	Mathematics	40 - 44
7.	Economics	45 - 48
8.	Geography	49 - 52
9.	Statistics	53 - 57
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15.	Geology and Mining	83 - 85
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B.Sc. PL-II

I. PHYSICS

Scheme:			Max. Marks: 100
Min. Pass Marks: 36			
Paper I	3 hrs. duration	Max. Marks: 33	Min. Pass marks 12
Paper II	3 hrs. duration	Max. Marks: 33	Min. Pass marks 12
Paper III	3 hrs. duration	Max. Marks: 34	Min. Pass marks 12
Practical	5 hrs. duration	Max. Marks: 50	Min. Pass marks 18

Paper-I : Thermodynamics and Statistical Physics

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

Scheme of Examination: First question will be of nine marks comprising of six parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

Unit-1

Thermal and adiabatic interactions: Thermal interaction; Zeroth law of thermodynamics; System in thermal contact with a heat reservoir (canonical distribution); Energy fluctuations; Entropy of a system in a heat bath; Helmholtz free energy; Adiabatic interaction and enthalpy; General interaction and first law of thermodynamics; Infinitesimal general interaction; Gibb's free energy; Phase transitions. Clausius Clapeyron equation; Vapour pressure curve; Heat engine and efficiency of engine. Carnot's Cycle; Thermodynamic scale as an absolute scale; Maxwell relations and their applications.

Unit-2

Production of low temperatures and applications: Joule Thomson expansion and J I coefficients for ideal as well as Vander Waal's gas, porous plug experiment, temperature inversion, Regenerative cooling, Cooling by adiabatic expansion and demagnetization; Liquid Helium, He I and He II, superfluidity, Refrigeration through Helium dilution, Quest for absolute zero, Nernst heat theorem

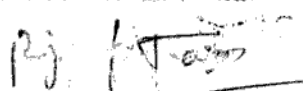
The distribution of molecular velocities: Distribution law of molecular velocities, most probable, average and r.m.s. velocities; Energy distribution function; effusion and molecular beam, Experimental verification of the Maxwell velocity distribution; The principle of equipartition of energy

Transport phenomena: Mean free path, distribution of free paths, coefficients of viscosity, thermal conductivity, diffusion and their interaction.

Unit-3

Classical Statistics: Validity of Classical approximation; Phase space micro and macro states; Thermodynamic probability, relation between entropy and thermodynamic probability, Monatomic ideal gas, Barometric equation; Specific heat capacity of diatomic gas, Heat capacity of solids

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Unit-4

Quantum Statistics: Black body radiation and failure of classical statistics, Postulates of quantum statistics, indistinguishability wave function and exchange degeneracy, a priori probability, Bose-Einstein statistics and its distribution function; Planck distribution function and radiation formula, Fermi-Dirac statistics and its distribution function, contact potential, thermionic emission; Specific heat anomaly of metals; Nuclear spin statistics (para- and ortho-hydrogen).

Paper- II: Mathematical Physics and Special Theory of Relativity

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

Scheme of Examination: First question will be of nine marks comprising of six parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

UNIT-1

Orthogonal curvilinear coordinate system, scale factors, expression for gradient, divergence, curl and their application to Cartesian, circular cylindrical and spherical polar coordinate.

Coordinate transformation and Jacobian, transformation of covariant, contra-variant and mixed tensor; Addition, multiplication and contraction of tensors; Metric tensor and its use in transformation of tensors.

Dirac delta function and its properties.

UNIT-2

Lorentz transformation, Length Contraction, Time Dilation, Mass variation, rotation in space-time like and space like vector, world line, macro-causality.

Four vector formulation, energy momentum four vector, relativistic equation of motion, invariance of rest mass, orthogonality of four force and four velocity, Lorentz force as an example of four force, transformation of four frequency vector, longitudinal and transverse Doppler's effect.

Transformation between laboratory and center of mass system, four momentum conservation, kinematics of decay products of unstable particles and reaction thresholds; Pair production, inelastic collision of two particles, Compton effect.

UNIT-3

(a) Transformation of electric and magnetic fields between two inertial frames. Electric field measured in moving frames. Electric field of a point charge moving with constant velocity.

(b) The second order linear differential equation with variable coefficient and singular points. series solution method and its application to the Hermite's, Legendre's and Laguerre's differential equations. Basic properties like orthogonality, recurrence relation, graphical representation and generating function of Hermite, Legendre and Laguerre functions (simple applications).

UNIT-4

Techniques of separation of variables and its application to following boundary value problems
(i) Laplace equation in three dimensional Cartesian coordinate system-line charge between two earthed parallel plates (ii) Helmholtz equation in circular cylindrical coordinates-cylindrical resonant cavity (iii) Wave equation in spherical polar coordinates the vibrations of a circular membrane (iv) Diffusion equation in two dimensional Cartesian coordinate system heat conduction in a thin rectangular plate (v) Laplace equation in spherical coordinate system-electric potential around a spherical surface.

Paper III: Electronics and Solid State Devices

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

Scheme of Examination: First question will be of ten marks comprising of five parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

Unit 1: Circuit analysis and PN junctions

Circuit analysis: Networks- some important definitions, loop and nodal equation based on D.C. and A.C. circuits (Kirchhoffs Laws). Four terminal network: Ampere volt conventions, open, close and hybrid parameters of any four terminal network, Input, output and mutual impedance for an active four terminal network. Various circuit theorems: Superposition, Thevenin, Norton, reciprocity, compensation, maximum power transfer and Miller theorems.

PN junction: Charge densities in N and P materials; Conduction by drift and diffusion of charge carriers, PN diode equation: capacitance effects.

Unit 2: Rectifiers and transistors

Rectifiers: Basic idea of Half-wave, full wave and bridge rectifier: calculation of ripple factor, efficiency and regulation; Filters: series inductor, shunt capacitor, L section and π -section filters. Voltage regulation: Voltage regulation and voltage stabilization by Zener diode, voltage multiplier

Transistors: Notations and volt-ampere characteristics for bipolar Junctions transistor. Concept of load line and operating point Hybrid parameters, CB, CE, CC configurations Junction field effect transistor (JFET) and metal oxide semiconductor field effect transistor (MOSFET) Circuit symbols, biasing and volt-ampere characteristics, source follower operation of FET as variable voltage resistor

Unit 3: Transistor biasing and amplifiers

Transistor biasing: Need of bias and stability of Q point, stability factors, and various types of bias circuits for thermal bias stability: fixed bias, collector to base feedback bias and four resistor bias.

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Amplifiers: Analysis of transistor amplifiers using hybrid parameters and its gain-frequency response. Basic idea of cascade amplifiers, direct coupled and RC coupled amplifiers. Amplifier with feedback. Concept of feedback, positive and negative feedback, voltage and current feedback circuits. Advantages of negative feedback. Stabilization of gain, effect of negative feedback on output and input resistance, reduction of nonlinear distortion, effect on gain-frequency response.

Unit 4: Oscillators and Logic Circuits

Oscillators: criteria for self-excited and self-sustained oscillation, circuit requirement for build-up of oscillation, Basic transistor oscillator circuit and its analysis, Colpitt's and Hartely oscillators, RC Oscillators

Logic circuits: Logic fundamentals: AND, OR, NOT, NOR, NAND, XOR gates, Boolean algebra, De Morgan's theorem, positive and negative logic, logic gates circuit realization using DFL and FFL logic, Simplification of Boolean expressions.

Reference Books:-

1. John D. Ryder, Electronic Fundamentals and Application, Prentice Hall of India Pvt. Ltd. New Delhi.
2. John D. Ryder, Engineering Electronics, McGraw Hill Book Company, New Delhi
3. Jacob Millman and Christose Haikias, Integrated Electronics, Analog and Digital Circuits and systems, McGraw- Hill Ltd. (1972).
4. Albert Paul Malvino, Digital Computer Electronics, Tata McGraw- Hill Pub. Co. Ltd., New Delhi (1983).
5. Kumar & Gupta, Hand book of Electronics.
6. G.K. Mittal, Hand Book of Electronics.
7. G.K. Mittal, Electronics Devices and Applications.
8. R.P. Jain, Digital Electronics.


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7. G.K. Mithal, Electronics Devices and Applications.
8. R.P. Jain, Digital Electronics.

PRACTICAL

Teaching : 4 hrs/week

Practical One-Paper

Min Pass Marks : 18

5 hrs. duration

Max. Marks : 50

Note : Total number of experiments to be performed by the students during the session should be 16 selecting any 8 from each section.

Section-A

1. Study of dependence of velocity of wave propagation on line parameter using torsional wave apparatus.
2. Study of variation of reflection coefficient of nature of termination using torsional wave apparatus.
3. Using platinum resistance thermometer find the melting point of a given substance.
4. Using Newton's rings method find out the wave length of a monochromatic source and find the refractive index of liquid.
5. Using Michelson's interferometer find out the wavelength of given monochromatic source (Sodium Light)
6. To determine dispersive power of prism.
7. To determine wave length of sodium light using grating.
8. To determine wave length of sodium light using Biprism.
9. Determine the thermodynamic constant $\gamma = \frac{C_p}{C_v}$ using Clement's & Desorme's method.
10. To determine thermal conductivity of a bad conductor by Lee's method.
11. Determination of ballistic constant of a ballistic galvanometer.
12. Study of variation of total thermal radiation with temperature.

Section-B

1. Plot thermo emf versus temperature graph and find the neutral temperature (Use sand bath).
2. Study of power supply using two diodes/bridge rectifier with various filter circuits.

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Syllabus : B.Sc. Part-II

3. Study of half wave rectifier using single diode and application of L and π section filters.
4. To study characteristics of a given transistor PNP/NPN (common emitter, common base and common collector configurations).
5. Determination of band gap using a junction diode.
6. Determination of power factor ($\cos \theta$) of a given coil using CRO.
7. Study of single stage transistor audio amplifier (variation of gain with frequency).
8. To determine c/m by Thomson's method.
9. Determination of velocity of sound in air by standing wave method using speaker, microphone and CRO.
10. Measurement of inductance of a coil by Anderson's bridge.
11. Measurement of capacitance and dielectric constant of a liquid and gang condenser by de-Sauty bridge.

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2. CHEMISTRY

Scheme:

Max Marks: 150

	Duration (hrs.)	Max. Marks	Min. Pass Marks
Paper-I	3	33	
Paper-II	3	33	36
Paper-III	3	34	
Practical	5	50	18

Note: Ten (10) questions are to be set taking two (02) questions from each unit. Candidates have to answer any 5 questions selecting at least one question from each unit.

CH-201 Paper-I: Inorganic Chemistry (2 hrs or 3 periods/week)

Unit-I

Chemistry of Elements of First Transition Series:

Characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds and complexes illustrating relative stability of their oxidation-states, coordination number and geometry.

Chemistry of Elements of Second and Third Transition Series:

General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry.

Unit-II

Coordination Compounds:

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes.

Unit-III

Chemistry of Lanthanide and Actinide Elements:

Electronic structure, oxidation states, ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide compounds.

General features, chemistry of separation of Sp, Pu and Am from U, electronic configuration, oxidation states, magnetic properties, complexation behavior, comparison of lanthanides and actinides, actinide elements.

Unit-IV

Oxidation and Reduction:

Concept of Redox, Potential data, analysis of redox, electrode, redox stability in water, Fenton, Latimer and Pourbaix diagrams, Application of redox chemistry, extraction of elements.

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Unit-V

Acids and Bases:

Theories: Arrhenius, Bronsted-Lowry, Lux-Flood. Solvent system concept and Lewis concept of acids and bases.

Non-aqueous Solvents:

Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2

CH-202 Paper-II: Organic Chemistry (2 Hrs. or 3 periods/week)

Unit-I

Electromagnetic Spectrum: An Introduction

Absorption Spectroscopy

Ultraviolet (UV) spectroscopy - Absorption laws (Beer-Lambert Law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of solvents on transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated dienes and enones.

Infrared (IR) spectroscopy - Molecular vibrations, Hook's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristics absorption of various functional groups and interpretation of IR spectra of simple organic compounds.

Unit-II

Alcohols - Classification and nomenclature.

Monohydric alcohols - Methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohol with mechanism.

Dihydric alcohols - methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$\text{Pb}(\text{OAc})_4$ and HIO_4] and pinacol-pinacolone rearrangement

Trihydric alcohols - methods of formation, chemical reactions of glycerol.

Phenols

Nomenclature, structure and bonding. Preparation of Phenols. Physical properties and acidic character. Comparative acidic strength of alcohols and phenols. Reactions of phenols: electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Mannich reaction and Reimer-Tiemann reaction.

Ethers and Epoxides

Methods of formation, physical properties. Chemical reactions - cleavage and autooxidation. Ziesel's method.

Synthesis of epoxides. Acid and base catalyzed ring opening of epoxides, orientation of epoxide

ring opening reactions of Grignard and organolithium reagents with epoxides

Unit-III

Aldehydes and Ketones

Structure of the carbonyl group. Syntheses of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, syntheses of ketones from nitriles and from carboxylic acids. Physical properties.

Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones. Cannizzaro reaction, MPV (Meerwein-Ponndorf-Verley), Clemmensen, Wolff-Kishner, LiAlH_4 and NaBH_4 reductions. Halogenation of enolizable ketones. Use of acetals and 1,3-dithiane as protecting group.

Unit-IV

Carboxylic Acids

Structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids, Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids, mechanism of decarboxylation.

Methods of formation and chemical reactions of halo acids. Hydroxy acids - malic, tartaric and citric acids.

Dicarboxylic acids: methods of formation and effect of heat and dehydrating agents (succinic, glutaric and adipic acids).

Carboxylic Acid Derivatives

Structure, nomenclature and synthesis of acid chlorides, esters, amides and acid anhydrides. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.

Preparation of carboxylic acid derivatives, chemical reactions, mechanisms of esterification and hydrolysis (acidic and basic).

Unit-V

Organic Compounds of Nitrogen

Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid.

Amines: Structure, nomenclature and preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds. Physical properties, stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines. Structural features effecting basicity of amines. Amine salts as phase-transfer catalysts. Gabriel phthalimide reaction and Hoffmann bromamide reaction with mechanism.

Reactions of amines: electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid, diazotisation and mechanism. Synthetic transformations of aryl diazonium salts, azo compounds and its applications.

CH-203 Paper III : Physical Chemistry
(2 Hrs. or 3 periods/week)

UNIT-I

Thermodynamics - I

Definition of Thermodynamic Terms: System, surroundings, etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process, concept of heat and work.

First Law of Thermodynamics : Statement, definition of internal energy and enthalpy, heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law. Joule-Thomson coefficient and inversion temperature. Calculation of w , q , dU & dH for the expansion of Ideal gases under isothermal and adiabatic conditions for reversible process.

Thermochemistry : Standard state, standard enthalpy of formation, Hess's law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation.

UNIT-II

Thermodynamics -II

Second Law of Thermodynamics : Need for the law, different statements of the law. Carnot cycle and its efficiency. Carnot-Theorem. Thermodynamic scale of temperature.

Concept of Entropy : Entropy as a state function, entropy as a function of V & T , entropy as a function of P & T , entropy change in physical change. Clausius inequality and entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics : Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions: Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P , V and T .

Chemical Equilibrium:

Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chatelier's principle. Reaction Isotherm and reaction isochore. Clapeyron equation and Clausius-Clapeyron equation, applications.

UNIT-III

Phase Equilibrium: Statement and meaning of the terms: phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system - water, CO_2 and sulphur systems.

Phase equilibria of two component system - solid-liquid equilibria simple eutectic Bi-Cd, Pb-Ag systems, de-alloyization of lead.

Solid solutions - compound formation with Congruent melting point (Mg-Zn) and incongruent melting point (NaCl-H₂O) System. Freezing mixtures ketone-dry ice.

Liquid-Liquid mixtures - Ideal liquid mixtures. Raoult's and Henry's law. Non ideal systems: azeotropes. H₂O-H₂O and ethanol-water systems. Partial miscible liquids: phenol-water. Lower and upper consolute temperature, effect of impurities on consolute temperature. Nernst distribution law, thermodynamic derivation, application.

UNIT-IV

Electrochemistry - I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution.

Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations, Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only), Transport number, definition and determination by Hittorf's method and moving boundary method.

Applications of conductivity measurements:

Determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

UNIT-V

Electrochemistry -II

Types of reversible electrodes : Gas-metal- ion, metal-metal ion, metal-insoluble salt anion and redox electrodes, electrode reactions, Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, sign conventions, electrochemical series and its significance.

Electrolytic and Galvanic cells - reversible and irreversible cells, conventional representation of electrochemical cells.

EMF of a cell and its measurements, Computation of cells EMF, Calculation of thermodynamic quantities of cell reactions (ΔG , ΔH and K), polarization, over potential and hydrogen overvoltage.

Concentration cell with and without transport, liquid junction potential, application of concentration cells, Valency of ions, solubility product and activity coefficient, potentiometric titrations.

Definition of pH and pK_a , determination of pH using hydrogen quinhydrone and glass electrodes, by potentiometric methods.

Suggested Books:

1. Principles of Physical Chemistry: B. R. Puri, Sharma and M. S. Pathania.
2. A Text Book of Physical Chemistry, A. S. Negi and S. C. Anand.
3. A Text Book of Physical Chemistry: Kundu and Jain.
4. The elements of Physical Chemistry, P. W. Atkins, Oxford.
5. University General Chemistry, C. N. R. Rao, Mac Millan.

CH- 204 Chemistry Practical (Pass course), Laboratory Course-II (4 hrs or 6 periods / week)

Inorganic Chemistry

(i) Preparation of Standard Solutions

Dilution - 0.1 M to 0.001 M solutions


(ii) Volumetric Analysis

(a) Determination of acetic acid in commercial vinegar using NaOH

(b) Determination of alkali content in antacid tablet using HCl

(c) Estimation of calcium content in milk as calcium oxalate by permanganometry

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- (ii) Estimation of hardness of water by EDTA
- (iii) Estimation of ferrous and ferric by dichromate method
- (iv) Estimation of copper using thiosulphate
- (iii) Gravimetric Analysis
 - a. Cu as $\text{CuSO}_4 \cdot \text{N}$
 - b. Ni as Ni (dimethylglyoxime)

Organic Chemistry

(i) Laboratory Techniques

A. Thin Layer Chromatography

Determination of R_f values and identification of organic compounds.

- (a) Separation of green leaf pigments (spinach leaves may be used).
- (b) Preparation and separation of 2,4-dinitrophenylhydrazones of acetone, 2-butanone, hexan-2-one and hexan-3-one using toluene and light petroleum (40-60) solvent system.
- (c) Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5 : 1.5)

B. Paper Chromatography: Ascending and Circular

Determination of R_f values and identification of organic compounds.

- (a) Separation of mixture of phenylalanine and glycine, Alanine and aspartic acid, leucine and glutamic acid. Spray reagent - ninhydrin.
- (b) Separation of a mixture of DL - alanine, glycine and L-Leucine using n-butanol: acetic acid : water (4:1:5). Spray reagent-ninhydrin.
- (c) Separation of monosaccharides a mixture of D- galactose and D-Fructose Using n- butanol : acetone : water (4:5:1) Spray reagent -aniline hydrogen phthalate.

(ii) Qualitative Analysis

Identification of two organic compounds (one solid and one liquid) through the functional group analysis, determination of melting point, boiling point and preparation of suitable derivatives.

Physical Chemistry

(i) Transition Temperature

- a) Determination of the transition temperature of the given substance by thermometric-dilatometric method (e.g. $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ / $\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$).

(ii) Thermochemistry

- a) To determine the solubility of benzoic acid at different temperatures and to determine ΔH of the dissolution process.
- b) To determine the enthalpy of neutralization of a weak acid - weak base versus strong base - strong acid and determine the enthalpy of ionization of the weak acid - weak base.
- c) To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born-Haber cycle.

(iii) Phase Equilibrium

- a) To study the effect of a solute (e.g. NaCl , sucrose, acetic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.

- iv) To construct the phase diagram of two components (e.g. diphenylamine-benzophenone) system by cooling curve method.

(iv) Distribution law

- a) To study the distribution of iodine between water and CCl_4 .
 b) To study the distribution of benzoic acid between benzene and water.

(Instructions to the Examiner)
B.Sc. Part II
CH- 204 Chemistry Practical (Pass course)

Max. Marks: 50

Duration of Exam: 5 hrs.

Minimum Pass Marks: 18

Inorganic Chemistry

Ex. 1 Volumetric Analysis

or

Gravimetric Analysis as mentioned in the syllabus

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Organic Chemistry

Ex. 2 Identification of two organic compounds (one solid and one liquid) through the functional group analysis, determination of melting point, boiling point and preparation of suitable derivatives

or

Perform one experiment out of the experiments on thin layer and paper chromatography given in syllabus

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Physical Chemistry

Ex. 3 Perform one of the physical chemistry experiments as mentioned in the syllabus. 12

Ex. 4 Viva-voce

5

Ex. 5 Record

5

50

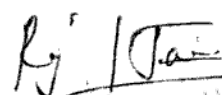
Books Suggested (Theory Course)

1. Basic Inorganic Chemistry F.A. Cotton, G. Wilkinson and P.L. Caus, Wiley
2. Concise Inorganic Chemistry, J.D Lee, ELBS
3. Concepts of Models of Inorganic Chemistry B. Douglas, D. McDaniel and J. Alexander, John Wiley
4. Inorganic Chemistry, D.F. Shriver P.W. Atkins and C.H. Langford, Oxford
5. Inorganic Chemistry, W.W. Porterfield Addison Wesley
6. Inorganic Chemistry, A.G. Sharpe, ELBS
7. Inorganic Chemistry, G.F. Messick and D.A. Larr, Prentice Hall
8. Organic Chemistry, Morrison and Boyd, Prentice Hall
9. Organic Chemistry, I.G. Wade, Prentice Hall
10. Fundamentals of Organic Chemistry, Solomon, John Wiley

11. Organic Chemistry Vol. I, II, III S.M. Mukherji, S.P. Singh and R.P. Kapoor. Wiley Eastern Ltd. (New Age International)
12. Organic Chemistry, F.A. Carey, McGraw Hill Inc.
13. Introduction to Organic Chemistry, Streitwieser, Heathcock and Kosover, Macmillan
14. Physical Chemistry, G.M. Barrow, International Student Edition, McGraw Hill.
15. Basic Programming with Application, V.K. Jain, Tata McGraw Hill.
16. Computers and Common Sense, R. Hunt and Shelly, Prentice Hall.
17. University General Chemistry, C.N.R. Rao, Macmillan.
18. Physical Chemistry, R.A. Alberty, Wiley Eastern Ltd.
19. The Elements of Physical Chemistry, P.W. Atkins, Oxford.
20. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern Ltd.

Books Suggested (Laboratory Courses)

1. Vogel's Qualitative inorganic Analysis, revised, Svehla, Orient Longman.
2. Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Jeffery and J. Mendham, ELBS.
3. Standard Methods of Chemical Analysis, W.W. Scott, The Technical Press.
4. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
5. Handbook of preparative Inorganic Chemistry, Vol I & II, Brauer, Academic Press.
6. Inorganic Synthesis, McGraw Hill.
7. Experimental Organic Vol I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
8. Laboratory manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
9. Vogel's Textbook of Practical Organic Chemistry, R.S. Furniss, Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
10. Experiments in General Chemistry, C.N.R. Rao and U.C. Agarwal, East-West Press.
11. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
12. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
13. Advanced Experimental Chemistry, Vol. I-Physical, J.N. Gurtu and R. Kapoor, S. Chand & Co.
14. Selected Experiments in Physical Chemistry, N.G. Mukerjee, J.N. Ghose & Sons.
15. Experiments in Physical Chemistry, J.C. Ghosh, Bharati Bhavan.


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University of Rajasthan
Syllabus B. Sc. Part II (Pass Course)
Zoology
(2022-2023)

Scheme:
Max. Marks: 100

Min. Marks: 36

Paper I	: 3 Hrs duration	33 Marks
Paper II	: 3 Hrs duration	33 Marks
Paper III	: 3 Hrs duration	34 Marks
Practical	: 4 Hrs duration	50 Marks

NOTE:

1. There will be two parts of every theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 (Paper I & II) or 10 (Paper III) very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, *i.e.*, three from each unit /section out of which candidate will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

PAPER – I: Z-201
STRUCTURE AND FUNCTION OF INVERTEBRATE TYPES

NOTE:

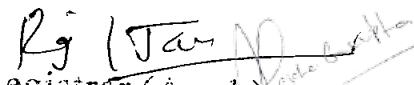
1. There will be two parts of this theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, *i.e.*, three from each unit /section, out of which candidate will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

Section – A

Habit, Habitat, Morphology, Structure, Organs and Systems (Locomotion, Digestive, Circulatory, Respiratory, Excretory, Nervous & Reproductive), Life Cycle, *Affinities and *Adaptations.

Note : * indicates whenever required.

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Arthropoda: Palaemon (Indian Fresh water Prawn), Scorpion, Periplaneta, Grasshopper, Apis.
Onychophora : Peripatus.

Section – B

Habit, Habitat, Morphology, Structure, Organs and Systems (Locomotion, Digestive, Circulatory, Respiratory, Excretory, Nervous & Reproductive), Life Cycle, *Affinities and *Adaptations.

Note : * indicates whenever required.

Mollusca: Pila, Unio, Sepia

Echinodermata: Asterias, Echinus, Cucumaria.

Hemichordata: Balanglossus and its phylogenetic significance

Section - C

Invertebrate Adaptations

1. Salient features of Hemichordata.
2. Evolution of canal system of sponges.
3. Parasitic adaptations in Helminthes.
4. Social organization in termites and honey bees.
5. Direct and indirect development in insects.
6. Water vascular system of starfish.
7. Crustacean larvae & mouth parts of insects.
8. Parasitism in Crustacea.

PAPER – II: Z-202

ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

NOTE:

1. There will be two parts of this theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, *i.e.*, three from each unit /section, out of which candidate will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

Section - A

Animal Physiology with special reference to mammals

1. Physiology of digestion: Various types of digestive enzymes and their digestive action in the alimentary canal.
2. Physiology of blood circulation: Composition and functions of blood; mechanism of blood clotting; heart beat; cardiac cycle; blood pressure; body temperature regulation.
3. Physiology of respiration: Mechanism of breathing; exchange of gases: transportation of oxygen and carbon dioxide in blood; regulation of respiration.

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4. Physiology of excretion: Kinds of nitrogenous excretory end products (ammonotelic, uricotelic and ureotelic); role of liver in the formation of these end products. Functional architecture of mammalian kidney tubule and formation of urine; hormonal regulation of water and electrolyte balance (Homeostasis).

Section-B

Regulatory aspects of Animal Physiology

1. Physiology of nerve impulse and reflex action: Functional architecture of a neuron, origin and propagation of nerve impulse, synaptic transmission, reflex arc.
2. Physiology of muscle contraction: Functional architecture of skeletal muscles; chemical and biophysical events during contraction and relaxation of muscle fibers.
3. Types of endocrine glands, their secretions and functions: Pituitary, adrenal, thyroid, pancreas, testis and ovary.
4. Physiology of Reproduction: Hormonal control of male and female reproduction, implantation, parturition and lactation in mammals.
5. Preliminary idea of neurosecretion, hypothalamic control of pituitary function.

Section-C

Biochemistry

1. Carbohydrates: Structure, function and significance; oxidation of glucose through glycolysis, Krebs's cycle and oxidative phosphorylation; interconversion of glycogen and glucose in liver; role of insulin and glucagon.
2. Proteins : Structure, function and significance, essential and non-essential amino acids, transformation of amino acids: deamination, transamination, decarboxylation. Synthesis of protein and urea, fate of ammonia (Ornithine cycle), fate of carbon skeleton.
3. Lipids: Structure, function and significance; Beta-oxidative pathway of fatty acids; brief account of biosynthesis of triglycerides. Cholesterol and its metabolism.

Paper – III: Z-203

Immunology, Microbiology & Biotechnology

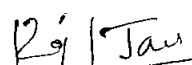
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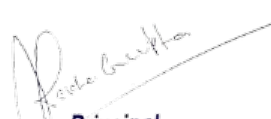
1. There will be two parts of this theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 10 very short answer (Maximum 25 words) type questions, each of 1 mark. This part is compulsory to attempt. Questions should be evenly distributed covering entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, *i.e.*, three from each unit /section, out of which candidate will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

Section - A

Immunology

1. Immunology: Definition, types of immunity: innate and acquired; humoral and cell mediated, Organs of immune system.
2. Antigen and antibody: Antigenicity of molecules, haptens, antibody types.


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3. Antigen-Antibody reactions: Precipitation reaction, agglutination reaction, neutralizing reaction, complement and lytic reactions and phagocytosis.
4. Immunity Regulating Cells: Macrophages, lymphocytes (B and T-Types) T-helper cells, T-Killer cells, plasma cells and memory cells.
5. Mechanism of humoral or antibody mediated immunity and cell mediated immunity.

Section - B

Microbiology

1. Brief introduction to the History of Microbiology: Work of Anatomy Van Leeuwenhoek, theory of spontaneous generation, germ theory of fermentation and disease: Works of Louis Pasteur, John Tyndall, Robert Koch and Edward Jenner.
2. The Prokaryota (Bacteria) : Structural organization:
 - (i) Size, shapes and patterns of arrangement.
 - (ii) Structural organization: Slime layer (capsule), cell envelopes: cytoplasmic membrane (inner membrane). Cell wall (outer membrane) of Gram- negative and Gram-positive bacteria; mesosomes; cytoplasmic organization; cell projections: flagella and cilia.
3. Genetic material of Bacteria: Chromosome, replication of bacterial DNA.
4. Reproduction in Bacteria: Asexual reproduction, binary fission, budding, endospore formation, exospores and cyst formation; sexual reproduction, conjugation.
5. Microbial Nutrition : Culture of bacteria
 - a. Carbon and energy source
 - b. Nitrogen and minerals
 - c. Organic growth factors
 - d. Environmental factors : Temperature and pH
6. Bacteria of Medical Importance:
 - (i) Gram-Positive
 - a. Cocci: *Staphylococci, Streptococci*
 - b. Bacilli: *Diphtheria, Tetanus.*
 - (ii) Gram-Negative
 - a. Cocci: *Gonorrhoea, Meningitis*
 - b. Bacilli: *Diarrhoea*
 - (iii) Mycobacteria: Tuberculosis, Leprosy

Section - C

Biotechnology

1. Definition, history, scope and application of biotechnology, major areas of biotechnology (microbial, plant and animal biotechnology).
2. Vectors for gene transfer.
3. Basic concepts of animal cell, tissue, organ and embryo culture.
4. Genetic engineering (outline idea only): Applications of genetic engineering, hazards and regulations.
5. Protoplast fusion in prokaryotes and eukaryotes.
6. Recombinant DNA technology; hybridomas and their applications, PCR. DNA finger printing, DNA foot printing. RFLP, RAPD & AFLP, Human genome project.
7. Monoclonal antibodies and their applications.
8. Brief account of cloning: its advantages and disadvantages.
9. Biotechnology in medicine (outline idea only), antibiotics, vaccines, enzymes, vitamins, artificial blood.

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10. Environmental Biotechnology (outline idea only): Metal and petroleum recovery, pest control, waste water treatment.
11. Food, drink and dairy biotechnology (outline idea only): Fermented food production; dairy products, wine, beer, vinegar and food preservation.

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Syllabus: B.Sc. Part – II (2022-2023)

Practical - Zoology

Min. Marks: 18
50

4 Hrs. / Week

Max. Marks:

I. Study of Museum Specimens:

Onychophora	:	<i>Peripatus</i>
Arthropoda	:	<i>Limulus</i> , Spider, Scorpion, Centipede, Millipede, <i>Lepas, Balanus, Squilla, Eupagurus</i> , Crab, <i>Mantis</i> , Honey-bee, (queen, king, worker) Locust, Silkworm Moth, Beetle, White grub.
Mollusca	:	<i>Chiton, Aplysia, Cypraea, Mytilus</i> , Pearl Oyster, <i>Dentalium, Loligo, Nautilus</i> .
Echinodermata	:	<i>Pentaceros, Echinus, Ophiothrix, Cucumaria, Antendon</i> .
Hemichordata	:	<i>Balanoglossus</i> .

II. Study of Microscopic Slides:

Arthropoda	:	V.S. of integument (cuticle): <i>Pediculus</i> , Bedbug, Termite and its castes, <i>Cyclops, Daphnia</i> , crustacean larvae (Nauplius, Metanauplius, Zoea, Mysis, Megalopa, Phyllosoma), statocyst of prawn.
Mollusca	:	V.S. of shell, T.S. gill of <i>Pila</i> , T.S of gill of Unio, Glochidium larva.
Echinodermata	:	Larval forms

III. Anatomy:

<i>Prawn/Squilla</i>	:	External features, appendages, alimentary canal and nervous system; Hastate Plate
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Pila : External features, pallial organs and nervous system; osphradium, radula.

IV. Study of the Following Through Permanent Slide Preparation:

- (i) Study of different cell types -Blood smear (Wrights or Leishman stain).
- (ii) Osphradium, gill lamella and radula of pila.
- (iii) Statocyst and Hastate plate of Prawn/Squilla

V. Microbiology Immunology and Biotechnology:

1. Preparation and use of culture media for microbes.
2. Study of microbes in food materials like curd, etc (Gram +ve & Gram-ve bacteria, Aspergillus, Mucor, Rhizopus, Penicillium, Alternaria and Fusarium).
3. Educational tour to any Microbiology laboratory/ Dairy/ Food processing factory/ Distillery. Collection of material may also be encouraged wherever possible. Candidates are required to submit a detailed report of the visit.
4. Antigen-antibody reactions-precipitation, agglutination.


VI. Animal Physiology:

1. Counting of red and white blood cells in the given blood sample.
2. Estimation of hemoglobin in the given blood sample.
3. Estimation of haematocrit value (PCV) in the given blood sample.
4. Demonstration of enzyme activity (catalase) in liver.
5. Study of salivary digestion of starch and the effect of heat and alcohol on salivary digestion of starch.
6. Study of histological structure of major endocrine glands of mammals.

VII. Biochemistry:

1. Detection of protein, carbohydrate and lipid in the animal tissue/food samples.
2. Identification of different kinds of mono-, di- and poly-saccharides in the given food samples.
3. Circular Paper chromatography of dyes/amino acids.

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B.Sc. Part - II

Scheme of Practical Examination Distribution of Marks

Time: 4 Hrs.
50

Min. Pass Marks. : 18

Max. Marks:

	Regular	Ex. /N.C. Students
1. Anatomy (any system)	6	5
2. Permanent Preparation	4	6
3. Exercise in Microbiology/immunology/Biotechnology	4	6
4. Exercise in Animal Physiology	5	6
5. Exercise in Biochemistry	5	6
6. Identification and comments on Spots (1 to 8)	16	16
7. Viva Voce	5	5
8. Class Record	5	-
	50	50

Notes:

1. Anatomy: Study of systems of the prescribed types with the help of dissection.
2. With reference to microscopic slides, in case of non-availability, the exercise should be **substituted with diagrams/ photographs.**
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
5. **It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.**

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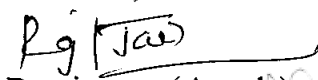
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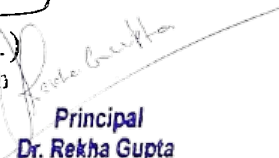
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Recommended Books:

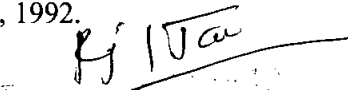
1. Barnes R. D: Invertebrate Zoology, W. B. Saunders, 1969.
2. Barrington EJW: Invertebrate Structure and Function. 2nd edition John Wiley & Sons, Inc., 1978.
3. Barrington EJW: The Biology of Hemichordata and Protochordata. Oliver & Boyd, London 1965.
4. Barrett KE, Barman SM, Boctano, S and Brooks HL. Ganongs: Review of Medical Physiology. 24th edition McGraw Hill Education India Pvt. Ltd., 2012.
5. Berril NJ: The Tunicates. The Roy Society, London.
6. Brusca RG and Brusca GJ: Invertebrates. 2nd edition Sinauer/Panima Books, 2003.
7. Cooper GM and Hausman RE: The Cell: A Molecular Approach. 6th edition ASM Press Washington, DC/ Sinauer/Panima Books, 2013.
8. Conn EE, Stumpf PK, Bruening G, Doi, RH: Outline of Biochemistry. 5th edition. John Wiley & Sons, 1987.
9. De Robertis EDP and De Robertis Jr EMF: Cell and Molecular Biology. 8th edition Lippincot Williams & Wilkins, 2006.
10. David R, Burggren Wand French K: Eckert Animal Physiology. 5th edition W H Freeman & Company, New York, 2001.
11. Eckert R, Randall D. J. Burggen W, French K: Eckert Animal Physiology and Burggren WW & Co. Ltd., 1997.
12. Fox SI: Human Physiology. 8th edition McGraw Hill Education 2003.
13. Gardner EL, Simmons MJ and Snustad DP: Principles of Genetics 8th edition John Wiley & Sons, Inc., 2006.
14. Giese A. C: Cell Physiology. 4th Edition, Saunders, 1973.
15. Glick BR., Paeternak JJ: Molecular Biotechnology, 4th edition ASM Press, 2010.
16. Goldsby RA, Kindt TJ and Osborne BA: Kuby Immunology. WH Freeman and Co., New York, 2002.
17. Grant: Biology of Developmental System
18. Gupta PK. Genetics: Classical to Modern. Rastogi Publications, 2007.
19. Hall JE: Guyton and Hall Textbook of Medical Physiology. 12th edition Saunders Publications, 2010.
20. Hill RW, Wyse GA, Anderson M: Animal Physiology. 3rd edition Sinauer Associates Inc. USA, 2012.
21. Hyman LH: The Invertebrates, Vol. 6, McGraw Hill.
22. Jordan EL and Verma PS: Invertebrate Zoology. S. Chand & Company Ltd., 2012.
23. Karp G: Cell & Molecular Biology: Concepts and Experiments. 7th edition John Wiley & Sons, Inc., 2013.
24. Kotpal RL: Modern Text Book of Zoology: Invertebrates. Rastogi Publications, 2012.
25. Lal SS: Practical Zoology Invertebrate. 11th revised edition Rastogi Publications, 2014.
26. Lehninger AL: Biochemistry. 2nd edition Kalyani Publishers, 1991.
27. Lal SS: Practical Zoology Invertebrate. 11th revised edition, Rastogi Publications, 2014.
28. Lehninger AL: Biochemistry. Kalyani Publisher, 2008.
29. Lodish H, Berk A, Kaiser CA, Krieger M, Bertscher A, Ploegh H, Amon A, Scott M P. Molecular Cell Biology. 7th edition. Mac Millian High Education (International edition) England, 2013.
30. Meyers R. A: Molecular Biology and Biotechnology (A comprehensive Desk References John Wiley & Sons, 1995.
31. Murphy K: Janeway's Immunology. Garland Science; 8th edition, 2011.

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32. Nelson DL and Cox MM: .Lehninger Principles of Biochemistry. 5th edition W. H. Freeman, 2008.
33. Nelson DL and Cox MM: Lehninger Principles of Biochemistry. 6th edition W. H. Freeman, 2013.
34. Owen J, Punt J, Stranford S: Kuby Immunology. 7th edition WH Freeman & Co. Ltd., 2013.
35. Old RW and Primrose SB: Principles of Gene Manipulation: An Introduction to Genetic Engineering. University of California, 1980.
36. Sastry KV: Animal Physiology and Biochemistry. 2nd edition Rastogi Publications, 2014-15.
37. Vander AJ, Sheerman J, Liciano D: Human Physiology: The Mechanics of Body Function. McGraw Hill Co., New York, 1998.
38. Verma PS and Jordan EL: Invertebrate Zoology. S Chand &Co. Ltd, New Delhi, 2001.
39. Verma PS, Tyagi BS, Agarwal VK: Animal Physiology. 6th edition S. Chand& Co., 2004.
40. Voet D and Voet JG: Biochemistry. 4th edition, John Wiley & Sons, Inc., 2011.
41. Voet D and Voet JG: Biochemistry. John Wiley & Sons, New York, 1990.
42. Verma PS: A Manual of Practical Zoology: Invertebrates. S.Chand &Co. Ltd.New Delhi, 1971.
43. Voet D and Voet JG: Biochemistry. 4th edition, John Wiley & SonsInc., 2011.
44. Wake MH: Hyman's Comparative Vertebrate Anatomy. 3rdedition University of Chicago Press Ltd., London, 1992.


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BOTANY
B.Sc. Part II (Pass Course Syllabus)

Scheme

Min. Pass Marks: 36

Paper I

3 hrs. duration

Max Marks: 100

Paper II

3 hrs. duration

Max. Marks 33

Paper III

3 hrs. duration

Max. Marks 33

Max. Marks 34

Practical Min.Marks: 18

4 hrs, duration

Max. Marks 50

Duration of examination of each theory paper-

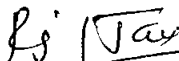
3 hours

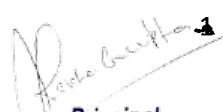
Duration of examination of practicals-

4 hours

Note:

1. There will be 5 questions in each paper. All questions are compulsory. Candidate has to answer all questions in the main answer book only.
2. Q.No. 1 will have 18 very short answer type Questions(not more than 20 words) of half marks each covering entire syllabus.
3. Each paper is divided into four units. There will be one question from each unit. These Q.No. 2 to 5 will have internal choice.


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PAPER-I
Molecular Biology and Biotechnology
(2 hrs /week)

Unit-1

Genetic Material: Biological, chemical and physical nature of heredity material, Structure of DNA and RNAs (mRNA, tRNA and rRNA). Watson and Crick model of DNA, Nucleosome model.

DNA replication: Meselson – Stahl experiment of semiconservative replication of DNA; RNA Primers, Okazaki-fragments, polymerases; DNA-Protein interactions.

Preliminary account of DNA damage and repair.

Unit-2

Central dogma of life, **Transcription** in eukaryotes: role of promoter, gene, pre mRNA synthesis, pre mRNA processing: capping, splicing and polyadenylation.

Translation : genetic code (codon), Initiation, elongation and termination.

Regulation of gene expression in prokaryotes and eukaryotes: Negative and positive control, attenuation and antitermination, Reverse transcriptase and its application.

Unit-3

Biotechnology: Functional definition. Basic aspects of Plant tissue culture, basal medium, media preparation and aseptic culture technique. Concept of cellular totipotency; Callusing; Differentiation and morphogenesis; Micropropagation; Tissue culture and its applications. Basic concept of Protoplast culture, Anther culture, Embryo culture and their applications.

Unit-4

Recombinant DNA technology : Tools and techniques used in rDNA technology - Restriction enzymes. Vectors for gene transfer: Bacteriophage, plasmids, cosmids and Artificial chromosome, cDNA technology, gene amplification, Polymerase chain reaction, Application of PCR technique, DNA fingerprinting and its uses. Application of Biotechnology and Transgenic plants.

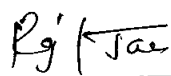
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Practical Exercises:

1. *Elementary knowledge of principles and uses of various instruments in molecular biology and biotechnology -Laminar air flow, Centrifuge, Autoclave, Incubator, Spectrophotometer, pH meter, Gel electrophoresis unit.*
2. *Media preparation*
3. *Aseptic culture technique*
4. *Explant culture-shoot tip, nodal segment*
5. *DNA isolation from plant parts.*
6. *Gel electrophoresis technique.*

Suggested Books :

1. *Gupta P.K. (2012). Cell and Molecular Biology. Rastogi Publications, Meerut.*
2. *Gamborg O.L. and Philips G.C. (1995). Plant Cell, Tissue and Organ culture.*
3. *Dnyansagar, V.R. (1986). Cytology and Genetics, Tata McGraw-Hill Pub. Co. Ltd. New Delhi.*
4. *Verma, P.S. and Agarwal, V.K. (2012). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Co. Ltd. New Delhi.*
5. *Alberts, B., Bray, D.J., Raff, M., Roberts, K. and Wasson, L.D. (2001). Molecular Biology of Cell, Garland Publishing Co., Inc., New York.*
6. *Micklos, D.A., Freyer, G.A. and Crotty, D.A. (2003). DNA Science a first course (Second Ed.). Cold Spring Harbor Laboratory Press, NY., USA.*
7. *Razdan, M.K. (1993). An Introduction to Plant Tissue Culture. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.*
8. *Mascarenhas, A.F. (1988). Handbook of Plant tissue culture. Publication & Information Div., ICAR, New Delhi.*
9. *Purohit, S.S. and Mathur, S.K. (1996). Biotechnology fundamentals and applications. Agro Botanical Publishers, Bikaner.*
10. *Rana, S.V.S. (2012). Biotechniques theory & practice (Third Ed.). Rastogi Publications, Meerut.*


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Paper-II
PLANT PHYSIOLOGY AND BIOCHEMISTRY
(2 hrs /week)

Unit-1

Water: Structure, physico-chemical properties, importance to plant life, concept of water potential. Absorption and Transport of water; Ascent of sap, Transpiration, Guttation, stomatal movement, factors affecting transpiration. Guttation.

Mineral Nutrition: Essential micro and macro nutrients; their uptake, hydroponics-and nutrient requirement deficiency and toxicity symptoms.

Transport of organic substances: Mechanisms of phloem transport, factors regulating the translocations of nutrients.

Unit-2

Photosynthesis: Pigments, Photosynthetic apparatus, light reaction, photo system I & II, Z scheme, photophosphorylation, C₃(Calvin cycle), C₄ cycle, and factors affecting the photosynthesis.

Respiration: - Aerobic and anaerobic respiration; RQ (Respiratory Quotient),Kreb's cycle, electron transport system, oxidative phosphorylation, and factors affecting the process. Fermentation.

Unit-3

Carbohydrates: Introduction, importance, nomenclature, classification, molecular structure & function of mono, di and polysaccharides, their properties, glycosidic linkages and glycoprotein.

Proteins: Amino acids-structure, electrochemical properties, peptide bonds, chemical bonds and nomenclature, structure and classification of proteins, physical and chemical properties.

Enzymes: Structure, nomenclature & classification of enzyme. Characteristics of enzymes, mechanism of action, multi-enzyme system, regulation of enzyme activity.

Lipids: Importance of fatty acids (saturated and unsaturated). Alpha and Beta oxidation.

Brief introduction and application of secondary metabolites.

Unit-4

Phases of growth and development: Seed dormancy and germination, plant movement, Biological clock-their regulatory factors.

Photoperiodism & vernalisation; physiology and mechanism of action, concept of florigen and phytochrome.

Plant hormones: auxins, gibberellins, cytokinins, ethylene and ABA; discovery & physiological effects.

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Suggested Readings:

1. Verma, S.K.: Textbook of plant physiology. S. Chand & Company, 1999.
2. Parashar, A. N. and Bhatia, K. N.: Plant physiology. Trueman Book Company, 1985.
3. Jain, V. K.: Fundamentals of plant physiology. S. Chand & Company Ltd., 2013.
4. Verma, S. K. and Verma, M.: A textbook of plant physiology, biochemistry and biotechnology. S. Chand Ltd., 2000.
5. Verma, V.: Textbook of plant physiology. ANE Books India, 2007.
6. Malik, C. P. and Srivastava, A. K.: Textbook of plant physiology. Kalyani publication, 1982.

Practical Exercises:

1. To determine the osmotic potential of vacuolar sap by plasmolytic method.
2. To study the permeability of plasma membrane using different concentrations of organic solvents.
3. To study the effect of temperature of permeability of plasma membrane.
4. To separate chloroplast pigments by solvent method.
5. To separate chloroplast pigments using paper chromatography.
6. To separate amino acids in a mixture by paper chromatography.
7. To prepare the standard curve of protein.
8. To demonstrate the tests for proteins in the unknown samples.
9. To demonstrate the enzyme activity - Catalase, peroxidase and amylase.
10. To demonstrate the tests for different types of carbohydrates and lipids.
11. Bioassay of growth hormone (auxin, cytokinin, gibberellin)
12. Demonstration of phenomenon of osmosis by use of potato osmometer
13. To demonstrate root pressure
14. To demonstrate rate of transpiration by use of potometers.
15. Photosynthesis by inverted funnel method, Moll's experiment
16. To demonstrate anaerobic and aerobic respiration
17. R.Q. by Ganong's respirometer
18. Measurement of growth using auxanometer.

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or

Paper III
Pteridophytes, Gymnosperms & Palaeobotany
(2 hrs./week)

Unit-1

General characters of Pteridophytes, Classification (G.M. Smith). Distribution and alternation of generation. Stellar system in Pteridophytes. Eusporangiate and leptosporangiate development of Sporangia, Apogamy, and Apospory. Economic importance of Pteridophytes.

Unit-2

Morphology, anatomy and reproduction of *Psilotum*, *Selaginella*, *Equisetum* and *Marsilea*.

Characteristics of Gymnosperms, distribution and classification (K.R. Sporne).

Unit-3

Morphology, anatomy, reproduction and life cycle of *Cycas*, *Pinus* and *Ephedra*. Economic importance of Gymnosperms.

Unit-4

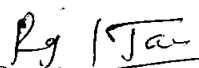
Process of fossilization, types of fossils, techniques of study of fossils. Geological time scale. Primitive land plant: *Rhynia*, Fossil Pteridophytes: reconstructed plants-Lepidodendron and Calamites. Fossil Gymnosperm- *Williamsonia*.

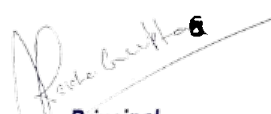
Suggested Laboratory Exercises:

1. Study of external morphology, anatomy of vegetative and reproductive parts of *Psilotum*, *Selaginella*, *Equisetum* and *Marsilea*.
2. Study of external morphology, anatomy of vegetative and reproductive parts of *Cycas*, *Pinus* and *Ephedra*.
3. Study of fossils and slides of fossils.
4. Preparation of charts of Geological time scale


Suggested Readings


Bold, H.C., Alexopolous, C.J. and Delevoryas, T. 1987 Morphology of Plant and Fungi (5th).
Harper and Foul Co., New York.


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- Gifford, E.M. and Foster, A.S. 1988. Morphology and Evolution of Vascular Plants. W.H. Freeman and Company, New York.
- Sharma, O.P. Pteridophytes. 2000. Today and Tomorrow Publications.
- Sarabhai, R.C. and Saxena, R.C. 1990. A text book of Botany. Rastogi Publications, Meerut.
- Sporne, K.R. 2002. The Morphology of Gymnosperms. B.I. Pub. Pvt. Ltd., Mumbai, Kolkata, Delhi.
- Vashishta, P.C. 2002. Pteridophytes. S. Chand & Co. New Delhi.
- Wilson, N.S. and Rothewall, G.W. 1993. Palaeobotany and Evolution of Plants. (2nd Ed.). Cambridge University Press, U.K.
- Singh, V. Pandey, P.C. & Jain, D.K. 2013. A Text book of Botany (IV Ed). Rastogi Publications, Meerut.


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BOTANY PRACTICAL EXAMINATION B.Sc PART-II**SKELETON PAPER****M.M. 50****TIME: 4 Hours**

S.No.	Practical	Regular	ExNC
1(a)	Comment on the Tissue culture or Biotechnology technique	5	5
1(b)	Exercise based on molecular biology	5	5
2	Perform the given physiological experiment and write the principle, procedure, results based on observations and precautions involved.	7	7
3	Perform the bio-chemical test of the given sample and discuss the observation giving reasons.	3	3
4	Make a suitable preparation of material "A" (Pteridophyte)(vegetative/reproductive part). Draw a labelled sketch. Identify giving reasons.	5	5
5	Make a suitable preparation of material "B"(Gymnosperm)(vegetative/reproductive part).Draw a labelled sketch.Identify giving reasons.	5	5
6	Comment upon spots (1-5)	10	15
7	Viva-Voce	5	5
8	Practical record	5	-
	TOTAL	50	50

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5. GEOLOGY

Scheme
Min. Pass Marks : 36
Paper-I
Paper-II
Practical one

3 hs. duration
3 hs. duration
3 hrs. duration

Max. Marks : 100
Max. Marks : 50
Max. Marks : 50
Max. Marks : 50
Min. Pass Parks : 18

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Note : The paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all taking atleast one question from each section.

Paper-I : Palaeontology and Structural Geology

Section-A

Definition, Scope, sub-division, and relationship of palaeontology with other branches.

Fossils-condition necessary for preservation, modes of preservation, uses. Elementary ideas about origin of life, evolution and fossil records.

Skeletal morphology and geological distribution of following groups

Foramanifers, Brachiopods, Mollusca (Lamelibranches, Gastropods and Cephalopods-Nautiloids, Ammonoids, Dibranchia), Trilobites, Echinoids, Graptoloids and Corals.

Section-B

Gondwana Flora-morphological characters of the flora : Vertebraria, Glossopteris, Gangamopteris, Ptilophyllum.

Unconformity-its kinds, recognition in the field and geological significance. Overlap and Offlap.

Inliers and Outliers. Basic Concept of cleavages. Lineation, Joints, Salt Domes.

Section-C

Attitude of planes (Bedding Planes) and lines. Dip (true and apparent, Strike, Pitch and Plunge. Uses of Clinometer/Bed : apparent and vertical thickness. Criteria to determine top and bottom sequence, Morphology of folds and faults, their geometric and genetic classification and recognition in the field. Elementary ideas of the mechanics of folding and faulting.

Practical

Palaeontology : Identification, description and drawing of different views of the following fossils :

Nummulites, Calymene, Paradoxide, Trinucleus, Phacops, Olenus, Olenellus, Terebratulala, Productis, Spirifer, Rhynchonella, Atrypa, athyris, Lingula, Strophomena, Arca, Pecten, trigonia, Cardium, Hippurite, Venus, Lima, Inoceramus, Lophos, Gryphaea, Exogyra, Spondylus, Trochus, Conus, Natica, Turritella, Physa, Murex, Cypraea, Bellerophon, Nautilus, Gantatites, Ceratites.

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Syllabus : B.Sc. Part-II

Perisphinctes, Belemnite, Cidaris, Hemiaster, Glossopteris, Gangamopteris, Vertebraria, Ptillophyllum.

Structural Geology : Study of physiographic features in topographical maps and use of clinometer compass, drawing profiles and geological section along given direction.

Simple dip and strike problems connected with true and apparent dips, true and vertical thickness and width of the outcrop by calculation and geometrical methods.

Completion of outcrops : Determination of thickness of beds, identification of structural features in hand specimen, drawing of profiles and section showing the following features: Simple beds, folds, faults, unconformities, overlaps, offlaps and intrusion.

Books recommended.

- ❖ Woods, H. : Palaeontology invertebrate.
- ❖ Lehmann, U., Hillmer, G. 1983; Fossil Invertebrates, Cambridge University Press.
- ❖ Nield, E.W. and Tucer V.C.T., 1985; Palaeontology-An Introduction, Pergamon Press.

Paper-II : Petrology

Note : The paper will contain nine questions in each section. Candidates are required to attempt five questions in all selecting at least one question from each section.

Section-A

Nature and composition of magmas, plutonic, hypabyssal and volcanic rocks, intrusive and extrusive forms, structure and texture. Elements of classification of igneous rocks.

Crystallization of basaltic magma, Bowen's Reaction Principle, differentiation and assimilation.

Crystallisation of unicomponent and bicomponent silicate melts. Diopside-Albite-Anorthite basalt system and variation of igneous rocks. Study of common igneous rocks-Granite, rhyolite, gabbro, basalt, Pegmatite, dolerite, syenite, diorite and peridotite.

Section-B

Process of formation of sedimentary rocks-Weathering, decomposition, disintegration, transportation and deposition. Concept of lithification and diagenesis.

Sedimentary rocks-Structure, texture, residual, mechanically transported, chemical and organic deposits. Elementary idea of sedimentary environments and provenance.

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Study of common sedimentary rocks-sandstone, limestone, shale, conglomerate and greywacke.

Section-C

Metamorphism agents and types, Concept of grade and facies of metamorphism, Texture, structure and classification of metamorphic rocks.

Types of metamorphism and their products, Cataclastic, thermal and regional metamorphism. Dynamothermal metamorphism of argillaceous and calcareous rocks.

Retrograde metamorphism and metasomatism; anatexis. Study of important metamorphic rocks, slate, schist, gneiss, granulite, marble.

Practical

Petrology - Neat drawing of different forms assumed by intrusive igneous rocks. Study and recording of the typical textures of plutonic, hypabyssal and volcanic rocks.

Megascopic study of the following igneous rocks: Granite, pegmatite, aplite, syenite, nepheline-syenite, diorite, gabbro, norite, dunite, peridotite, basalts, obsidian, lamprophyre, phonolite and trachyte.

Microscopic study of the following rocks; Granite, syenite, diorite, gabbro, dunite, pyroxenite, dolerite, rhyolite and basalt.

Sedimentary and Metamorphic rocks - Study of typical textures of sedimentary and metamorphic rocks. Systematic megascopic and microscopic study of the following rocks types: Conglomerate, breccia, sandstone, arkose, greywacke, shale, limestone, slate, phyllite, schist, gneiss, marble, quartzite, migmatite and charnockite.

Book Recommended

1. Tyrrel., G.W. : The principles of Petrology, Methuen & Co. London.
2. Harker, A. : Petrology, McGraw Hill Book Co. Inc. New York.
3. William, Turner & Gilbert, Petrography CBS Publisher, Delhi.
4. Jackson, J. Text Book of Lithology.
5. Hatch & Wales, Petrology.
6. Smith, H.O. : Minerals & Microscope.
7. Kerr : Optical Mineralogy, CBS Publisher, Delhi.

6. MATHEMATICS

B.Sc. Part-II 2020

Teaching : 3 Hours per Week per Theory Paper.

2 Hours per Week per Batch for Practical

Examination Scheme:

Min.Pass Marks			Max. Marks
	Science – 54		150
	Arts – 72		200
		Duration	Max. Marks
Paper – I	Real Analysis	3 hrs.	40 (Science) 53 (Arts)
Paper – II	Differential Equations	3 hrs.	40 (Science) 53 (Arts)
Paper – III	Numerical Analysis	3 hrs.	40 (Science) 54 (Arts)
Practical		2 hrs.	30 (Science) 40 (Arts)

Note:

1. Common paper will be set for both the Faculties of Social Science and Science. However, the marks obtained by the candidate in the case of Faculty of Social Science will be converted according to the ratio of the maximum marks of the papers in the two Faculties.
2. Each candidate is required to appear in the Practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the Principal in consultation with Local Head/Head, Department of Mathematics in the college.
3. An Internal/external examiner can conduct Practical Examination of not more than **100 (Hundred)** Candidates.
4. Each candidate has to pass in Theory and Practical examinations separately.

Paper – I: Real Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

**Max. Marks: 40 (Science)
53 (Arts)**

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Real numbers as complete ordered field, Limit point, Bolzano-Weierstrass theorem, closed and Open sets. Concept of compactness and connectedness. Heine-Borel theorem. Holder inequality & Minkowski inequality, Metric space – Definition and examples, Open and Closed sets, Interior and Closure of a set, Limit point of a set in metric space.

Unit 2: Real sequences- Limit and Convergence of a sequence, Monotonic sequences. Cauchy's sequences, Subsequences, Cauchy's general principle of convergence. Properties of continuous functions on closed intervals.

Unit 3: Properties of derivable functions, Darboux's and Rolle's theorem. Notion of limit, continuity and differentiability for functions of several variables. The directional derivative, the total derivative, expression of total derivative in terms of partial derivatives.

Unit 4: Riemann integration – Lower and Upper Riemann integrals, Riemann integrability, Mean value theorem of integral calculus, Fundamental theorem of integral calculus. Functions of bounded variations. Introduction, properties of functions of bounded variations, total variation.

Unit 5: Sequence and series of functions – Pointwise and Uniform convergence, Cauchy's criterion, Weierstrass M-test, Abel's test, Dirichlet's test for uniform convergence of series of functions, Uniform convergence and Continuity of series of functions, Term by term differentiation and integration.

Reference Books :

1. K.A. Ross, Elementary Analysis: The Theory of Calculus, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.
2. R.G. Bartle D.R. Sherbert, Introduction to Real Analysis (3rd edition), John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.
3. Charles G. Denlinger, Elements of Real Analysis, Jones and Bartlett (Student Edition), 2011.
4. S. Kumaresan, Topology of Metric Spaces, Narosa Publishing House, Second Edition 2011.
5. G. F. Simmons, Introduction to Topology and Modern Analysis, Mcgraw-Hill, Edition 2004.

Paper – II: Differential Equations

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

**Max. Marks: 40 (Science)
 53 (Arts)**

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Degree and order of a differential equation. Equations of first order and first degree. Equations in which the variables are separable. Homogeneous equations and equations reducible to homogeneous form. Linear equations and equations reducible to linear form. Exact differential equations and equations which can be made exact.

Unit 2: First order but higher degree differential equations solvable for x, y and p . Clairaut's form and singular solutions with Extraneous Loci. Linear differential equations with constant coefficients, Complimentary function and Particular integral.

Unit 3: Homogeneous linear differential equations, Simultaneous differential equations. Exact linear differential equations of n th order. Existence and uniqueness theorem.

Unit 4 : Linear differential equations of second order. Linear independence of solutions. Solution by transformation of the equation by changing the dependent variable/the independent variable, Factorization of operators, Method of variation of parameters, Method of undetermined coefficients.

Unit 5: Partial differential equations of the first order. Lagrange's linear equation. Charpit's general method of solution. Homogeneous and non-homogeneous linear partial differential equations with constant coefficients. Equations reducible to equations with constant coefficients.

Reference Books :

1. R.S. Senger, Ordinary Differential Equations with Integration, Prayal Publ. 2000.
2. D.A. Murray, Introductory Course in Differential Equations, Orient Longman (India), 1967.
3. E.A. Codington, An Introduction to Ordinary Differential Equations, Prentice Hall of India, 1961.

Paper – III: Numerical Analysis and Vector Calculus

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

**Max. Marks: 40 (Science)
54 (Arts)**

Note: (i) This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

(ii) Non-Programmable Scientific Calculators are allowed.

Unit 1: Differences. Relation between differences and derivatives. Differences of a polynomial. Newton's formulae for forward and backward interpolation. Divided differences. Newton's divided difference, Lagrange's interpolation formula.

Unit 2: Central differences. Gauss's, Stirling's and Bessel's interpolation formulae. Numerical Differentiation. Derivatives from interpolation formulae. Numerical integration, Derivations of general quadrature formulas, Trapezoidal rule. Simpson's one-third, Simpson's three-eighth and Gauss's quadrature formulae.

Unit 3: Relation between the roots and coefficients of general polynomial equation in one variable, transformation of equations, Descartes's rule of signs, solution of cubic equations by Cardon's method, biquadratic equations by Ferrari's method.

Numerical solution of Algebraic and Transcendental equations, Bisection method, Secant method, Regula-Falsi method, Iteration method, Newton- Raphson Method (derivation of formulae and rate of convergence only).

Unit 4: Gauss elimination and Iterative methods (Jacobi and Gauss Seidal) for solving system of linear algebraic equations. Partial Pivoting method, ill conditioned systems, Numerical solutions of ordinary differential equations of first order with initial condition using Picard's, Euler and modified Euler's method.

Unit 5: Scalar and Vector point functions. Differentiation and integration of vector point functions. Directional derivative. Differential operators. Gradient, Divergence and Curl. Theorems of Gauss, Green, Stokes (without proof) and problems based on these theorems.

Reference Books :

1. B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, India, 2007.
2. C. F. Gerald and P. O. Wheatley, Applied Numerical Analysis, Pearson Education, India, 7th edition, 2008.
3. C.F. Gerald, P.O. Wheatley, Applied Numerical Analysis, Addison-Wesley, 1998.

Practical

Teaching: 2 hours per week per batch not more than 20 students.

Examination Scheme:

Duration: 2 Hours

	Science	Arts
Max.Marks	30	40
Min.Pass Marks	11	15
Distribution of Marks:		
Two Practicals one from each group		
10 Marks each	=	20 Marks (13 Marks each) 26
Practical Record	=	05 Marks 07
Viva-voce	=	05 Marks 07
Total Marks	=	30 Marks 40

The paper will contain TWO practical. The candidates are required to attempt both practical.

Practicals with Computer Programming in C Language.

Programming languages and problem solving on computers, Algorithm, Flow chart, Programming in C- Constants, Variables, Arithmetic and logical expressions, Input-Output, Conditional statements, Implementing loops in Programs, Defining and manipulation arrays and functions.

Group A:

1. Printing n terms of Fibonacci sequence.
2. Finding $n!$, $\sum n$, $\sum n^2$ etc.
3. Defining a function and finding sum of n terms of a series/sequence whose general term is given (e.g. $a_n = \frac{n^2+3}{n+1}$).
4. Printing Pascal's triangle.
5. Finding gcd and lcm of two numbers by Euclid's algorithm.
6. Checking prime/composite number.
7. Finding number of primes less than n, $n \in \mathbb{Z}$.
8. Finding mean, standard deviation and ${}^n P_r$, ${}^n C_r$ for different n and r.

Group B:

1. Numerical integration using Trapezoidal, Simpson's 1/3, 3/8 and Waddle rules.

Note:

1. Each Candidate (Regular/non-Collegiate) has to prepare his/her practical record.
2. Each Candidate has to pass in Practical and Theory examinations separately.

7. Economics

B.Sc. Part-II 2020

Scheme:	Min. Pass Marks	Max. Marks
Arts	72	200
Science	54	150

Each paper shall be of three hour duration and of 100 marks for Arts students and of 75 marks for Science students.

Paper – I	Introductory Macro Economics
Paper – II	(a) Elements of Statistics and Mathematics (b) History of Economic Thought

Note: There will be two papers of Economics. Each paper shall consist of three parts. Part A shall contain question No I consisting of very short type X (Ten) questions. The candidate is required to answer each question in 20 words. Part B shall contain question No 2 consisting of V (five) question. The candidate is required to answer each question in 100 words. Part C shall contain three essay type questions (one from each section) with internal choice.

A candidate will be required to attempt five questions in all. All questions of Part A and Part B are compulsory while rest 3 questions are to be attempted from parts C selecting one question from each section. All questions carry equal marks. Each question will carry 20 marks for Arts students and 15 marks for Science students.

Paper-I

Introductory Macro Economics

Section- A

Macroeconomics, Meaning, Subject matter and Importance. Basic tenets of Classical, Keynesian, New-Classical and New –Keynesian economics, Macrocosmic variables, Circular flow of Income, National Income: Basic concepts, Measurement, Sectoral Accounts, Nominal and Real Aggregates.

Money function. Demand and Supply Quantity Theory of Money Transaction Approach. Cash Balance Approach. Keynes reformulation of the Quantity Theory of Money inflation Meaning and Impact. Theories of Inflation- Demand Pull (Keynesian and modern), Demand Push. Structural Theories of Inflation.

Section-B

Income and Employment Determination : Classical Modal and Keynesian Model, Consumption Function: Psychological Law of Consumption, Determinants of Consumption, Paradox of, Thrift, Investment Function: Determinants of investment, Marginal Efficiency of Capital and Marginal Efficiency of Investment, Concept of Multiplier and Accelerator.

Section-C

Central Bank: Organizational set-up and functions of Central Bank (with special reference to RBI). Commercial Bank: Functions, Modern trends of Commercial Banking. Quantitative and Qualitative Credit control by RBI. Money Supply: Meaning & Definition, four measures (M_1 M_2 M_3 and M_4) Monetary Policy: Objectives, Targets and Indicators, Transmission Mechanism.

Recommended Books :

1. G.S. Gupta Macro Economics, Theory and Application, 4th Ed, McGraw Hill, New Delhi.
2. Dornbusch, Fisher and Startz: Macroeconomics, XI Edition, Indian Reprint, Tata McGraw-Hill, Publishing Company Ltd. New Delhi.
3. N. Gregory Mankiw, Macroeconomics, Worth Publishers (Latest Edition).
4. H.L. Ahuja. (Hindi and English edition) Macro Economics, Theory and Policy; S. Chand & Co. Ltd, New Delhi.
5. Suraj B. Gupta: Monetary Economics, S. Chand and Co. Ltd.
6. L.N. Nathuranmka, Prarambhik Samashti Arthshastra, Ramesh Book Publishing House, Jaipur
7. Rana and Verma: Macroeconomic Analysis, Vishal Publications,
8. Richard T. Froyen, Macroeconomics, Theories and policies, (X Edition), Adapted by Pearson Education.

Paper –II (a): Elements of statistics and Mathematics**Duration: 3 hrs****Max Marks: 100****Section- A**

Surds, Indices, Quadratic Equation, Logarithms, Permutation and Combination, Binomial Theorem, Arithmetic progression, Geometric Progression and Harmonic Progression, Analytical Geometry: Straight Line, Parabola and Hyperbola, Matrices and Determinants, solution of Simultaneous equations by Cramer's rule and Matrix Inverse. Simple differentiation, Partial differentiation (involving two independent variables). Maxima, minima point of inflexion. Simple Integration involving one independent variable, Application in Economics (Elasticity, Average, Marginal Concepts)


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Section – B

Statistics-definition, nature and importance, Uses and relevance of statistical methods, Census and Sample survey, Methods of data collection and tabulation, Diagrammatic and Graphical representation of data; Measures of Central Tendency: Arithmetic Mean, Mode, Median, Geometric Mean, Harmonic Mean. Concept and Measures of Dispersion and Skewness.

Section – C

Simple Correlation: Karl Pearson's and Rank Correlation, Regression analysis, Fitting of Linear Regression lines using Least Square Method, Analysis of Time Series, Determination of trend by straight line trend equation, Index numbers, Interpolation (Binomial Expansion and Newton's method), Association of Attributes.

(Note: Use of non-programmable calculator is permitted)

Books Recommended :

- 1 B.C. Mahta and G.M.K Madanani Elementary Mathematics for use in Economics
Laxmi Narain Agarwal, Agra
- 2 S.C. Gupta. Statistical Methods. Sultan Chand and Sons. New Delhi
- 3 Murray R. Spiegel Theory and Problems of Statistics McGraw Hill Book London
- 4 S.C. Gupta and V.K. Kapoor Fundamentals of Applied Statistics. S Chand and New Delhi
- 5 Salvatore. D Mathematics and Statistics. Schaum's Series. Tata McGraw Hill
- 6 G.S. Monga Mathematics and Statistics for Economics, Vikas Publishing House. New Delhi
- 7 बी सी मेहता एंव जी एम के मदनानी अर्थशास्त्र में प्रारम्भिक गणित लक्ष्मीनारायण अग्रवाल आगरा।
- 8 कैलाशनाथनागर सांख्यिकी के मूलतत्त्व मीनाक्षीप्रकाशन मेंरठ।

Paper- II (b) History of Economic Thought

Section –A

Mercantilism Views on Trade Money, Prices. Wages and Employment Physiocracy: Natural Order. Primacy of Agriculture. Net Product and Circulation of Wealth. Theory of taxation and role of government. Classical School : Adam Smith. Views on Division of Labour. Theory of Value, Capital accumulation Distribution, International trade, Economic Development Critiques of Adam Smith T.R. Malthus .Theory of Population .Theory of gluts. David Ricardo. Theory of Value and Distribution. Foreign Trade, Economic Development and Theory of Rent


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Section-B

Critiques of the Classical School – Sismondi. Robert Owen, Friedrich List.

J.S. Mill theory of value. Views on Production and Distribution Karl Marx: Efforts at Scientific Socialism Theory of Money Labor Theory of Value, Theory of Capital Accumulation and crisis Distribution. German Historical School and the Development of Marginalism. Neo-classical School: Marshall-Price Determination and Elasticity. Consumer Surplus costs: Economics Rent and Profit

Section C

Economic of Kautilya, Economic thought of Dadabhai Naroji, Mahatma Gandhi, G.K. Mehta, Deendayal Upadhyaya.

Books Recommended :

1. Louise Haney, History of Economic Thought, Surjit Publication, New Delhi
2. Enc Roll: History of Economic Thought, Faber and Faber (Rupa)
3. Gide and Rist: History of Economic Doctrine
4. M.R. blaug, Economic Theory in Retrospect: History of Economic Thought from Adam Smith to J.M. Keynes. (5th Edition), Cambridge University Press, Cambridge.
5. T.N. Hajela. History of Economic thought, Ane's Student Edition, Daryaganj, New Delhi.
6. B.N. Ganguli, Indian Economic Thought: A 19th Century Perspective, Tata McGraw Hill, New Delhi.
7. J.A. Schumpeter, History of Economic Thought. Oxford University Press.

B. Geography

Scheme of Examination

Faculty	Min. Pass Marks	Max. Marks
Arts/Social Science	72	200
Science	54	150
Paper I	Resources Geography	Arts 75 Science 50
Paper II	Human Geography	Arts 75 Science 50
Practical	18	Arts 50 Science 50
Notes		

1. Students are permitted to use the stencils, simple calculator and log tables wherever needed in both theory and practical examinations.
2. There will be a common paper for Arts and Science.
3. Q.1 will be compulsory and will cover the entire course of the paper.
Q No. 1 of 20% marks of the maximum marks be set in two parts
(a) Part (a) will have ten items for locating on a map (to be supplied by examination centre) carrying 10% marks of the maximum marks and candidates shall attempt any five items.
(b) Part (b) will have 10 short answer questions carrying 10% marks of the maximum marks and candidates shall attempt any five items.
4. Remaining 9 questions carrying equal marks will be set with three questions from each section of the syllabus.
5. Candidate will attempt 5 questions in all including question No. 1 selecting at least one question from each section.
6. Practical examination will be conducted by the board of examiners.
7. The candidate will have to pass in theory and practical separately.
8. The non-collegiate candidates will have to attend a practical training camp of 48 hours at a college affiliated to the University of Rajasthan, Jaipur notified by the University from time to time in which Geography subject is taught on payment of fee fixed by the University. The candidates appearing at examination from any examination centre located in Jaipur City will attend the practical camp at the University Post Graduate Department on payment of fee fixed by the University. The candidate will procure Certificate of successful completion of practical training camp from the College/Department of Geography and produce the same at the time of practical examinations.

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Paper I: Resources Geography

Section A

Nature, scope and significance of resources geography, definition and classification of resources: renewable and non renewable resources, resource classification of Zimmerman. Natural Resources: Distribution, exploitation, uses and conservation of forest, water, soils, fisheries, mineral resources, energy resources (coal, petroleum, natural gas and non-conventional energy resources).

Section B

Human resources: Population growth, distribution and density, causes of inequalities, population-resources relationship and problems, Agricultural resources: fisheries and cereal crops: rice, wheat, maize and barley; beverages: tea, coffee and tobacco, commercial crops: cotton, rubber, jute, sugarcane, silk and artificial fibres. Agricultural regions of the world.

Section C

Concepts of Resources utilization, their conservation, environmental and cultural constraints in resource utilization, water conservation and rainwater harvesting, soil and forest resources conservation, land capability classes, resources regions of the world, resources regions of the India, economic regions of the India, sustainable development.

Recommended Readings:

- Alexander, E.W. 1988: Economic Geography. Prentice Hall India, New Delhi.
Bunting, B.C., 1987: The Geography of Soil. Prentice hall, New York.
कौशिक, एस.डी. 2010: संसाधन भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।
माथुर, वी. 1998: संसाधन भूगोल। रस्तोगी प्रकाशन, मेरठ।
Mitchell, Bruce. 1979: Geography and Resource Analysis. Longmans, London.
Park, C.C. 2001: The Environment-Principles and applications. Routledge. London.
Robinson, G.W. 1932: Soils, their Origin, Constitution and Classification. London.
Shafi, M. 2004: Agricultural Geography. Pearson India.

Paper II: Human Geography

Section A

Definition, aims and scope of human geography, relation of human geography with other social sciences. Principles of human geography, essential factors of human geography.

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according to Brunhes and Huntington, schools of man-environment relations: determinism possibilism and neo determinism.

Section B

Human races: evolution and migration, zone-strata theory, classification of races: types, characteristics and distribution. human races in India, tribes of the world: eskimos, bushman, pigmy, masai, badduicn and khirgiz; tribes in India: bhils, nagas, santhal, gond, gujjar of Jammu and Kashmir and toda. Population growth and theories, distribution and density of world population.

Section C

Migration of population: causes, types and impact; population regions and population policies in India. Rural settlements: factors affecting development of rural settlement, types and patterns of rural settlements, building materials and house types, urban settlements: process of urbanization, urban problems in India, impact of human activities on environment.

Recommended Readings:

- Chandna, R.C. 2000: Geography of Population. Kalyani Publishers, New Delhi.
Dohrs, F.E. and Summners, L.W. (eds.) 1967: Introduction to Geography. Thomas Crowell Co., New York.
Dear, M.J. and Flusty, S. (ed.) 2002: The spaces of Post modernity, Readings in Human Geography. Blackwell Publishers Ltd., Oxford.
Fellner, Geis and Getis, J. 1998: Human Geography-Landscape of human activities. Longman, London.
Hussain, M. 2012: Human Geography. Rawat Publications, Jaipur.
हार्सन, एम. 2006: संसाधन भूगोल। वसुन्धरा प्रकाशन, गोरखपुर।
Leong, G.C. and Morgan, E.C. 1982: Human and Economic Geography. Oxford University Press, Oxford 2nd Edition.
कौशिक, एस.डी. 2012: मानव भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।
मौर्य, एस.डी. 2005: जनसंख्या भूगोल। शारदा पुस्तक भवन, एलाहबाद।
पण्डा, बी.पी. 2001: जनसंख्या भूगोल। मध्यप्रदेश हिन्दी ग्रन्थ अकादमी, भोपाल।
राव, बी.पी. एवं श्रीवास्तव, बी.वे. 2008: मानव भूगोल। वसुन्धरा प्रकाशन, जयपुर।
Singh, R.L. 2005: Fundamentals of Human Geography. Sharda Pustak Bhawan, Allahabad.


Practicals

Scheme of examination

Min. Pass Marks: 18

Max. Marks: 50

	Bifurcation of Marks	Time
Written test	24	3 hrs.
Field survey and viva voce	10+04	2 1/2 hrs.
Record and viva voce	08+04	


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N.B. 1. There shall be 6 questions in written paper selecting at least two questions from each section. Candidates are required to attempt 3 questions selecting 1 question from each section. All questions carry equal marks.

Section A

Definition of cartography, types of cartographic symbols and their uses, drawing instruments and materials, classification and representation of data with the help of squares, rectangles, circles, spheres, ring, pyramids, wheel diagrams, traffic flow diagram, isochronic chart.

Section B

Classification and uses of maps, drawing of isopleth, choropleth, chorochromatic, choroschematic and dot maps (simple, multiple and multi colour), measures of central tendency and dispersion: mean, median, mode, quartiles, standard deviation.

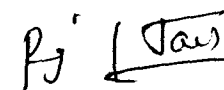
Section C


Elements of map reading. History of topographical maps in India. Scheme of topographical mapping in India as per National Map Policy, 2005. Conventional symbols and interpretation of physical and cultural features on topographical maps.

Prismatic Compass survey: equipments, methods of measurement of bearings, correction of bearings, record of survey closing error and its corrections.

Recommended Readings:

- Monkhouse, F. J. and Wilkinson, F.J. 1985: Maps and Diagrams. Methuen, London
Mahnood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi (fourth revised edition).
Raisz, E. 1962: General Cartography. John Wiley and Sons, New York. 5th edition.
Singh, R.L. and Singh, Rana, P.B., 1991: Elements of Practical Geography. Kalayani Publishers, New Delhi.
Sarkar, A. K. 1997: Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
शर्मा, जे.पी. 2011: प्रयोगात्मक भूगोल की रूपरेखा। रस्तोगी पब्लिकेशन्स, मेरठ।
Singh, L.R 2006: Fundamentals of Practical Geography. Sharda Pustak Bhawan, Allahabad.
Venkatramiah, C, 1997: A Text book of Surveying. University Press, Hyderabad'


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9. STATISTICS
Marks Scheme

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Statistical Inference	50 marks	65 marks
Paper II	Statistical Applications in Society and Industry	50 marks	65 marks
Paper III	Practical based on Paper I, II	50 marks	70 marks

53.

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Total 150 200 Marks

Note: In each Question paper, 10 (ten) questions will be set having 2 (Two) from each unit. Candidates have to answer five questions in all, taking not more than one from each unit.

Paper I

(Statistical Inference)

Unit-I

Sampling from a distribution : Concept of statistic and its sampling distribution. Sampling distribution for mean of Binomial, Poisson and Normal Distribution. Chi-square Distribution: Definition, Moments, MGF, moments, C.C.F., Mode & Skewness, Limiting and Additive Property. Distribution of ratio of chi-square variates. Applications. Testing Normal Population variance, Test for Goodness of fit, Contingency table & Independence of attributes, Yate's correction. 18 hours

Unit-II

t-Distribution : Definition of Student's -t & Fisher's -t Statistic and derivations of their distributions. Constants & Limiting Property of t distribution. Applications. Testing of Single mean, Difference of two means; paired t-test and sample correlation coefficient. F-Distribution : Definition, Derivation, Constants, Application—Testing of equality of two variances. Relationship between t, F and chi-square Distributions. 18 hours

Unit-III

Theory of Estimation: Point Estimation-Concept and Problem for Point Estimation; Criterion of a good estimator (Unbiasedness, Methods of Maximum likelihood, Consistency, Efficiency, Sufficiency). MVUE. Method of moments. Interval Estimation-Concept, Confidence Interval, Confidence Coefficient, Construction of Confidence Interval for Population Mean, Variance, Difference of Population Means & Ratio of Variances for Normal Distributions. 18 hours

Unit-IV

Testing of Hypothesis: Simple, Composite, Null and Alternative Hypothesis. Types of error, Critical region. BCR, Neyman-Person's Lemma for BCR, BCR In case of Binomial, Poisson, and Normal and Exponential Population. 18 hours

Unit-V

Large sample tests-Testing of single mean, proportion. Testing of difference of means and proportions. Non-Parametric Tests-Definition, Merits & Limitations. Sign test for one sample and two sample cases, Run Test, Median test. 18 hours

REFERENCES

1. Goon A.M., Gupta M.K., Das Gupta B. (1991) : Fundamentals of Statistics, Vol. 1, World Press, Calcutta.
2. Hodges J.L. and Lehman E.L. (1964) : Basic Concepts of Probability and Statistics, Holden Day.
3. Mood A.M., Graybill F.A. and Boes D.C. (1974) : Introduction to the Theory of Statistics, McGraw Hill.
4. Freund J.E. (2001) : Mathematical Statistics, Prentice Hall of India.
5. Gupta S.C. & Kapoor V.K. : Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.

ADDITIONAL REFERENCES

1. Bhatt B.R., Srivankatramana T and Rao Madhava K.S. (1997) : Statistics : A Beginner's Text, Vol. II, New Age International (P) Ltd.
2. Rohatgi V.K. (1967) : An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor G.W. and Cochran W.G. (1967) : Statistical Methods, Iowa State University Press.
4. Dudewicz E.J. & Mitra S.N. : Modern Mathematical Statistics, John Wiley and Sons.

Paper II

STATISTICAL APPLICATIONS IN SOCIETY AND INDUSTRY

Unit-I

Demographic Methods : Sources of demographic data-census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality- Crude death rates, Infant mortality rates, Death rate by cause, Standardized death rate. Complete life table-Construction and its main features, Mortality rate and probability of dying. Relation between different columns of life table, uses of life table and its limitations. Measurement of fertility.

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Crude birth rate, General fertility rate, Specific fertility rate, Total fertility rate, Gross Reproduction Rate, Net Reproduction Rate.

18 hours

Unit-II

Economic Statistics: Index numbers-Definition, Applications of index numbers, Price relatives, Quantity & Value relatives, Link and Chain Relatives. Problems involved in computation of Index number. Use of averages; Simple aggregative and Weighted average methods: Laspeyre's, Paasche's and Fisher's index number. Tests for index numbers. Consumer price index.

18 hours

Unit-III

Time Series Analysis: Definition & its different components; illustrations; additive and multiplicative models. Different Methods for determination of trends & seasonal fluctuation along with their merits & demerits.

18 hours

Unit-IV

Educational Statistics: Methods of standardization of scales and tests, Z-scores, T-scores, Standard scores, Percentile score, Intelligence Quotient and its measurement and uses. Validity of test scores & reliability of Scores and their determination.

18 hours

Unit-V

Statistical Quality Control: Concept of SQC, Process control & Product control. Causes of variation in quality. General theory of control charts, control limits, subgrouping. Summary of out of control criteria. Control charts for variables: Construction of Mean and Range charts. Concept of Defects and Defectives. Control Charts for attributes: Construction of np-chart, p-chart, c-chart and their merits and demerits.

18 hours

REFERENCES:

1. Croxton F.E., Cowden D.J. (1969): Applied General Statistics, Prentice Hall of India.
2. Duncan A.J. (1974): Quality Control and Industrial Statistics, Taraporewala and Sons.
3. Goon A.M. Gupta M.K. Das Gupta. B. (1986): Fundamentals of Statistics, Vol.II World Press, Calcutta.
4. Grant E.L. (1964): Statistical Quality Control, Mc Graw Hill.
5. Guilford J.P. & Fruchter B: Fundamental Statistics in Psychology and Education (1980). Mc Graw Hill.

Syllabus : B.Sc. Part-II

6. Guilford J.P. (1954): Psychometric Method. Mc Graw Hill.
7. Srivastava O.S. (1983): A Textbook of Demography, Vikas Publishing.
8. Gupta S.C. & Kapoor V.K.: Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi.

ADDITIONAL REFERENCES:

1. Freeman Frank S. (1962): Psychological Testing, Oxford & IBH Publishing Co.
2. Gupta and Mukhopadhyay P.P.: Applied Statistics, Central Book Agency.
3. Pressat R. (1978): Statistical Demography, Methuen and Co. Ltd.

Paper III

Practical Paper

1. Tests of significance based on t, Chi-square, F, Testing of significance of sample correlation coefficient. Use of Z-transformation.
2. Large sample tests for means and proportions. Tests of goodness of fit and independence of attributes in contingency tables.
3. Non parametric tests: Sign, Run, Median (for large samples)
4. Computation of mortality and fertility rates. Construction of life table.
5. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's, Chain Base Indices. Consumer price index.
6. Tests for Index numbers.
7. Determination of trend in a time series and construction of seasonal indices.
8. Drawing of \bar{X} , R, np, p and C-Charts.

10. APPLIED STATISTICS
Marks Scheme

Paper	Nomenclature	Science	Arts	Marks
Paper I	Statistical Inference	50 mark	65 marks	
Paper II	Statistical Applications in Society and Industry	50 mark	65 marks	
Paper III	Practical based on	50 mark	70 marks	

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Paper I, II

Total	150	200 Marks
Note: In each Question paper, 10 (ten) questions will be set having 2 (Two) from each unit. Candidates have to answer five questions in all, taking not more than one from each unit.		

Paper I

Statistical Inference

Unit-I

Sampling from a distribution: Concept of statistic and its sampling distribution. Sampling distribution for mean of Binomial, Poisson and Normal Distribution. Chi-square Distribution: Definition, MGF, moments, C.G.F., Mode & Skewness and other properties (without proof). Applications: Testing Normal Population variance, Test for Goodness of fit, Contingency Table & Independence of attributes, Yate's correction.

18 hours

Unit-II

t-Distribution: Definition of Student's t & Fisher's F Statistic. Property and Applications of t -distribution for testing Single mean, difference of two means, observed sample correlation coefficient. Paired t -test, F -Distribution: Definition, Mean, Variance & mode, Application of F -distribution- Testing of equality of two variances. Relationship between t , F and chi-square Distributions (without proof)

18 hours

Unit-III

Theory of Estimation: Point Estimation- Problems for Point Estimation; Criterion of a good estimator (Unbiasedness, Consistency, Efficiency, Sufficiency). MVUE, Method of moments and Methods of Maximum likelihood Interval Estimation- Confidence Interval for mean, variance, difference of means and ratio of variances for normal populations.

18 hours

Unit-IV

Testing of Hypothesis: Simple, Composite, Null and Alternative Hypothesis. Types of error, Critical region. BCR, Neyman-Person's Lemma (statement only) and its application. BCR in case of Binomial, Poisson, and Normal Population.

18 hours

Unit-V

Large sample test-Testing of single mean, proportion. Testing of difference of means and proportions. Non-Parametric Tests-Definition, Merits & Limitations. Sign test (for one sample and two sample cases) Run Test, Median test.

18 hours

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REFERENCES

1. Goon A.M. Gupta M.K., Das Gupta B. (1991) : Fundamentals of Statistics, Vol. 1, World Press, Calcutta.
2. Hodges J.L. and Lehman E.L. (1964) : Basic Concepts of Probability and Statistics, Holden Day.
3. Mood A.M., Graybill F.A. and Boes D.C. (1974) : Introduction to the Theory of Statistics, McGraw Hill.
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2. Rohatgi V.K. (1967) : An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor G.W. and Cochran W.G (1967) : Statistical Methods, Iowa State University Press.
4. Dudewicz E.J. & Misra S.N. : Modern Mathematical Statistics, John Wiley and Sons.

Paper II

STATISTICAL APPLICATIONS IN SOCIETY AND INDUSTRY
(Course contents are same as that of subject statistics.)

Unit-I

Demographic Methods : Sources of demographic data census, register, ad hoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality - Crude death rates, Infant mortality rates, Death rate by cause, Standardized death rate. Complete life table - Construction and its main features, Mortality rate and probability of dying. Relation between different columns of life table, uses of life table and its limitations. Measurement of fertility : Crude birth rate, General fertility rate, Specific fertility rate, Total fertility rate, Gross Reproduction Rate, Net Reproduction Rate. 18 hours

Unit-II

Economic Statistics : Index numbers - Definition, Applications of index numbers, Price relatives, Quantity & Value relatives, Link and Chain Relatives. Problems involved in computation of index number. Use of averages, Simple aggregative and Weighted average

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methods. Laspeyre's Paasche's and Fisher's index number. Tests for index numbers. Consumer price index. 18 hours

Unit-III

Time Series Analysis: Definition and its different components, illustrations, additive and multiplicative models. Different Methods for determination of trend & seasonal fluctuation along with their merits & demerits. 18 hours

Unit-IV

Educational Statistics: Methods of standardization of scales and tests, Z-scores, t-scores, Standard scores, Percentile scores, Intelligence Quotient and its measurement and uses, Validity of test scores, Reliability of Test Scores and their determination. 18 hours

Unit-V

Statistical Quality Control: Concept of SQC, Process control & Product control. Causes of variation in quality, General theory of control charts, control limits, sub-grouping, Summary of out-of-control criteria. Control charts for variables: Construction of Mean and Range charts. Concept of Defects and Defectives. Control Charts for attributes: Construction of np-chart, p-chart, c-chart and their merits and demerits. 18 hours

REFERENCES:

1. Croxton F.E. Gowden D.J. (1969): Applied General Statistics, Prentice Hall of India.
2. Duncan A.J. (1974): Quality Control and Industrial Statistics, Taraporewala and Sons.
3. Geon A.M. Gupta M.K. Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press, Calcutta.
4. Grant E.L. (1964): Statistical Quality Control, Mc Graw Hill.
5. Guilford J.P. & Fruchter B: Fundamental Statistics in Psychology and Education (1980). Mc Graw Hill.
6. Guilford J.P. (1954): Psychometric Method. Mc Graw Hill.
7. Srivastava O.S. (1983): A Textbook of Demography, Vikas Publishing.
8. Gupta S.C. & Kapoor V.K.: Fundamentals of Applied Statistics, Sultan Chand and Sons., New Delhi.

ADDITIONAL REFERENCES:

1. Freeman Frank S. (1962): Psychological Testing, Oxford & IBH Publishing Co.

Syllabus : B.Sc. Part-II

2. Gupta and Mukhopadhyay P.P : Applied Statistics, Central Book Agency.
3. Pressat R(1978): Statistical Demography, Methuen and Co. Ltd.

PAPER III
Practical Paper

(Course contents are same as that of subject statistics.)

1. Tests of significance based on t, Chi-square, F. Testing of significance of sample correlation coefficient.
2. Large sample tests for means and proportions. Tests of goodness of fit and independence of attributes in contingency tables.
3. Non-parametric tests: Sign, Run, Median (for large samples)
4. Computation of mortality and fertility rates. Construction of life table.
5. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's, Chain Base Indices. Consumer price index.
6. Tests for Index numbers.
7. Determination of trend in a time series and construction of seasonal indices.
8. Drawing of \bar{X} , R, np, p and C-Charts.

11. PSYCHOLOGY

B.A. /B.Sc. Pass Course Part-II

SCHEME OF EXAMINATION:

Faculty		Max. Marks		Min. Passing Marks	
	Arts	200		72 (Th.54 Pr.18)	
	Science	150		54 (Th.36 Pr.18)	
Paper	Nomenclature		Duration	Max. Marks	
				Arts	Science
I	Abnormal Psychology		3 Hrs.	75	50
II	Psychological Statistics		3 Hrs.	75	50
	Practical		3 Hrs.	50	50

NOTE:-

1. There will be three papers in Psychology. Each paper will be of 3 hours. There will be a common paper for Arts and Science. In I and II Papers there will be 3 Sections A, B and C and will cover the entire course content of the paper.

Section-A Will contain 10 questions of 20 words each. Each question will be of 1.5 marks for Arts students and 1 mark for Science students. Thus, Part-A will be of 15 marks for Arts students and of 10 marks for Science students.

Section-B Will contain 7 questions of 50 words each, out of which students are required to attempt 5 questions. Each question will be of 3 marks for Arts students and of 2 marks for Science students. Thus, Part-B will be of 15 marks for Arts student and of 10 marks for Science students.

Section-C Will contain 3 long questions each with internal choice. Each question will be of 15 marks for Arts students and 10 marks for Science students. Thus, Part-C will be of 45 marks for Arts students and 30 marks for Science students.

For clarification the distribution of marks is tabulated as below:-

ARTS			
Section	No. of Questions	Marks	Total
A	10	1.5	15
B	5 (Out of 7)	03	15
C	3 (with internal choice)	15	45
		Total Marks	75
SCIENCE			
Section	No. of Questions	Marks	Total
A	10	01	10
B	5 (Out of 7)	02	10
C	3 (with internal choice)	10	30
		Total Marks	50

2. Use of simple calculator will be allowed for statistical portions of all papers.

Paper I - Abnormal Psychology	
Section: A	
1.	Mental Disorder : Definition, Indicators of Abnormality, DS M - 5 and ICD - 10 Classification Systems, Mental Health Professionals .
2.	Causal Factors and View points : Risk Factors and Causes; Necessary, Sufficient and Contributory causes; Diathesis - Stress Models, Biological, Psychological and Social perspectives .
3.	Clinical Assessment and Diagnosis : Basic elements in Assessment, Physical and Psychosocial Assessment .

Section: B	
4. Anxiety, Obsession Compulsion and Trauma and Stress or Related Disorders :	
Types, Clinical Picture and Causal Factors.	
5. Mood Disorders and Suicide : Types, Clinical Picture and Causal Factors .	

6. Somatic Symptoms and Dissociative Disorders : Types, Clinical Picture and Causal Factors

Section: C

7. Feeding and Eating Disorders : Types, Clinical Picture and Causal Factors

8.	Schizophrenia and Other Psychotic Disorders : Types, Clinical picture and Causal Factors.		
9.	Psychological Treatment / Cognitive - Behavioral Therapy, Psychodynamic Therapies.	Therapies : Behavioral Therapy, Humanistic - Existential Therapies,	Cognitive and Therapies,

Books Recommended:

- Butcher, J. N., Hooley, J. M. & Mineka, S. (2017). *Abnormal Psychology*. Noida : Pearson India Education.
- Oltmanns, T. F. & Emery, R. E. (2017). *Abnormal Psychology*. Noida : Pearson India Education.
- David, B. H. & Durand V. M. (2007). *Abnormal Psychology : An Integrated Approach*. New Delhi: Thomson.
- Ray, W. J. (2015). *Abnormal Psychology*. New Delhi : Sage.

Paper II - Psychological Statistics

Section-A

1. Introduction: Nature and Scope of Statistics and Psychological Data; Application of Statistics in Psychology; Nature and Levels of Measurement - Categorical and Continuous Variables.
2. Frequency Distribution: Drawing of Frequency Distribution. Bivariate Frequency Distribution, Graphical Representation of Grouped Data-Histogram, Polygon.
3. Measurement of Central Tendency: Purpose and Types; Characteristics and Computation of Mean, Median and Mode.

Section-B

4. Measures of Variability: Concept and Uses; Characteristics and Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
5. Correlation: Concept and Types- Pearson's Product Moment Correlation (for Ungrouped Data by Assumed Mean and Actual Mean); Spearman's Rank Order Correlation.
6. Hypothesis Testing and Inferences Making: Population and Sample, Types of Sampling, Standard error of Mean, 't' test (Independent group), Interpretation of 't' values, levels of Significance.

Section-C

7. Non Parametric Tests: Nature and Assumptions of Distribution-free Statistics; Chi-Square; Equal Probability, 2 x 2 Contingency Table; Median Tests.
8. ANOVA: Purpose and Assumptions of ANOVA. One way ANOVA
9. Computer Analysis: Preparation of Data, Uses of SPSS.

Books Recommended:

- Broota K.D. (1992): *Experimental design in behavioural research*. New Delhi: Wiley Eastern.
- Garrett, H. (1981). *Statistics in psychology and education*. Mumbai: Vakil Febber and Simons.
- Mininum, E.W., King, B.M. & Bear. G. (1993). *Statistical Reasoning in Psychology and Education*. New York: John Wiley.
- Siegel. S. (1994). *Non-parametric Statistics*. New York: McGraw Hill.

Practical

1. Assessment of Mental Health
2. Assessment of State and Trait Anxiety
3. Measurement of Depression
4. Measurement of Coping – Styles
5. Assessment of Family Pathology
6. Word – Association Test
7. Eight-State Questionnaire
8. Neuropsychological Assessment
9. Stress: Measurement and Analysis of Group Data (Mean and Median)
10. Stress: Measurement and Analysis of Group Data ('t' test)

12.

ELECTRONICS

Scheme			
Min. Pass Marks	36		Max. Marks : 100
Paper-I	3 hrs. duration		Max. Marks : 33
Paper-II	3 hrs. duration		Max. Marks : 33
Paper-III	3 hrs. duration		Max. Marks : 34
Practical Min.-18	5 hrs. duration		Max. Marks : 50
	Paper-I- Amplifier Circuits		
Max. Marks-33			Time : 3 Hours

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Syllabus : B.Sc. Part-II

Five questions are to be set taking one from each unit (each question will have an internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Q-point, Stability of Q-point, Various Transistor biasing circuits, Thermal bias stability, An amplifier with feedback gain, Stabilization. Reduction of non linear distortion by negative feedback. Effect of feedback on input and output impedances.

Unit-2

Frequency response of linear amplifiers and noise distortion. current and voltage, series and parallel feedback. Examples of positive and negative feedback, Emitter follower. Differential amplifiers with balanced, unbalanced, single input and double input (DC and AC analysis), common mode rejection ratio.

Unit-3

Operational amplifiers, Differential amplifier, operational amplifiers as an integrator, differentiator, inverting amplifier, adder and subtractor amplifier, voltage comparator and logarithmic amplifier, Ideal and practical operational amplifier for offsets, input offset current and voltage, power supply using 741 operational amplifier, uses of operational amplifier as oscillator.

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Unit-4

Class A, B and C operating conditions for power amplifiers, condition of maximum power transfer, special features of transistors used for power amplification. Need of impedance matching in power amplifier, shunt feed power amplifier, Efficiency, Distortion, power dissipation and power amplification, phase inverters of push-pull amplifier, Class A, AB and B push-pull amplifier using transistors.

Unit-5

Problems in amplifier circuit elements at high frequency, Equivalent circuit, wide band amplifiers, High and low frequency compensation, pulse response and testing of an amplifier. Tuned amplifiers (single and double tuned) and their uses as A.F. amplification in radio and TV receivers (No mathematical derivations, only qualitative description)

Paper-II- Rectifiers and Oscillators

Max. Marks 33

Time: 3 Hours

Five questions are to be set taking one from each unit (each question will have internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Half wave, Full wave and bridge rectifiers, Definition of ripple factor. Efficiency, voltage regulation, smoothing filters, L-section and π - section filters and their cascading, Filter efficiency, Metal rectifiers, common power supply, voltage regulation and V.R. tubes.

Unit-2

Zener diode, Electronically regulated power supply, voltage multipliers, Trouble in low and high voltage power supply.

Barkhausen Criterion for maintained oscillations, grid biasing and self-sustained oscillations, Tuned grid, Tuned emitter oscillator (Mainly transistor type), crystal controlled oscillators, R-C phase shift oscillators, Designing, Considerations of Hartley and Wein bridge oscillators.

Unit-3

Bistable multivibrator, Monostable and Bistable multivibrator (Collector coupled), Improvement of multivibrator response, synchronization Triggering in relaxation oscillators.


Unit-4

Response of sinusoidal, Triangular and Rectangular waves to CR and LR circuits. Their uses as integrating and differentiating circuits.

Non-linear wave shaping circuits, Clipping and clamping circuits, slicer, limiter circuits, Limiting and clipping amplifier peeping circuits.

Unit-5

Terminology used to describe sweep generator, Fundamental sweep voltage generator, Transistor constant current sweep generator.


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References

1. Electron tube circuits J. Seeley
2. Engineering Electronics- Ryder
3. Hand book of Electronics-Gupta & Kumar
4. Applied Electronics - G.K. Mithal
5. Electronics - V.P. Arora

Paper-III-Digital Computer and Programming

Max. Marks-34

Time: 3 Hours

Five questions are to be set taking one from each unit (each question will have an internal choice). Student will attempt all the five questions. 40% weightage will be given to problems and numericals.

Unit-1

Variable resistor network, Binary ladder, D/A Converter, A/D converter, simultaneous conversion, A/D converter counter method, electromechanical A/D conversion, D/A and A/D conversion controls. Block diagram of a general purpose computer organization and control.

Unit-2

Central Processing Unit, I/O units, Arithmetic logic unit, Internal storage, Auxiliary storages like HDD, FDD, CD etc. Read only memory, Random Access Memory. Computer generations and classification.

Unit-3

Algorithm-Definition and properties of algorithm, flow chart, symbols of flow chart, converting a flow chart into a high level language. Examples of simple algorithms. Low level language viz. machine language, assembly language, high level language like BASIC.

Unit-4

BASIC: BASIC character set, numeric constants and variables, arithmetic operators, expressions and functions, character string constants and variables string operator, expressions and functions. Terminal features, system commands and editing, PRINT, REM, INPUT/OUTPUT statements.

Elementary BASIC programmes for numeric and string processing.

Unit-5

Flow of control, unconditional and conditional branching, relational logic operators, two way and multi way selection statements; nesting repetition statements.

Definite and indefinite loops, subscripted variables. Vectors and arrays, simple programme exercises. Function definition and invocation. Subroutine, modular programmes; entering and exiting subroutine. Files, random and sequential files. Simple programming exercises.

Experiments for Practical work

Note:

A candidate has to perform at least sixteen experiments in all taking eight experiments from each section 'A' and 'B'.

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In practical examination the candidate will be required to perform two experiments: one from section 'A' and the other from section 'B'. The distribution of marks will be as follows-

Time duration - 5:00 Hrs. Expts. (two) - 30 (15 for each expt) marks

Viva Voce - 10 marks

Practical record - 10 marks

Total - 50 marks

Section-A

1. To study high pass frequency filter.
2. To study low pass frequency filter.
3. To study RC differentiating circuit.
4. To study RC integrating circuit.
5. To study bridge rectifier with L & π filter.
6. To study transistor biasing circuits.
7. Study of counters and shift registers.
8. To study bistable multivibrator (collector coupled).
9. To study Exclusive OR (XOR) gate and verify its truth table.
10. Solution of simple equations using analog computer.

Section-B

1. To study analog to digital convertor circuit.
2. To study digital to analog convertor circuit.

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Syllabus : B.Sc. Part-II :

3. To study negative feed back amplifier.
4. To study triode valve characteristics and calculate its parameters.
5. To study OP Amp as summing amplifier.
6. To study OP Amp as an inverter.
7. To study OP Amp as a non-inverter.
8. To study push-pull amplifier using transistor.
9. To study emitter follower and its frequency response.

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13. Textile Craft

B.Sc. Part-II 2020

SCHEME : B.A/B.Com/B.Sc. PART-II

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	22
	Paper-II	3 Hrs	30	
2. Practical :	Paper-I	3Hrs	35	25
	Paper-II	3 Hrs	35	
3. Submission	Paper-I		35	25
	Paper-II		35	

Paper-I : Weaving Theory-I

UNIT-I

Yarn numbering system –Indirect (cotton, metric, woollen and worsted count) and Direct (Tex and Denier)

Yarn Twist and their types, Balance of fabric

Methods of fabric construction: Braiding & Lacing, knitting, felting and weaving

UNIT-II

Types of loom- Shuttle & Shuttle less; introduction to shuttleless looms- airjet, waterjet, projectile and rapier loom

Preparation of Warp and Weft for weaving

Draft, Peg plan, Weave, Repeat, Design

UNIT-III

Derivatives of Plain weave- Rib and Basket

Derivative of twill weave- Regular, Irregular, Left hand, Right hand, Pointed and curved twill

Fabric defects, Selvedge, Types of Selvedge's

Paper-II: Dyeing Theory –I

UNIT-I

Difference between dyeing and printing

Mechanical finishes- basic process of beating, singeing, napping, calendaring and embossing.

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UNIT-II

Stages of Dyeing (fibre, yarn & fabric)

Wool dyeing and silk dyeing

Dyeing machines- Jigger and Winch dyeing machine

UNIT-III

Steps of printing- preparation of cloth & colour

Methods of Direct printing- Block & Roller printing

Thickeners and types of thickeners

Practical (Paper-I)

1. Thread count and Balance of the cloth
2. Weave samples of derivatives of plain and twill weave

Practical (Paper-II)

1. Introduction to motif, repeat and layout
2. Block printing- samples preparation
3. Batik-spot, crack, scratch and painting (samples)

Submission (Paper-I)

1. Assessment of samples
2. Preparation of weave samples

Submission (Paper-II)

1. Any one article using block
2. Any one article using batik

Examination Scheme:

One Major Problem: 20 Marks

One Minor Problem: 15 Marks

Reference books :

Sahnai, V.A. (1989) Theory of Dyeing, Sevak publications. Mumbai

Trotman, E.R. (1985) Technology of Dyeing, John wiley & sons Inc London. London

Pryag, R.S. (1994) Technology of Printing, India publisher.

Pryag, R.S. (1995) Technology of Finishing, India publisher.

Bucker, (1998) Textiles, Abhishek spublications.

Kulkarni, M.M., Weaving technology, Virindra publication, Jalgon.

14. Garment Production & Export Management

B.Sc. Part-II 2020

B.A/B.Com.– Maximum Marks 40

Hrs.3

B.Sc. Maximum Marks 50

THEORY PAPER – 1

Fashion and Apparel Design

OBJECTIVES :-

1. To Develop Sensitivity & Understanding towards Historical World Costumes.
2. To Focus on Design Elements & Principles and their Details on Garments.
3. To Create Awareness About the Techniques of Pattern Making & Principle of Fittings.

SECTION –A

TRADITIONAL COSTUMES

1. Study of traditional costumes of various regions of India.
2. History of costumes of Indian civilization.
3. Brief knowledge of world costumes ; French , German, Greek, European

SECTION –B

TECHNIQUES IN PATTERN MAKING

4. Eight head theory – principles and advantages.
5. Pattern making techniques- drafting, draping, flat pattern.
6. Colour and colour schemes, psychological effects of colour on clothes.
7. Fitting – principles of fitting, factors to be considered while fitting, common fitting problems, remedying fitting defects of bodice, sleeves, and skirts.

SECTION – C

DESIGN

8. Classification of design – structural and decorative
9. Elements and principles of design.
10. Layout of design of fabric in cutting - floral , checks, plaids, lines.

References :

1. Erwin, M. D., Kinchen, L.A. & Peters, A. (1979). Clothing for moderns. Macmillan publishing new York.
2. Jo, K. M. (1985). Clothing construction I&II. Prentice Hall.
3. Mathews, M. (1974). Practical clothing construction part I & II. Chennai, Cosmic press.
4. Doogaji, & Deshpandey, R. (1988). Basic process and clothing construction. Raaj Prakashan.

THEORY PAPER – II

ELEMENTS OF MARKETING AND FINANCE

B.A./B.Com.-Maximum Marks 40

Hrs. – 3

B.Sc. – Maximum Marks 50

OBJECTIVES :

1. To create awareness about the procedures to select, proceed & start the Small Scale Industry.
2. To guide the process of product development according to the market needs.
3. To become familiar with the methods of payment in foreign trades & about types or bills.

SECTION A

1. Market structure- Types of market, market survey, elements of cost.
2. History of readymade garment industry, Problem and prospects in global market
3. Branded versus non -branded market.
4. Types of garments exported.

SECTION B

5. Elementary knowledge of working capital factors affecting working capital, operating cycle.
6. Sources of finance.
7. Letter of credit
8. Methods of payment in foreign trade
9. Various typed of bills.
10. Insurance

SECTION C

Brief study of ;

11. ECGC (export credit and guarantee corporation)
12. EIC (export inspection council)
13. IIP (Indian institute of packaging)
14. ICA (Indian of arbitration)

References :

1. Srivastav, & Aggarwal. (). Vipdan prabandh.
2. Mamoria, C.B., Joshi, R. L. & Mulla, N.I. (2003). Principles & practice of marketing in india. Kitab Mahal distributors.
3. Satya narayan; Sales management.
4. Daver R.S. (2009). Salesmanship and Publicity. Vikas publishing house Pvt Limited.

PRACTICAL- 1 APPAREL DESIGNING

B.A/B.Com.–Maxmium Marks 60

Hrs.- 4

B.Sc. – Maxmium Marks 25

OBJECTIVES :

To familiarize with basics of color

To develop expertise in drawing croquis and draping dresses on them.

Contents:

1. Colour wheel and colour scheme.
2. Introduction to eight head theory and stick figure 9.5", 10.5".
3. Developing an adult croquis from block figure.
4. Draping of garments on croquis (at least 8 sheets) using different colours schemes and occasions.
5. Preparation of a portfolio.

Examination Scheme :

B.A./B.COM:-Max Marks:-60

1. Major Problems-30

2. Minor Problems:-20

Internal:-10

B.SC:-Max Marks:-25

1. Major Problem:-10

2. Minor Problems:-10

Internal:-5

PRACTICAL – II

CLOTHING CONSTRUCTION

B.A./B.Com.–Maxmium Marks 60

Hrs- 4

B.Sc. – Maxmium Marks - 25

OBJECTIVES :

1. To be able to make basic drafts of bodice, sleeve and collar.
2. To learn the knowhow of stitching and all basic processes and ornamentation techniques.

Contents :

1. Pattern making
 1. Child basic block and sleeve block.
 2. Sleeve variations; slash and spread method-puff, bell, legomutton, bishops sleeves.
 3. Sleeve bodice combination; Magyar, raglan, dolman sleeves.
 4. Different types of collars.
 5. Different types of yokes.
2. Stitching of each sleeve, collar and yokes on bodice block.
3. Fashion designing (5 each) on sheet baby frocks, a line frocks , rompers. sun suits skirts and tops, bush -shirts with shorts.
4. Redesigning of old garment using the idea such as; to consider factors such as money, creativity, individuality, skills, needs,
 - (i) Patchwork
 - (ii) Ornamental fabric.
 - (iii) Decorative embroideries
 - (iv) Trims
 - (v) Paints and dyes
 - (vi) Introduction of fashion designing in fashion shows.
5. Introduction fashion designing in fashion shows.

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References :

1. Jo, K.M. & Beazley. (1985).The sewing book of a complete guide. Prentice Hall.
2. Ireland, P. J. (1982). Fashion designing drawing and presentation. Batsford Ltd. 4th Revised edition.
3. Chase, R.W. (1997). CAD for fashion design. Prentice Hall; Pap/DSKT edition.

Examination Scheme :

B.A.\B.Com.-Max Marks:-60

1. Major Problems-30

2. Minor Problems:-20

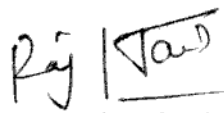
Internal:-10

B.Sc:-Max Marks:-25

1. Major Problem:-10

2. Minor Problems:-10

Internal:-5


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15.

Geology and Mining

Scheme:

Theory: Max Marks 100 Minimum Pass marks: 36

Paper I: Petrology 3 hrs duration Max Marks 50

Paper II: Principles of Stratigraphy and 3 hrs duration Max Marks 50

Geology of India

Practical (one) 4 hrs duration Max Marks 50

Paper I: Petrology

Section-A - Igneous Rocks

Composition of magmas; intrusive and extrusive forms; structure and texture; Classification

Crystallization of basaltic magma; Bowen Reaction Principle; differentiation

Study of common igneous rocks: Granite, rhyolite, gabbro, basalt, pegmatite, diorite, syenite and peridotite

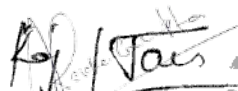
Section-B- Sedimentary Rocks

Process of formation of sedimentary rocks; lithification and diagenesis

Structure and texture of rocks; Elementary idea of sedimentary deposits, sedimentary environments and provenance

Study of common sedimentary rocks: Sandstone, limestone, shale, conglomerate and breccia

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Section-C – Metamorphic Rocks

Agents and types of metamorphism; concept of grade and facies; Structure and classification

Types of metamorphism and their products; metasomatism and anatexis

Study of common metamorphic rocks: Marble, schist, gneiss, quartzite, slate

Paper II: Principles of Stratigraphy and Geology of India

Section-A

Principles of stratigraphy; standard stratigraphic scale; principles of correlation;

Palaeogeography of India in Permo-Carboniferous period; Physiographic subdivisions of India

Stratigraphic divisions in India and their equivalents

Section-B

Stratigraphy, distribution, lithology and correlation of the Aravalli, Delhi and Vindhyan Supergroup of rocks

Distribution, succession, climate, correlation, fossil content and mineral resources of the Gondwana Supergroup

Section-C

Lithology, succession, distribution and fossil content of Triassic of Spiti, Jurassic of Kachchh, Tertiary period, Siwalik Supergroup

Origin, composition, distribution and age of Deccan Traps; Tectonic framework of India

Practical

Study of typical textures of rocks; Megascopic study of common igneous, sedimentary and metamorphic rocks; Microscopic studies of granite, rhyolite, gabbro, dolerite, limestone, sandstone, schist, gneiss and marble.

Neat drawings of paleogeographical maps of India during Permian-Carboniferous; Distribution of various geological formations in outline map of India; Identification and description of the representative stratigraphic rocks.

Geological fieldwork and collection of samples.

16. ENVIRONMENT SCIENCE

B.Sc. Pt II- 2020

Scheme:

Theory

Max Marks: 100

Min. Marks:36

Paper 1

3 hours duration

Max Marks:50

Paper 2

3 hours duration

Max Marks:50

Practical

4 hours duration


Min. Marks:18

Max Marks:50

Note:

1. Two types of Question papers for each theory paper will be applicable. Total duration of 3 hours for each paper. One question paper will comprise of the objective questions and the other will be of descriptive type question.
2. Descriptive type question paper (to be given during 1st 2 hours of examination) will have 9 questions from each section out of which a student is supposed to attempt 4 questions selection at least 1 from each section. This portion of the paper will carry maximum 30 marks. Each descriptive question will be of 7.5 marks.
3. The objective question paper will be given after 2 hours of commencement of descriptive type paper and will have 35 questions of the objective type. This portion of the paper will carry 20 marks. The objective type questions will be of the following types:
 - a. Multiple choice type questions:20 questions of ½ marks each.
 - b. Fill in the blanks/one word/true or false type questions:10 questions of ½ mark each.
 - c. Very short answer type questions:5 questions of 1 mark each

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Paper I: Environmental Pollution

Section-A

1. Sources and Classification of Air pollutants; aerosols, gases, vapors.
2. Meteorological Aspects; Factors affecting Air Pollution, wind roses, plume behavior, estimation of plume rise.
3. Air Pollution modeling; Dispersion models, Pasquill model, ASME model, Gaussian plume model, assumption, limitation applications.
4. Effects of Air Pollution; effects on economics, effects on environment and effects on human beings.
5. Global effects of Air Pollution, Greenhouse effect, Global warming, climate change, Acid rains, Ozone depletion.
6. Air Pollution due to automobile; Vehicular emissions, Motor fuel combustion, automobile emission mechanism from various vehicles.

Section-B

1. Classification of water pollutants.
2. Different types of sources of water pollution.
3. Types of wastewater and its quantum.
4. Effects of water pollution on Environment(Soil, organisms, vegetation, crop plants)
5. Effects of water pollution on human beings.
6. Pollution of water by Industries and power plants.
7. Marine pollution; quantum, types of pollutants, effects on water quality, organisms and ultimate effects on human beings.

Section-C

1. Various sources of Noise Pollution.
2. Methods of measurements of Noise Pollution.
3. Temporary effects of Noise Pollution on human beings.
4. Permanent effects of Noise Pollution on human beings.
5. Land pollution due to Municipal solid waste.
6. Pollution due to agricultural chemicals on land and crop plants.

Suggested Readings:

- ❖ Banerjee, B.N. 1987, Environmental Pollution and Bhopal Killings, Gian Publishing House, New Delhi.
- ❖ Environmental Radiation and Thermal Pollution and their control, Acol Publication, New Delhi.

- ❖ Katyal, T. and Satake, M. 2001. Environmental Pollution. Anmole Publications Pvt. Ltd. New Delhi.
- ❖ Liu, D.H.F. and Liptak, B.G. 2000. Air Pollution. Washington. D.C.
- ❖ Nath, P. and Nath, S. 1990. Environmental Pollution conservation and Planning, Chng Publication, Allahabad.
- ❖ S.A. 1991, Environmental Impacts on Water Resources Project, Discovery Publishing Home, New Delhi.
- ❖ Santara, S.C. 2001. Environmental science. New Central Book Agency (P) Ltd. Calcutta.
- ❖ Sharma, P.D. 2005. Ecology and Environment. Rastogi Publications, Meerut.
- ❖ Sinha, U.K. 1986, Ganga Pollution and Health Hazards, Alka Enterprises, New Delhi.
- ❖ Tebbntt, T.H.Y.1983, Principles of water quality control, Pragmon Press, Oxford.

Paper II: Computer Techniques, Environmental Biotechnology and Environmental Microbiology

Section A

1. Biotechnology and its possible role in Environmental conservation.
2. Oil Slicks, oil spills, pesticide, tannery food industries and applications of biotechnology.
3. Bioremediation: Bioremediation of polluted soil.
4. Hazardous wastes in environment and use of Biotechnology.
5. Air Pollution abatement and Biotechnology (Bio scrubbers, Bio beds, Bio trickling filters).
6. Biotechnology and Wastewater treatment.

Section B

1. Microbiology and its possible role in solution of Environmental Challenges.
2. Air borne diseases and causal organisms.
3. Water borne diseases and causal organisms.
4. Role of microbes in metal recovery.
5. Role of microbes in pest control.
6. Degradation of pesticides in environment and soil.
7. Vermitechnology and waste treatment.

Section C

1. Software MS Word and its possible role in environmental challenges.
2. Software XP and environmental Challenges.
3. Role of Websites and internet in environmental conservation.
4. Wind rose formation and its application in environmental monitoring.

Suggested readings:

- ❖ Allen, M.J. and Geldreich, E.F. 1975. Bacteriological criteria for groundwater. *Groundwater* .13: 45-52.
- ❖ Alvares, Claude, ed. 1996. *The Organic Farming Source book*, Goa. The other India Press
- ❖ Annan, Kaffi, A. 2002. *Towards a sustainable Future*. 44(7): 10-15.
- ❖ Bonde, G.J. 1977. Bacterial indicator of Water Pollution. *Adv. Aqua. Microbial*. 1: 273-364.
- ❖ Border, R. and Winter, J. 1978. *Microbial methods for monitoring the environment – water and waste*. USEPA, Cincinnati, USA
- ❖ Brown, C.M., old Camp bell, Priest, F.G. 1987. *Introduction to Biotechnology*, Blackwell Scientific Publishers, London.
- ❖ Cabelli, V.J. 1982. Microbial indicator systems for assessing water quality. *Anton Von Leeuwenhock*. 48: 613-618.
- ❖ Carson, Rachel. 1962. *Silent Spring*. Indian Edition. Goa : Other Indian Press.
- ❖ Cass, A.E.G. 1990. *Biosensors: A practical approach*, Oxford University Press, New York.
- ❖ Chakraverty, A. 1989. *Biotechnology and other Alternative Technologies*. Oxford and IBH Publishing CO. Pvt. Ltd. New Delhi
- ❖ Chatterjee, A.K. and Alam, B .1998. Aquatic plants in heavy metal pollution abatement and monitoring .pp 191-205. In: Sood, P.P and Prakash .R. (eds). *Heavy metal pollution, Toxication and Chelation*. M.D. Publications, New Delhi.
- ❖ Chatterjee, D.K., Kellog, S.T., Furukawa, K., Kilbanes, J.J. and Chakraborty, A.M. 1991. Genetic approach to the problems of toxic chemical pollution. PP: 199-212. Walton, A.G. (ed.). *Recombination DNA*. Elsevier. Amsterdam.
- ❖ Davis, B.D., Dulbecco, R., Einsen, H.N. and Ginnsberg, H.S. 1990. *Microbiology*. Harper and Row Publication. Singapore.
- ❖ FikSel, J. and Covello, V.T. 1986. *Biotechnology, Risk assessment*. Pergamon Press, New York.
- ❖ Forsteb, C.F. 1985. 1986. *Biotechnology and Wastewater treatment*. Cambridge University Press, London.
- ❖ Forster, C.F. and Warse, D.A.J. 1987. *Environmental Biotechnology*. Ellis Horwood Ltd. U.K.
- ❖ Gandey, A.E. and Gandy, E.T. 1981. *Microbiology for Environmental Scientists and Engineers*. McGraw – Hill, New York.

- ❖ James, A. and Evison, L. 1979. Biological indicators of Water quality. John Wiley and sons.
- ❖ Lowries, P. and Wells, S. 1991. Microorganisms, Biotechnology and Disease, Cambridge University Press. Cambridge.
- ❖ Mc Carthy, J.F. and Roch, M. 1983. Biomarkers of Environmental Contamination. CRC Press, Boca Raton, California.
- ❖ Mitchell, R. 1974. Introduction to Environmental Biotechnology. Prentice – Hall, London.
- ❖ Prentis, S. 1984. Biotechnology. A new Industrial Revolution. Orbis Publishing, London.
- ❖ Primose, S.B. 1987. Modern Biotechnology. Blackwell Oxford.
- ❖ Rana, S.V.S. 1986. Recent trends in Biotechnology and Biosciences. Pragati Press. Muzzafarnagar.
- ❖ Rehm, H.J. and Redd, G. 1986. Biotechnology, Vol I to B VCH Nemheim, FRG
- ❖ Sanunders, V.A. and sanders, J.R. 1987. Microbial Genetics applied to Biotechnology, Cromm, Helm, and London.
- ❖ Stoner, D. 1994. Biotechnology for the treatment of Hazardous wastes. Lewis Publishers. Boca Raton, California.
- ❖ Walker, J.M. and Ginford, E.B. 1985. Molecular Biology and Biotechnology Dorset Press, Dorset.
- ❖ Yoken, E. and Dimartino, V. 1989. Biotechnology in future Society Grower Publishing Co. USA.

Suggested Field and Laboratory Exercises

1. Estimation of SPM (Suspended Particulate Matter) from heavy traffic and busy areas.
2. Estimation of CO₂.
3. Estimation of SO_x.
4. Estimation of NO_x.
5. Preparation of pollution roses.
6. Estimation of Noise Levels from busy areas.
7. Estimation of Noise Levels from Silence zone (Hospital area, sanctuaries, National Parks)
8. Estimation of pH of water.
9. Estimation of EC of water.
10. Estimation of TDS of water.
11. Estimation of Chlorides.

12. Visit to various water harvesting structures (traditional water harvesting structures), ponds, bawries, kunds, kacchatanka, puccatanka.
13. Collection of water from surface water sources, tankas etc.
14. Estimation of pH, EC, TDS, Chlorides, Oxygen, alkalinity etc. from surface water sources of different locations.
15. Estimation of pH, EC, TDS, Chlorides, Oxygen and fluoride determination of ground water collected from different sources.
16. Visit to sewerage treatment plants. Collection and analysis of water from sewerage plants.
17. E-coil count and other microbe identification.

17.

BIO-TECHNOLOGY

Scheme :		
Min. Pass Marks : 36		
Paper-I	3 hrs. duration	Max. Marks : 100
Paper-II	3 hrs. duration	Max. Marks : 50
Practical Min. Marks: 18	5 hrs. duration	Max. Marks : 50
Paper-I : Biophysics and Molecular Biology		Max. Marks : 50

Section - A

- Energetics of living body, sources of heat, limits to temperature.
- Heat dissipation and conservation.
- Lambert-Bear law, Spectrophotometry and colorimetry Primary
- Events in photosynthesis.
- Strategies of light reception in microbes, plants and animals.
- Correction of vision faults, Electrical properties of biological com-
- partments. Electricity as a potential signal.
- Generation and reception of sonic vibrations. Hearing aids.
- Intra- and inter-molecular interactions in biological systems. Spa-
- tial and charge compatibility as determinant of such interactions.
- Physical methods applied to find out molecular structure. X-ray
- crystallography, and NMR.
- General spectroscopy. - UV, vis, fluorescence, atomic absorption,
- IR, Raman spectra.
- Physical method of imaging intact biological and biological struc-
- ture : Ultrasound, optical filters, X-ray, CAT scan, EEG, ECG,
- NMR imaging.

Section - B

- Molecular basis of life, Structure of DNA, DNA replication both
- prokaryotes and eukaryotes.
- DNA recombination, molecular mechanisms in prokaryot and
- eukaryot.
- Insertion elements and transpos.
- Structure of prokaryotic genes.
- Prokaryotic transcription.
- Prokaryotic Translation.
- Prokaryotic gene expression (lac, his, trp, catabolic repression)

Section - C

- Structure of eukaryotic genes.
- Eukaryotic transcription.
- Eukaryotic Translation.

- Eukaryotic gene expression transcription factors etc.
- Gene expression in yeast.
- Gene expression in protozoan parasites.
- Gene organization and expression in mitochondria and chloroplasts.
- Post-translation regulation of gene expression.
- Development and environment regulation of gene expression.

B.Sc. Part II

Paper-II: Immunology Animal Cell Culture and Recombinant DNA Technology Max. Marks 50

Section - A

- The Immune system and immunity along with historical perspective.
- Antigen-antibody and their structure.
- The organs and the cells of the immune system and their function.
- Antigen-antibody interaction.
- Humoral and cell-mediated immunity (role of MHC and genetic restriction)
- Origin of diversity in the immune system
- Effectors mechanisms.
- Immunity to infectious of diseases, vaccines.

Section - B

- History developed of cell cultures. The natural surrounding of animal cells.
- Metabolic capabilities of animal cells. Simulating natural condition for growing animal cell.
- Importance of growth factors of the serum.
- Primary cultures. Anchorage dependence of growth Non anchorage dependent cells.
- Secondary cultures. Transformed animal cells - Established/continuous cell lines.
- Commonly used animal cell lines-their origin and characteristics.
- Growth kinetics of cells in culture.
- Application of animal cell culture for studies on gene expression.
- Organ culture
- Transfection of animal cell : Selectable markers. HAT selection. Antibiotic resistance etc.
- Cell fusion : Transplantation of cultured cells. Differentiation of cells.

Section - C

What is gene cloning and why do we need to clone a gene?
Tools and techniques-plasmids and other vehicles genomic DNA,
RNA, cDNA, RT
enzymes and other reagents technique, laboratory requirements
Safety measures and regulations for recombinant DNA work
Choice and selection of the tools and the techniques
Vehicles : Plasmids and bacteriophages; available phagemids,
cosmids, viruses.
Purification of DNA from bacteria, plant and animal cells
Manipulation of purified DNA, introduction of DNA into living
cells. Cloning vector for E.coli. Cloning vectors for organisms
other than E.coli, yeast, fungi, plants, agrobact, plant virus and
animal viruses.
Application of cloning in gene analysis: How to obtain a clone of
a specific gene,
studying gene location of structure, studying gene expression.
Gene cloning and expression of foreign genes in research and
biotechnology. Production of protein from cloned gene.
Gene cloning in medicine : Pharmaceutical compounds, artificial
insulin gene, recombinant vaccine, diagnostic reagents.
Practical - Bases on theory syllabus

MAY 1, 2011

COMPUTER APPLICATION
(Common for B.A./B.Com./B.Sc.)

	Science	Com. Arts	Science	Com./Arts
Paper I Data Base Management System	50	50		65
Paper II Structured Programming and Computer Graphics	50			55
Practical Programming Laboratory		50		
On-the-Job training (4 weeks)				70

The duration of these papers will be 3 hours.

Paper I Data Base Management System
Categorization of DBMS Systems. Network. Hierarchical and relational databases. Application of DBMS systems. Relational databases management system. Why to use them and where. Data Description Language. Data Manipulation Language and Data Control Language.

Introduction to DBASE, DBASE commands. Development of an application under DBASE using forms, screens and PRG. files. Security considerations in database management systems. Performance improvement in databases. Relational databases, advanced concepts. Introduction to ORACLE.

Structured query language. Form design on a multiser environment. Report generator, Query by example and Report by form. Accessing RDBMS using programming techniques.

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COMPUTER APPLICATION (VOCATIONAL COURSE) FOR

B.A./B.Com/B.Sc. Part II

Paper-I

Paper Name : Operating System

Unit I

Concepts: Operating System & its need, Objectives of Operating System, Functions of Operating System, Types of OS: Simple Batch Systems, Multi-programmed Batch System, Time Sharing Systems, Parallel System, Distributed Systems and Real-Time Systems, Booting Process of OS, Operating System Structure.

Unit II

Process Management: Process Concept, Process States, Process Scheduling.
CPU Scheduling Algorithms: Basic Concepts, Scheduling Criteria, FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multiple Feedback Queue, Multiple- Processor Scheduling.

Unit III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Unit IV

Memory Management: Background, Why use memory management in OS, Logical versus Physical Address Space, Swapping, Contiguous Allocation (Fragmentation), Paging, Segmentation, Basic concept of Virtual Memory and Demand paging.
Introduction to File System : File Concepts(Operations and Attributes), Directory Structure, File System Structure

Unit V

Introduction of different Operating System(Linux, Unix, Windows Server), Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Input and Output, Inter Process Communication, network Structure, Security.

Recommended reference books:

1. A. Silberschatz and P.Galvin, "Operating System Concepts", Addison-Wesley, 5th Ed., 2001.
2. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition), Pearson Education, 2000.
3. Tanenbaum A.S., Modern Operating Systems, PHI Publ.
4. Peterson Richard, " The Complete Reference Linux " Tata McGraw Hill.
5. Simitabha Das, "Unix/Linux Concepts & Applications". Tata McGraw Hill
6. Achyut S. Godbole: Operating Systems, Tata Mc-Graw Hill Publishing Company Limited, 2000.
7. Harvey M. Deitel, Operating Systems, Pearson Education, 2001 .

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Paper-II

Paper Name : Database Management System

Unit I

Data, Data Processing, Merits and demerits of file organisation. Database Overview, Purpose of the Database system, File systems Vs. Database Systems, View of Data: Data Abstraction, Instances, Schema, Data Models: Overview of Network, Hierarchical, and Relational Model, Database Architecture and Administrators, Codd's Rules.

Unit II

ER Model: Basic Terminology, Entity, Entity sets, attributes and keys, Relation and Relationship sets, Entity-Relationship Diagram, Weak and Strong entity types, Features of E-R Model, Specialization, Generalization Aggregation, Creating table from ER diagram.

Unit III

Basic Concept of functional dependencies, loss less decomposition and dependency preservation. Normalization and its types: 1NF, 2NF, 3NF and BCNF. Introduction to transactions, Transaction States.

Unit IV

Query Languages: DDL, DML, DCL, Introduction to SQL, Data Types, Basic SQL commands like Create, Alter, Drop, Truncate, Insert, Update, Delete etc.

Unit V

Transaction management and Concurrency control, Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), database recovery management.

Recommended Books:

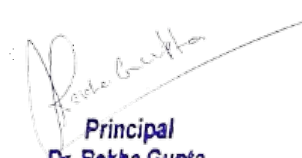
1. Korth H F and Silberschatz A, System Concepts, Sixth Edition; McGraw Hill, 2010
2. Leon, and Leon, SQL Tata McGraw Hill Pub. Co. Ltd.
3. Ivan Bayross; SQL/PL 4th Edn: BPB, 2009
4. Navathe S.B. Elmasri R.; Fundamentals of Database Systems, 5th Edn, Pearson 2011.
5. Ramakrishan and Gharke, Database Management Systems, 3rd Ed, TMHI, 2007.
6. Singh S.K.; Database Systems; 1 Edition; Pearson, 2006.

Paper-III

Paper Name : DBMS Lab

Content : Lab practical's based on paper II.

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System management. User management Security considerations
Practical.

Design of a database for a business application. Design of data entry forms and report layouts for this database. Creation of programs to access and manipulate database.

Development of a business application in RDBMS.

Paper-II : Structured Programming and Computer Graphics

Introduction. Need of structured programming. Methods of documentation. Methods of analyzing a program requirements. Data flow diagrams. Entity relationship. Flow charts.

Various categories of programming language (3GL, 4GL, etc.), introduction to C and COBOL. Program development in C using structured programming concepts.

Why Graphics. Various types of graphics programs. Drafting packages. DTP packages. Microsoft Windows. Various documentation cum DTP packages e.g. Wordperfect, Microsoft Word etc.

Introduction to a Pagemaker/Ventura or a similar package. Preparation of documents using DTP package. Formatting. Various fonts and characters set. Various type of printers used in DTP. Introduction to commercial DTP system available in market. Indian language fonts. Creation of Indian language fonts.

Practical

Development of a business application using C.

Preparation of a document and publishing it using a DTP System. Creation of fonts.

Managing a Microsoft Window session. Creating groups and program items under Window. Turning Windows for a computer system.

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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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SA

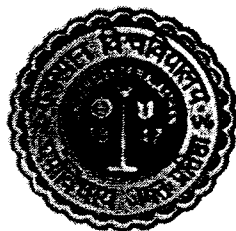
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Kalwar, Jaipur

Syllabus for B.Sc. Botany

3/4 years Undergraduate Programme

(From the Academic Year 2023-24 onwards)

(Syllabus as per NEP-2020 and Choice Based Credit System)



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University of Rajasthan

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**University of Rajasthan,
Jaipur-302004**

Vision:

To create potential and competent professionals in Botany through the courses with practical training and advanced technical skill equipped with knowledge and aptitude for higher education and research.

Mission:

- Dissemination of global demand-based knowledge through teaching with technical professionalism.
- Creation of individuals with social and environmental concern.
- Training the students to create economically and environmentally viable solutions in the field of plant science.

Programme Outcomes

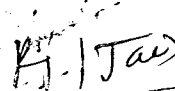
- PO1. Developing the potential for vertical career growth in plant sciences, academic and service sectors and related fields.
- PO2. Development of in-depth analytical and critical thinking, so that students would be able to identify and solve the problems with the help of botany.
- PO3. Proficient knowledge in the major domains of plant sciences including plant identification, plant diseases, microbiology, Plant biotechnology etc.
- PO4. Students can successfully learn tools and techniques related to plant research.
- PO5. After completion of course students would be able to execute their professional roles in society as botanist, plant taxonomist, plant pathologist, etc.
- PO6. Students will be able to learn skills to work as a team with the people from multidisciplinary environment.
- PO7. To design and develop sustainable solutions to major biological problems by applying appropriate tools.
- PO8. Develop skills, attitude and values required for self-directed, lifelong learning and professional development.
- PO9. Acquire knowledge and understanding of norms and ethics in the field of botany.


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B.Sc. BOTANY
COURSE STRUCTURE UNDER C.B.C.S. AND NEP-2020

Year	Sem	Course Code	Course Title	Credit		Marks
				T	P	
1 st			Hindi			
			English			
	I	BOT-UG-CC01	Diversity of Plant Kingdom	4	2	
	II	BOT-UG-CC02	Cell Biology, Molecular Biology and Genetics	4	2	
2 nd	III	BOT-UG-CC03	Microbiology and Plant Pathology	4	2	
	VI	BOT-UG-CC04	Plant Taxonomy and Economic Botany	4	2	
3 rd	V	BOT-UG-CC05	Plant Biochemistry and Physiology	4	2	
	VI	BOT-UG-CC06	Angiosperms Anatomy and Embryology	4	2	
4 th	VII	BOT-UG-CC07	Ecology and Conservation Biology	4	2	
	VIII	BOT-UG-CC08	Plant Biotechnology	4	2	
		Discipline specific Elective	Plant Tissue Culture	2	2	
			Plant Disease Management	2	2	
			Plant Stress Biology	2	2	
			Phytopharmacology	2	2	
			Genetic Engineering	2	2	
			Molecular Genetics	2	2	
		Multidisciplinary Elective course	Plant Propagation Techniques	2	2	
			Herbal Medicine and Human Health	2	2	
			Plant Diseases	2	2	
			Management of Crop Diseases	2	2	
			Plant Biodiversity and conservation	2	2	
			Ethnobotany	2	2	
		Phytochemistry	2	2		
		Paleobotany				


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BOT-UG-CC01 Diversity of Plant Kingdom

Objectives

- To understand microscopic to macroscopic view of the plants.
- To differentiate algal members from different class of the kingdom Algae
- To understand structure and reproduction in bryophytes.
- To understand difference between Hepaticopsida, Anthocerotopsida and Bryopsida.
- To interpret structure, reproduction, life cycle and economic importance of Lichens.

Course Outcome:

On completion of the course, the student would be able to develop the following:

BOT A02	
Cognitive level	Course outcome
1. Understanding	<ul style="list-style-type: none">➤ To aware students, diversity of plants present in various habitats.➤ To understand microscopic to macroscopic view of the plants.➤ To interpret amphibious to symbiotic relationship of the plants.
2. Memorizing	<ul style="list-style-type: none">➤ Diagrammatic representation of the algae, bryophytes and lichens.➤ Habit, habitat, thallus organization of various members.➤ Typical type of Life cycles found in algae and bryophytes.
3. Applying	<ul style="list-style-type: none">➤ Economic importance of algae, bryophytes and lichens.➤ Microscopic identification of algae, bryophytes and lichens.

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UNIT I

Algae: General characters, Classifications (Fritsch) upto classes. Diverse Habitat. Range of thallus structure. Reproduction (Vegetative, Asexual, Sexual). Types of the life cycle. Type studies of Cyanophyceae- Nostoc, Oscillatoria, Chlorophyceae- *Chara*; Rhodophyceae-*Polysiphonia*.

Fungi: General characteristics; Thallus organization; types of fruiting bodies, Cell wall composition; Heterokaryosis and Parasexuality; Nutrition; Classification (*Alexopoulos*); reproduction, economic importance. Type studies: Oomycetes *Albugo* Zygomycota: *Rhizopus*, Basidiomycota: *Agaricus*.

Lichens- General characters, habitat, morphology and reproduction.

15 hrs

UNIT II

Bryophytes: General characters, Origin, and evolution of Bryophyta. Classification (Rothmaler), Habitat, Range of thallus structure, Reproduction (Vegetative and Sexual), Alternation of generations and Economic importance. Study of Morphology, Anatomy, Reproduction, Gametophytes and sporophytes of *Marchantia*, *Anthoceros* and *Funaria*.

15

hrs

UNIT III

Pteridophytes: General characters of Pteridophytes, affinities with Bryophytes & Gymnosperms, classification, economic importance, study of life histories of fossil Pteridophytes – Rhynia. Type studies Life histories of *Selaginella*- (Heterospory and seed habit) *Marsilea*. Stellar System in Pteridophytes

15 hrs

UNIT IV

Gymnosperms: General characters, classification, Gymnosperms: Type studies Life histories of *Cycas* and *Ephedra* Economic importance of gymnosperms.

Angiosperms: General characters, Differences between Monocotyledons and Dicotyledons, Typical life cycle of Angiosperm.

15 hrs

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Suggested Laboratory Exercises:

- Visit Local Garden /field study of plants
- Study of anatomy by making suitable temporary slides and study of permanent slides of *Chara, Vaucheria, Ectocarpus, Polysiphnia* (vegetative and reproductive).
- Lichens: Study of growth forms of lichens (crustose, foliose and fruticose)
- *Rhizopus*: study of asexual stage from temporary mounts and sexual structures through permanent slides.; *Agaricus*: Peziza, Specimens of button stage and full grown mushroom; sectioning of gills of *Agaricus*.
- **Bryophytes**- morphology of vegetative and reproductive stages of *Marchantia*, *Anthoceros* and *Funaria*.
- **Pteridophytes**- study of vegetative and reproductive stages of *Selaginella*- (Heterospory and seed habit), *Equisetum*, *Marsilea*
- Study of Vegetative and reproductive stages of *Cycas Pinus and Ephedra* using temporary and permanent slides.
- Study of monocot and dicot flowers and seeds.

Suggested Readings:

- Alexopoulos, C.J. and Mims, C.W.: Introductory Mycology, John Wiley and Sons, New York, 2000
- Dube, H.C. :Fungi, Rastogi Publication, Meerut, 1989.
- Vashista, B.R. Botany for Degree Students -Fungi, S. Chand & Co., New Delhi, 2001.
- Gilbert, M. Smith: Cryptogamic Botany, Vol. I & II (2nd Ed.) Tata McGraw Hill. Publishing Co., Ltd., New Delhi, 1985.
- Kumar, H.D.: Introductory Phycology, Affiliated East—West Press, Ltd. New York, 1988.
- Puri. P.: Bryophytes, Atmaram & Sons. Delhi, Lucknow, 1985.
- Aneja, K.R.: Experiments in Microbiology, Plant Pathology and Biotechnology New Age International (P) Ltd., Publishers, New Delhi 2003.
- Pandey BP(2022) Algae, Bryophytes and Lichens, S Chand Publication

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BOT-UG-CC02

Cell biology, Molecular Biology and Genetics

Objectives

- To understand the structural organization of cells.
- To understand functions of organelles in the cell.
- To differentiate between plant and animal cells and to analyse different stages of mitosis and meiosis
- To understand Mendel laws.
- To understand functions genes, linkage and crossing over.

Course Outcomes:

At the completion of the course, the student would be able to develop

BOT A03	
Cognitive level	Course outcome
1. Understanding	<ul style="list-style-type: none">➤ The functions and structural properties of different cells.➤ Learn, understand and develop skill and hands on training in basics of cell biology and genetics.➤ Function of genes, linkage and crossing over.➤ To interpret genetics of a large group of population.
2. Memorizing	<ul style="list-style-type: none">➤ The structural and functional aspects of cellular organelles.➤ Human chromosomes and organization of chromosomes.➤ Differentiation between linkages, crossing over, allelic interactions.➤ Mendel's laws of genetics.
3. Applying	<ul style="list-style-type: none">➤ Variations in functions of cell organelles.➤ Concept of cell cycle, abnormalities, cell membrane, cell-cell interactions.➤ Possibilities of mutations and mutagens.

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UNIT I

Ultrastructure of Cell and Cell Organelles: Eukaryotic and Prokaryotic cell structure; Ultrastructure and functions of different cell organelles (Cell wall, Plasma membrane, Nucleus, Mitochondria, Chloroplast, Ribosome, Peroxisomes, Lysosome, Golgi bodies and Endoplasmic Reticulum); Basic idea of Mitochondrial and Chloroplast genome. 15 hrs

UNIT II

Chromosome organization: Chromosome Morphology, Specialized types of chromosomes: Polytene chromosomes. **Cell Division:** Cell cycle; Mitosis and Meiosis, **Chromosomal aberrations in human and ploidy in plants:** Deletion, Duplication, Translocation, Inversion, Aneuploidy and Polyploidy. **Mutations:** Spontaneous and induced Mutations, Physical and Chemical mutagens. 15 hrs

UNIT III

Gene and DNA: Concept of Genome, Gene. **Genetic material:** DNA as genetic material (Griffith's transformation experiment); structure of DNA (Watson and Crick Model); Structure and function of different types of RNA (rRNA, m RNA, tRNA). **DNA replication:** Mechanisms of Eukaryotes DNA replication: Initiation, Elongation and Termination; Leading and lagging strands, Okazaki fragments. **Transcription:** initiation, elongation and termination. **Translation:** initiation, elongation and termination in Eukaryotes Genetic code 15 hrs.

UNIT IV

Genetic inheritance: Mendel's laws of inheritance and their exceptions; allelic (incomplete dominance, co-dominance, lethality) and non-allelic interactions (complementary genes, epistasis and duplicate genes); Multiple allelism (ABO blood groups in men); Quantitative inheritance (Grain color in wheat). **Cytoplasmic inheritance:** Plastid inheritance (different types of leaves in *Mirabilis jalapa*); Mitochondrial inheritance (Cytoplasmic male sterility in plants). 15 hrs

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Suggested Laboratory Exercises:

- Study of cell structure from Onion,
- Study of cyclosis in *Tradescantia* spp.
- Study of plastid for pigment distribution in *Lycopersicom*, *Cassia* and *Capsicum*.
- Study of electron microphotographs of Prokaryotic cells for various cell organelles.
- Study of electron microphotographs of virus, bacteria and eukaryotic cells for comparative study of cellular organization.
- Study of different stages of mitosis and meiosis in root-tip cells and flower buds respectively of onion.
- To solve genetic problems based upon Mendel's laws of inheritance: Monohybrid, Dihybrid, Back cross and test cross.
- Permanent slides/photographs of different stages of mitosis and meiosis, polytene chromosome

Suggested Reading

- Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2014). **Molecular Biology of the Cell** (6th Ed.). New York: Garland Science
- Cooper, G. M., and Hausman, R. E. (2013). **The Cell: A Molecular Approach** (6th Ed.). Washington: ASM ; Sunderland.
- Karp, G. **Cell and Molecular Biology. Concepts and experiments**. John Harris, D., Wiley & sons, New York
- Lodish, H. F., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A., Ploegh, H., Aman, A., Martin, K. (2016). **Molecular Cell Biology** (8th Ed.). New York: W. H. Freeman
- Gupta P. K. **Cell and Molecular Biology** 2018. 5th edition Rastogi Publication India.
- Hartl, D. L., & Jones, E. W. (1998). **Genetics: Principles and Analysis**. Sudbury, MA: Jones and Bartlett.
- Pandey BP (2022) **Cell Biology and Genetics**, S Chand Publication

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Multidisciplinary courses

1. Herbal Medicine and Human Health

Course Objective

To introduce students to complementary and alternative medicine

To explore uses of plants as medicine ranging from traditional indigenous approach for treating ailments to modern pharmaceuticals

To inculcate awareness about the rich diversity of medicinal plants in India.

Unit I

Scope and importance of medicinal plants in the traditional systems of medicine and modern medicine. Importance of preventive and holistic healing in the Indian traditional systems of medicine. **Ayurveda**: History, origin, fundamental doctrine and concepts of Panchamahabhutas, Saptadhatu and Tridosha relation to health and diseases.

Unit II

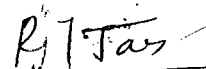
Therapeutic and pharmaceutical uses of important plants used in the Ayurveda, Siddha and Unani system of medicine. Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses. Medico-ethnobotanical sources in India; Significance of the following plants: a) *Azadirachta indica* b) *Ocimum sanctum* c) *Vitex negundo*. d) *Pongamia pinnata* e) *Cassia auriculata* f) *Indigofera tinctoria* g) *Prosopis cineraria* h) *Acacia nilotica* i) *Ficus religiosa*.

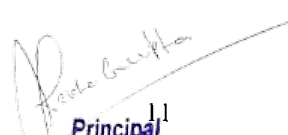
Unit III

Nutraceuticals and polyherbal formulations. Plants used for the treatment of hepatic disorders, cardiac diseases, infertility, diabetes, blood pressure, cancer and skin diseases. Role of AYUSH, NMPB and AIIA in the promotion of medicinal plants. Evaluation and Standardization of crude drugs. Fundamentals of Pharmacognosy. Organoleptic, microscopic and phytochemical evaluation of plant drugs.

Unit IV

Conservation of Endangered and Endemic Medicinal plants. Red Data List Criteria. In situ Conservation: Biosphere Reserves, National Parks, Sacred Groves. Ex-situ conservation: Botanic Gardens, National Gene Banks, Plant cell, tissue, and Organ culture, Cryopreservation. Role of NBPGR, CIMAP, JNTBGRI and RRL.


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2. Plant Biodiversity and Conservation

Unit I

Plant diversity and its scope- Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro-biodiversity and cultivated plant taxa, wild taxa. **Values and uses of Biodiversity:** Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes.

Unit II

Loss of Biodiversity: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agrobiodiversity, Projected scenario for biodiversity loss, Management of Plant Biodiversity: Organizations associated with biodiversity management- IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.

Unit III

Conservation of Biodiversity: Conservation of genetic diversity, species diversity and ecosystem diversity, In situ and ex situ conservation, Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.

Unit IV

Role of plants in relation to Human Welfare; a) Importance of forestry their utilization and commercial aspects b) Avenue trees, c) Ornamental plants of India. d) Alcoholic beverages through ages. Fruits and nuts: Important fruit crops their commercial importance. Wood and its uses.

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SYLLABUS

(Three/Four Year Under Graduate Programme in Science)

I & II Semester

Examination-2023-24

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Pass course

University of Rajasthan

UG0802 Four- Year Bachelor of Science (B.Sc.)

Subject/Discipline-Zoology

Syllabus: B.Sc. Semester I

(2023-2024)

ZOO- 51T-101 : 3 Hrs duration 20+80 Marks 8+32 Marks
ZOO- 51P-102 : 4 Hrs. duration 10+40 Marks 4+16 Marks

Code of the Course	Title of the Course	Level of the Course	Credits of the Course
ZOO- 51T-101	Animal Diversity	5	4
Type of Course		Delivery Type of the Course	
Major		Lectures: 60 lectures including diagnostic and informative assessments during lecture hours	
Prerequisites	Biology courses of Central Board of Secondary Education or equivalent		
Objectives of the Course	The main purpose of introducing this course is to teach the students the Morpho-taxonomy, and evolutionary relationships among and between non-chordates and chordates along with creating awareness and concern towards importance of animal diversity for human survival and its socioeconomic significance. In addition to this, the course is aimed at nurturing skills of conducting scientific inquiry and experimentation in the field of animal diversity to acquire knowledge of fundamental concepts and theories of animal diversity.		

Syllabus

Animal Diversity

Section – A

LOWER INVERTEBRATES

Unit 1: Protista/Protozoa: General Characteristics and Classification up to classes;

Locomotory Organelles and locomotion in Protozoa. 3 hrs

Unit 2: Porifera : General characteristics and Classification up to classes; Canal system in

Porifera. 3 hrs

Unit 3: Coelenterata (Cnidaria): General characteristics and Classification up to classes;

Polymorphism in Hydrozoa. 3 hrs

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- Unit 4: Helminthes: Platyhelminthes: General characteristics and Classification up to classes; Life cycle of *Taenia solium* and its parasitic adaptations.
Nemathelminthes : General characteristics and Classification up to classes; Life cycle of *Ascaris lumbricoides* and its parasitic adaptations. 6 hrs

Section – B

HIGHER INVERTEBRATES

- Unit 1: Annelida : General characteristics and Classification up to classes; Formation of Coelom; Metamerism in Annelida. 3 hrs
Unit 2: Arthropoda: General characteristics and Classification up to classes; Larval forms in Arthropoda, Metamorphosis in Insects. 5 hrs
Unit 3: Mollusca: General characteristics and Classification up to classes; Torsion and detorsion in Gastropoda; Pearl Formation. 4hrs
Unit 4: Echinodermata: General characteristics and Classification up to classes; Water-vascular system in Asteroidea. 3 hrs

Section –C

LOWER VERTEBRATES

- Unit 1: Protochordata: General characteristics and Classification of Protochordata up to orders; Retrogressive metamorphosis. 3 hrs
Unit 2: Agnatha: General characteristics and outline classification of cyclostomes up to classes; Ammocoete larva 3 hrs
Unit 3: Pisces: General characteristics and Classification up to order. Parental care in fishes and Migration in fishes. 5 hrs
Unit 4: Aquatic adaptation in fishes; Origin fins; Scales of fishes; Osmoregulation in Fishes. 4 hrs

Section –D

HIGHER VERTEBRATES

- Unit 1: Amphibia: General characteristics and classification up to order; Neotany; Parental care in Amphibians. 3 hrs
Unit 2: Reptilia: General characteristics and classification up to order; Identification of Poisonous and non-poisonous snakes; Biting mechanism in Snakes. 4 hrs
Unit 3: Aves: General characteristics and classification up to order; Types of feathers; Flight adaptations and Migration in birds. 4 hrs
Unit 4: Mammals: General characteristics and classification up to orders; Dentition in Mammals; Adaptive radiation in mammals. 4 hrs

Recommended Books:

1. Barnes, R.D. (2006) Invertebrate Zoology. VII Edition, Cengage Learning, India.
2. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002) The Invertebrates: A New Synthesis. III Edition, Blackwell Science
3. Young, J. Z. (2004) The Life of Vertebrates. III Edition. Oxford university press.
4. Jordan E.L., Verma P. S.(2022): Invertebrate Zoology. S. Chand and Company Limited.
5. Jordan E.L., Verma P. S.(2022): Chordate Zoology. S. Chand and Company Limited.

Suggested Readings:

1. Barrington, E.J.W. (2012) Invertebrate Structure and Functions. II Edition, EWP Publishers
2. Ruppert, E.E., Fox, R.S., Barnes, R. D. (2003) Invertebrate Zoology: A Functional Evolutionary Approach. VII Edition, Cengage Learning, India
3. Pechenik, J. A. (2015) Biology of the Invertebrates. VII Edition, McGraw-Hill Education
4. Pough H. Vertebrate Life, VIII Edition, Pearson International
5. Kachhwaha, N and Kaushik, P (2019): Freely online available gaming website-innovativezoology.com to study vertebrate and invertebrate classification.

Course Learning Outcome: Upon completion of the course, students will be able to:

1. Learn Morpho-taxonomy and structural organization of non-chordate and chordate groups.
2. Acquire knowledge of diversity of non-chordate and chordate groups.
3. Learn evolutionary relationships and phylogeny of non-chordates and chordates through functional and structural similarities.
4. Understand the economic importance of non-chordates and chordates and their significance in the ecosystem.
5. Promote shared learning through practical classes, class room presentations and projects.

University of Rajasthan
B.Sc. Semester I (2023-2024)
Practical-Zoology (ZOO- 51P-102)

ZOO- 51P-102

: 4 Hrs. duration 10+40 Marks

4+16 Marks

I. Microscopic Techniques:

1. Organization and working of Optical Microscope: Dissecting and compound microscopes.

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2. General methods of microscopic slide preparations: Narcotization; fixing and preservation; washing; staining; destaining; dehydration; clearing and mounting.
3. General idea of composition, preparation and use of:
 - (i) Fixatives: Formalin, Bouin's fluid.
 - (ii) Stains: Aceto-carmin, Aceto-orcin, Haematoxylin, Eosin.
 - (iii) Common reagents: Normal saline, Acid water, Acid alcohol and Mayer's albumin.

II. Study of Microscopic Slides and Museum Specimens:

Protozoa: *Euglena, Trypanosoma, Amoeba, Plasmodium, Paramecium, Vorticella.*

Porifera: *Leucosolenia, Euplectella, Spongilla,*

Coelenterata: *Physalia, Aurelia, Alcyonium, Sea anemone,*

Platyhelminthes : *Taenia, Planaria, Fasciola (WM), Miracidium, Sporocyst, Redia and Cercaria Larvae of Fasciola, Cysticercus larva.*

Aschelminthes : *Ascaris, Wuchereria.*

Annelida : *Neanthes (Nereis), Arenicola, Pheretima, Glossiphonia, Hirudo, Polygordius.*

Onychophora : *Peripatus*

Arthropoda : *Limulus, Spider, Scorpion, Centipede, Millipede, Lepas, Balanus, Eupagurus, Crab, Mantis, Pediculus, Bedbug, Termite, Cyclops, Daphnia, crustacean larvae (Nauplius, Metanauplius, Zoea, Mysis, Megalopa, Phyllosoma),*

Mollusca : *Chiton, Aplysia, Cypraea, Mytilus, Loligo, Nautilus. Glochidium larva*

Echinodermata : *Asterias, Echinus, Ophiothrix, Cucumaria, Antendon.*

Protochordates : *Balanoglossus, Herdmania, Amphioxus, Doliolum, Oikopleura.*

Agnatha : *Petromyzon, Ammocoete larva.*

Pisces : *Zygaena (Sphyrna), Torpedo, Chimaera; Acipenser, Clarias, Anguilla, Hippocampus, Exocoetus, Echeneis, any flat-fish, Protopterus.*

Amphibia : *Ichthyophis Proteus, Ambystoma, Axolotl, Alytes, Hyla.*

Reptilia : *Chelone*, and Fresh Water Tortoise, *Sphenodon*,
Hemidactylus, *Phrynosoma*, *Draco*, *Chameleon*;
Hydrophis, *Naja*, *Viper*, *Crocodylus*, *Alligator*.

Aves: *Pavo cristatus*, *Choriotis*.

Mammals: *Ornithorhynchus*, *Kangaroo*, *Bat*, *Manis*.

III. Anatomy:

Earthworm : External features, general viscera, alimentary canal, reproductive system and nervous system.

Prawn/Squilla : External features, appendages, alimentary canal and nervous system; Hastate Plate

Pila : External features, pallial organs and nervous system; osphradium, radula.

IV. Study of the Following Through Permanent Slide Preparation: Foraminiferous shells, Sponge spicules, Spongin fibres, Gemmule, *Hydra*, *Obelia* colony and; Parapodium of *Nereis*,

V. Study of local fauna such as insects, mollusks, fishes, amphibians, reptiles, birds mammals etc. and prepare a report on it.

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B.Sc. Semester I

Scheme of Practical Examination and Distribution of Marks

ZOO- 51P-102 : 4 Hrs. duration 10+40 Marks 4+16 Marks

	Regular	Ex. /N.C. Students
1. Anatomy (any system)	6	10
2. Permanent Preparation	4	10
3. Identification and comments on Spots (1 to 10)	20	20
4. Viva Voce	5	10
5. Class Record	5	-
	10+40=50	50

Notes:

***Internal marks for regular students only**

1. Anatomy: Study of systems of the prescribed types with the help of dissection.
2. With reference to microscopic slides, in case of non-availability, the exercise should be substituted with diagrams / photographs.
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
6. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.

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Kalwar, Jaipur

University of Rajasthan
UG0802 Four- Year Bachelor of Science (B.Sc.)
Subject/Discipline-Zoology
Syllabus: B.Sc. Semester II
(2023-2024)

ZOO- 51T-201 : 3 Hrs duration 20+80 Marks 8+32 Marks
 ZOO- 51P-202 : 4 Hrs. duration 10+40 Marks 4+16 Marks

Code of the Course	Title of the Course	Level of the Course	Credits of the Course
ZOO- 51T-201	Comparative Anatomy and Developmental Biology of Vertebrates	5	4
Type of Course		Delivery Type of the Course	
Major		Lectures: 60 lectures including diagnostic and informative assessments during lecture hours	
Prerequisites	B.Sc. Semester I: Animal diversity		
Objectives of the Course	<p>The course offers a complete understanding about anatomy of vertebrate animals. It educates the students regarding derivatives of integuments, skeletal system and visceral arches, anatomy of digestive system and associated glands, different respiratory organs, urinogenital organs, components of nervous system and receptors in vertebrates. Thorough understanding of essential and evolutionary aspects of comparative anatomy will be developed through pictorial presentation of different anatomical details. The course will also provide a glimpse of scope and historical background of developmental biology to the students, impart knowledge regarding basic concepts of differentiation, morphogenesis and pattern formation and insight into IVF, stem cells and cloning. Detailed understanding of essential events of developmental biology will be imparted through proper explanation of gametogenesis, and stages of embryonic development and foetal formation.</p>		

Syllabus

Comparative Anatomy and Developmental Biology of Vertebrates

Section- A

- Unit 1: Integumentary System: Structure and function of integument, Derivatives of integument glands. 4 hrs
- Unit 2: Skeletal System: Overview of skeleton; Brief account of jaw suspensorium and visceral arches. 4 hrs
- Unit 3: Digestive System: Brief account of alimentary canal and digestive glands. 3 hrs
- Unit 4: Respiratory System: Brief account of gills, lungs, air sacs and swim bladder. 4 hrs

Section – B

- Unit 1: Circulatory System: Evolution of heart and aortic arches. 3 hrs
- Unit 2: Urinogenital System: Succession of kidney, Evolution of urinogenital ducts. 4 hrs
- Unit 3: Nervous System: Comparative account of brain. 4 hrs
- Unit 4: Sense Organs: Types of receptors, Visual receptors in man. 4 hrs

Section C

- Unit 1: Scope and History of Developmental Biology; Concepts of Epigenesis, Preformation, Specification, Determination, Differentiation, Morphogenesis, Embryonic induction. 5 hrs
- Unit 2: Early Embryonic Development: Gametogenesis: Spermatogenesis and Oogenesis in mammals; parthenogenesis; Fertilization: External (amphibians), Internal (mammals), blocking mechanisms to Polyspermy. 5 hrs
- Unit 3: Types and Patterns of cleavage; Types of morphogenetic movements; Early development of frog (up to gastrula) and chick (up to 96 hrs); Fate maps, Fate of germ layers. 5 hrs

Section – D

- Unit 1: Late Embryonic Development: Metamorphic events in life cycle of frog and its hormonal regulation. 5 hrs
- Unit 2: Extra embryonic membranes in chick; Formation, types and functions of placenta in mammals. 5 hrs
- Unit 2: Applied Aspects of Developmental Biology: Stem cells, Cloning, Assisted Reproductive Techniques (ART). 5 hrs

Recommended Books:

1. Weichert C.K and William Presch (1970). Elements of Chordate Anatomy. Tata McGraw Hills

2. Hilderbrand, M and Gaslow G.E. Analysis of Vertebrate Structure. John Wiley and Sons
3. Wolpert, L & Tickle, C (2011) Principles of Developmental Biology (4th edition). Oxford University Press, ISBN: 9780198792918
4. Carlson, Bruce M (1996). Patten's Foundations of Embryology, McGraw Hill, Inc. ISBN: 9780070634275

Suggested Readings:

1. Kent, G.C. and Carr R.K.(2000)Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies
2. Kardong, K.V.(2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education 29
3. Gilbert, SF (2014) Developmental Biology. X Edition. Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.ISBN : 9780878939787
4. Balinsky, B.I. (2008). An Introduction to Embryology. International Thomson Computer Press.

Course Learning Outcome: Upon completion of this course, students should be able to:

1. Know about the levels of organization among different groups of vertebrates.
2. Understand that different organs and organ systems integrate with each other to impart proper regulation of a particular function.
3. Understand how the various organs evolved during the course of evolution through succession. • Know the evolution of different concepts in developmental biology.
4. Be able to understand the process of gamete formation from stem cell population to mature ova and sperm.
5. Be able to comprehend the sequence of steps leading to the formation of gametes and development of embryo..
6. Learn the mechanisms underpinning cellular diversity and specificity in animals.
7. Study the methods and tools related to developmental biology which help to understand different processes of embryogenesis.

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B.Sc. Semester II (2023-2024)

Practical-Zoology (ZOO- 51P-202)

ZOO- 51P-202

: 4 Hrs. duration 10+40 Marks

4+16 Marks

1. **Osteology:** a) Skull, Atlas and Axis vertebrae of Frog, Varanus, Fowl and Rabbit.
b) 8th vertebrae of Frog, typical thoracic, Ist and IInd sacral and caudal vertebrae of Varanus, fused thoracic and Synsacrum of Fowl, typical cervical vertebrae,

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- anterior thoracic vertebrae, anterior lumbar vertebrae and Sacrum of Rabbit.
 c) Pectoral and Pelvic girdle, Humerus and Femur, Radius-Ulna and Tibia-Fibula of Varanus, Fowl and Rabbit.

II. Anatomy:

Any edible fish (*Wallago/Labeo*): External features, general viscera, afferent and efferent branchial blood vessels, brain, cranial nerves.

III. Study of the following through Permanent Slide preparations:

Striped muscle fibers; Smooth muscle fibers, scales of edible fish, feather of birds, hair of different animals, blood film of any vertebrate.

IV. Exercises on Developmental Biology

1. Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages.

2. Study of Chick Embryo: 18 hrs, 21 hrs, 24 hrs, 33 hrs, 48 hrs, 72 hrs and 96 hrs of incubation.

- (i) Study of the embryo at various stages of incubation *in vivo* by making a window in the egg-shell.

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B.Sc. Part – I

Semester II

Scheme of Practical Examination and Distribution of Marks

ZOO- 51P-202

: 4 Hrs. duration 10+40 Marks

4+16 Marks

	Regular	Ex. /N.C. Students
6. Anatomy (any system)	6	10
7. Permanent Preparation	4	10
8. Developmental Biology	6	6
9. Identification and comments on Spots (1 to 7)	14	14
10. Viva Voce	5	10
11. Class Record	5	-
	10+40=50	50

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(Signature)

Notes:

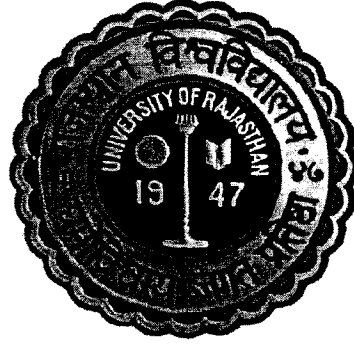
*** Internal marks for regular students only**

1. Anatomy: Study of systems of the prescribed types with the help of dissection.
2. With reference to microscopic slides, in case of non-availability, the exercise should be substituted with diagrams / photographs.
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
6. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.

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SYLLABUS

(Three/Four Year Under Graduate Programme in Science)

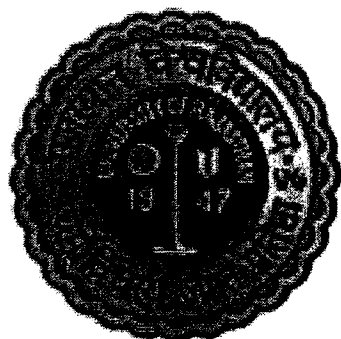
I & II Semester

Examination-2023-24

As per NEP - 2020

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UNIVERSITY OF RAJASTHAN

JAIPUR-302004

**FOUR-YEAR UNDERGRADUATE PROGRAMME
FACULTY OF SCIENCE**

**Programme: UG0802/03 – Four Year Bachelor of Science
B.Sc. Pass Course (Bio and Maths Group)**

Subject/Discipline – Chemistry

(Syllabus as per NEP-2020 and Choice Based Credit System)

(Academic Year 2023-24 onwards)

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Kalwar, Jaipur

PROGRAMME PREREQUISITES/ELIGIBILITY

12th standard pass in science from CBSE, RBSE or a recognized board of education.

PROGRAMME OUTCOMES (POs)

1. **Basic Knowledge of Science:** Students will get acquainted with the knowledge of chemical science which helps them to understand various phenomena happening in their surroundings.
2. **Dealing with untoward incidence:** The knowledge of science will help them to deal with untoward incidents in the neighborhood. For example, sudden explosion by chemicals and excessive misuse of unwanted substances can be managed with basic knowledge of chemistry and environmental pollution can be controlled by the students by spreading awareness in the society about the harmful pollutants.
3. **Proficiency in Scientific Principles:** Students will demonstrate a strong understanding of fundamental scientific principles in chemistry and they will be able to apply these principles to analysis and solution.
4. **Quantitative and Computational Skills:** Students will acquire proficiency in quantitative, analytical and computational principles. They will be able to perform calculations, manipulate mathematical expressions, and use computational tools to solve scientific problems.
5. **Experimental and Laboratory Skills:** Students will gain practical experience conducting experiments, using laboratory apparatus and equipment, and performing experimental data analysis. They will understand the importance of accurate measurement, data interpretation, and documentation.
6. **Employability:** Students will get employment in the following sectors:
 - The students can go in chemical and related industries viz. Pharmaceutical, Agrochemicals, Metallurgical, Fertilizer, Biofertilizer, Organic fertilizer, Textile, Food ceramic, Cement, Petrochemicals, Pesticides Plastics and Polymers etc.
 - The students can go for Ballistics, Forensic Lab, Bio Warfare Labs, CBIR Labs, DRDO, Industrial Chemistry etc.
 - They can opt a career in Petroleum, Soil Testing Labs environment conservation, preservation, and as Analytical Chemist, Chemical Product Officer, Radiologist and Toxicologist.
7. **Development of communication skills:** Students will develop effective oral and written communication skills. They will be able to clearly and concisely communicate scientific ideas, principles and experimental results to both technical and non-technical audiences.
8. **Development of Teamwork and Collaboration Skills:** Students will develop teamwork and collaboration skills through group projects, laboratory work, and research activities. They will be able to work effectively in diverse teams and contribute to collective goals.

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SEMESTER-WISE PAPER TITLES WITH DETAILS

UG0802/03 – Four Year Bachelor of Science (B.Sc. Pass Course)						
Subject/Discipline - Chemistry						
Credit Framework for Four Year Bachelor of Science under NEP – 2020						
Academic Session 2023-2024						
S. No.	Semester	Course Code	Course Title	Credits		Marks
				L	P	
1.	I	CHM-51T-101	Structure-bonding, Mathematical concept and States of matter	4	0	100
2.	I	CHM-51P-102	Chemistry Lab-I	0	2	50
3.	II	CHM-52T-103	Reaction mechanism, Stereochemistry, Aromatic hydrocarbon and Chemical kinetics.	4	0	100
4.	II	CHM-52P-104	Chemistry Lab-II	0	2	50


Scheme of Examination:

1 credit = 25 marks for examination/evaluation

Notes:

Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous assessment (20% weightage) and (End of Semester Examination) EoSE (80% weightage).

1. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study.
2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration.
 - Part-A of the paper shall have multiple questions of equal marks. This first question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
 - Part B of the paper shall consist of 4 questions with an internal choice of each. The four questions will be set with one from each of the units with internal choice. Third to fourth questions shall be based on applications of the topics/texts covered in the syllabus (60% weightage) and shall involve solving Problems (40% weightage) if applicable.
3. 75% Attendance is mandatory for appearing in EoSE.
4. To appear in the EoSE examination of a course/subject student must appear in the mid-semester examination and obtain at least a C grade in the course/subject.


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5. Credit points in a Course/Subject will be assigned only if, the student obtains at least a C grade in midterm and EoSE examination of a Course/Subject.

Syllabus: UG0802/03 - B.Sc. (Pass Course)

CHEMISTRY

Semester – I (2023-2024)

Course Code	Course Title	Duration	Maximum Marks	Minimum Marks
CHM-51T-101	Structure-bonding, Mathematical concept and States of matter	MT - 1 Hr. EoSE - 3 Hrs.	MT - 20 EoSE - 80	MT - 08 EoSE - 32
CHM-51P-102	Chemistry Lab-I	MT - 2 Hrs. EoSE - 4 Hrs.	MT - 10 EoSE - 40	MT - 04 EoSE - 16
Prerequisites/Eligibility		12 th standard pass in science from CBSE, RBSE or a recognized board of education.		
<p>Course Objectives: The aim of this course is to provide students with a theoretical understanding of the basic constituents of matter; atoms, ions and molecules in terms of their electronic structure and chemical bonding of these are to be explained by applying basic quantum chemistry. The objective of this course is to explain the basic concepts of mathematics and to explain the structural differences and transformations between states of matter. In addition, the laboratory course is designed to provide students with practical experience in basic qualitative analytical techniques, the use of laboratory techniques, and the determination of physical properties of matter.</p>				
<p>Course Outcomes: By the end of this course, students will have a clear understanding of various concepts related to atomic and molecular structure, chemical bonding, mathematical concepts, and states of matter. Students will also have practical experience in calibration of glassware, qualitative analysis of radicals, identification of functional groups in organic compounds, determination of various physical properties of substances, crystallization and preparation of standard solutions of different concentrations.</p>				

Syllabus

CHM-51T-101: Structure-bonding, Mathematical concept and States of matter.
(4 Hrs./week)

Duration

1 Hour
3 Hours

Maximum Marks

Midterm – 20 Marks
EoSE – 80 Marks

Minimum Marks

Midterm – 08 Marks
EoSE – 32 Marks

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Unit-I

Ionic Solids: General characteristics of ionic bonding, Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, Lattice enthalpy and Born-Landé equation for calculation of Lattice Enthalpy (no derivation), Born-Haber cycle and its applications, Solvation enthalpy and solubility of ionic solids, polarizing power and polarizability, Fajan's rule. lattice defects, semiconductors.

Metallic bond: Free electron, valence bond and band theories.

Weak Interactions: Hydrogen bonding, Van der Waals forces.

15 Lecture

Unit-II

Covalent Bond: Valence bond theory and its limitations, Directional character, Hybridization. Valence shell electron pair repulsion (VSEPR) theory to NH_3 , H_3O^+ , SF_4 , ClF_3 , ICl_2^- , H_2O .

Molecular Orbital Theory: LCAO method, bonding, nonbonding and antibonding MOs and their characteristics for combinations of atomic orbitals, MO treatment of homonuclear and heteronuclear (CO and NO) diatomic molecules. Comparison of VB and MO approaches.

Multicenter bonding in electron deficient molecules, bond strength and bond energy, ionic character in covalent compounds, calculation of percentage ionic character from dipole moment and electronegativity difference.

15 Lecture

Unit-III

Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs and calculations of slopes, differentiation of functions like k_x , e^x , x^n , $\sin x$ and $\log x$; maxima and minima, partial differentiation and reciprocity relations, integration of some useful/relevant functions; permutations and combinations, factorials, probability. Matrices and Determinant.

Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquid crystal, solid and liquid.

Solid State: Definition of space lattice, unit cell.

Laws of crystallography- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements in crystals.

Basic concept of X-ray diffraction by crystals. Derivation of Bragg's equation. Determination of crystal structure of NaCl and CsCl (Laue's method and powder method.). Defects in solids.

15 Lecture

Unit-IV

Gaseous State: Postulates of kinetic theory of gases, deviation from ideal behavior, van der Waals equation of state.

Critical Phenomenon: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state.

Molecular Velocities: Root mean square, average and most probable velocities. Qualitative

discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquification of gases (based on Joule-Thomson effect.)

Colloidal State: Definition of colloids, classification of colloids.

Solids in liquids (sols): properties - kinetic, optical and electrical, stability of colloids. Protective action, Hardy-Schulze law, gold number.

Liquids in solids (gels): classification, preparation and properties, inhibition, general applications of colloids.

Liquids in liquids (emulsions): types of emulsions, preparation. Emulsifier.

15 Lecture

Suggested Books and References:

1. Lee, J.D. Concise Inorganic Chemistry Wiley, India.
2. Housecroft, Catherine E. & Sharpe, Alan G. Inorganic Chemistry, Pearson Education Ltd.
3. Tuli, G. D. Advanced Inorganic Chemistry, S. Chand, New Delhi.
4. Satya Prakash Advanced Inorganic Chemistry, S. Chand, New Delhi.
5. Adams, D. M. Inorganic Solids – Introduction to Concepts in Solid-state Structural Chemistry, John Wiley, London.
- ⇒ 6. Puri, Sharma & Kalia, Principles of Inorganic Chemistry, S. Chand, New Delhi.
7. Puri, B. R., Sharma, L. R. & Pathania, M. S. Principles of Physical Chemistry, Vishal Publishing Co.
8. Gurdeep Raj, Advanced Physical Chemistry, Goel Publishing House.
9. Atkins, W. Physical Chemistry, Oxford University Press.
10. Silby, R. J. & Alberty, R. A. Physical Chemistry, John Wiley & Sons.
11. Barrow, G.M. Physical Chemistry, Tata McGraw-Hill.
12. Kapoor, K. L. A Textbook of Physical Chemistry, (Volume I) Macmillan India Ltd.

Syllabus

CHM-51P-102: Chemistry Lab I

(4 Hrs./week)

Duration	Maximum Marks	Minimum Marks
2 Hours	Midterm – 10 Marks	Midterm – 04 Marks
4 Hours	EoSE – 40 Marks	EoSE – 16 Marks

Inorganic Chemistry

10 marks

Separation and identification of six radicals (3 cations and 3 anions) in the given inorganic mixture including special combinations.

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Organic Chemistry

Laboratory Techniques

3 marks

- (a) Determination of melting point (naphthalene, benzoic acid, urea, etc.); boiling point (methanol, ethanol, cyclohexane, etc.): mixed melting point (urea-cinnamic acid, etc.).
(b) Crystallization of phthalic acid and benzoic acid from hot water, acetanilide from boiling water, naphthalene from ethanol etc.; Sublimation of naphthalene, camphor, etc.

Qualitative Analysis

7 marks

Identification of functional groups (unsaturation, phenolic, alcoholic, carboxylic, carbonyl, ester, carbohydrate, amine, amide, nitro and hydrocarbon) in simple organic compounds (solids or liquids) through element detection (N, S and halogens).

Physical Chemistry

Viscosity and Surface Tension:

10 marks

- a) To determine the viscosity/surface tension of a pure liquid (alcohol etc.) at room temperature. (Using the Ostwald viscometer/stalagmometer).
b) To determine the percentage composition of a given binary mixture (acetone and ethyl methyl ketone) by surface tension method.
c) To determine the percentage composition of a given mixture (non-interacting systems) by viscosity method.
d) To determine the viscosity of amyl alcohol in water at different concentration and calculate the excess viscosity of these solutions.

Viva voce

5 marks

Practical Record

5 marks

Syllabus: UG0802/03-B.Sc. (Pass Course)

CHEMISTRY

Semester – II (2023-2024)

Course Code	Course Title	Duration	Maximum Marks	Minimum Marks
CHM-52T-103	Reaction mechanism, Stereochemistry, Aromatic hydrocarbons and Chemical kinetics.	MT - 1 Hr. EoSE - 3 Hrs.	MT - 20 EoSE - 80	MT - 08 EoSE - 32
CHM-52P-104	Chemistry Lab-II	MT - 2 Hrs. EoSE - 4 Hrs.	MT - 10 EoSE - 40	MT - 04 EoSE - 16

Course Objectives: The objective of this course is to provide students with a theoretical understanding of the types of organic reactions and their mechanisms, generation and stability

of various intermediates, determination of reaction mechanism, stereochemistry of organic compounds with an understanding of the enantiomers, diastereomers, D/L and R/S nomenclature. The aim of this course is to explain the structure and reactivity of aromatic hydrocarbons, and to explain the order and molecularity of the reactions, the rate law and order of reactions determination. In addition, the laboratory course is designed to provide students with practical experience in basic quantitative analytical techniques including volumetric analysis, qualitative analytical techniques, and the determination of kinetic parameters of reactions.

Course Outcomes: By the end of this course, students will have a clear understanding of drawing logical and detailed reaction mechanisms for various fundamental reactions of aliphatic and aromatic hydrocarbons, methods of determining the reaction mechanisms, classifying the molecules as chiral or achiral, determining the D/L and R/S nomenclature of stereoisomers and identifying the formation of racemic mixture or optically active compounds during the reactions. Students will also have an understanding about order and molecularity of reactions, rate law and methods determining of order and kinetic parameters of reactions. Students will also have practical experience in quantitative analytical techniques including volumetric analysis, identification of organic compounds by determination of functional groups, determination of order and rate constant of various reactions.

Syllabus

CHM-52T-103: Reaction mechanism, Stereochemistry, Aromatic hydrocarbons and Chemical kinetics.
(4 Hrs./week)

Duration	Maximum Marks	Minimum Marks
1 Hour	Midterm – 20 Marks	Midterm – 08 Marks
3 Hours	EoSE – 80 Marks	EoSE – 32 Marks

Unit-I

Introductory Concept and Mechanism of Organic Reactions: IUPAC nomenclature of organic compounds, Dipole moment, Inductive and field effects, electromeric effect, conjugation, resonance and resonance energy, hyperconjugation. Homolytic and heterolytic bond cleavage. Type of reagents, electrophiles and nucleophiles. Reactive intermediates - carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (generation, reactions and stability). Types of organic reactions. Markovnikov's rule, Anti-Markovnikov's rule, Saytzeff's rule and Hofmann elimination. Energy considerations. Methods of determination of reaction mechanism (product analysis, intermediates, isotope labelling, kinetic and stereochemical studies), isotope effects.

15 Lecture

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Unit-II

Stereochemistry of Organic Compounds: Concept of isomerism, Types of isomerism, Difference between configuration and conformation, Flying wedge and Fischer projection formulae.

Optical Isomerism: Elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity. Properties of enantiomers, chiral and achiral molecules with two stereogenic centres. Diastereomers, threo and erythro isomers, meso compounds. Resolution of enantiomers. Inversion, retention and racemization (with examples).

Relative and absolute configuration, sequence rules, D / L and R / S systems of nomenclature.

Geometrical Isomerism: Determination of configuration of geometric isomers - cis / trans and E / Z systems of nomenclature. Geometrical isomerism in oximes and alicyclic compounds.

Conformational Isomerism: Newman projection and Sawhorse formulae, Conformational analysis of ethane, *n*-butane and cyclohexane. **15 Lecture**

Unit-III

Arenes and Aromaticity: Nomenclature of benzene derivatives. The aryl group, aromatic nucleus and side chain. Structure of benzene: molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO' diagram.

Aromaticity: Huckel rule, aromatic ions-three to eight membered.

Aromatic electrophilic substitution: General pattern of the mechanism, role of sigma and pi complexes. Mechanism of nitration, halogenation, sulphonation, mercuration, chloromethylation and Friedel crafts reactions. Energy profile diagrams. Activating and deactivating substituents. Directive influence orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Birch reduction. **15 Lecture**

Unit-IV

Chemical Kinetics: Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction: concentration, temperature, pressure, solvent, light, catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions - zero order, first order, second order and pseudo-order; half-life and mean-life. Determination of the order of reaction - differential method, method of integration, method of half-life period and isolation method.

Radioactive decay as a first order phenomenon.

Experimental methods of chemical kinetics: conductometric, potentiometric, optical methods, (polarimetry) and spectrophotometric method. Theories of chemical kinetics. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

Simple collision theory based on hard sphere model transition state theory (equilibrium hypothesis). Expression for the rate constant bases on equilibrium constant and thermodynamic

aspects.

15 Lecture

Suggested Books and References:

1. Gupta, S. S. Organic Chemistry, Oxford University Press.
2. Ahluwalia, V. K. Organic Reaction Mechanisms, Narosa Publishing House, New Delhi.
3. Agarwal, O. P. Organic Chemistry – Reactions and Reagents: Covering Complete Theoretical Organic Chemistry, Goel Publishing House, Meerut.
4. Morrison R. T. & Boyd R. N. Organic Chemistry, Prentice Hall.
5. Finar, I. L. Organic Chemistry (Vol. I & II) ELBS.
6. Bahl A. & Bahl B. S. Advanced Organic Chemistry, S. Chand.
7. Jain, M.K. & Sharma, S.C. Modera Organic Chemistry, Vishal Publishing Co.
8. March, J. & Smith, M. B. March's Advanced Organic Chemistry: Reactions, Mechanisms and Structure, Wiley.
9. Ahluwalia, V. K. Stereochemistry of Organic Compounds, Springer.
10. Puri, B. R., Sharma, L. R. & Pathania, M. S. Principles of Physical Chemistry, Vishal Publishing Co.
11. Gurdeep Raj, Advanced Physical Chemistry, Goel Publishing House.
12. Kapoor, K. L. A Textbook of Physical Chemistry, (Volume 5) Macmillan India Ltd.

Syllabus

CHM-52P-104: Chemistry Lab II

4 Hrs./week

Duration	Maximum Marks	Minimum Marks
2 Hours	Midterm – 10 Marks	Midterm – 04 Marks
4 Hours	EoSE – 40 Marks	EoSE – 16 Marks

Inorganic Chemistry

Volumetric Analysis

10 marks

- (a) Determination of acetic acid in commercial vinegar using NaOH
- (b) Determination of alkali content in antacid tablet using HCl
- (c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.
- (d) Estimation of hardness of water by EDTA
- (e) Estimation of ferrous and ferric by dichromate/permanganate method.
- (f) Estimation of copper using thiosulphate by iodometric method.

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Organic Chemistry

Qualitative Analysis

10 marks

Identification of organic compound through the functional group analysis, determination of melting point, boiling point and specific test.

Physical Chemistry

Chemical Kinetics:

10 marks

- a) To determine the specific reaction rate of the hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature.
- b) To study the effect of acid strength on the hydrolysis of an ester.
- c) To compare the strengths of HCl and H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate.
- d) To study kinetically the reaction rate of decomposition of iodide by H₂O₂.

Viva voce

5 marks

Practical Record

5 marks

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Principal
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Kalwar, Jaipur

**University of Rajasthan
Jaipur**

SYLLABUS

Three/Four Year U.G. Programme in Arts/Science

B.A.(UG9101)/B.Sc. Biology (UG0802)/B.Sc. Maths (UG 0803)

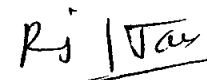
SUBJECT: GEOGRAPHY


(2023-24)

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Principal
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SEMESTER WISE PAPER TITLES WITH DETAILS

Three/Four Year U.G. Programme in Arts/ Science Subject: Geography									
S. No.	Level	Semester	Type	Title	Credits				Contact Hours
					L	T	P	Total	
1.	5	I	MJR	GEO-51T-101 Physical Geography-I	4	0	0	4	4
2.	5	I	MJR	GEO-51P-102 Practical-I	0	0	2	2	4
3.	5	II	MJR	GEO-52T-103 Human Geography	4	0	0	4	4
4.	5	II	MJR	GEO-52P-104 Practical-II	0	0	2	2	4


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Syllabus

B.A.(UG9101)/ B.Sc. Biology (UG0802)/B.Sc. Maths (UG 0803)

Semester I (2023-24)

GEO-51T-101-Physical Geography-I

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-51T-101	Physical Geography-I	5	4
Types of the Course	Delivery type of the Course		
Major	Lecture, 60 Lectures including diagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To attain knowledge in detail about physical geography and associated branches.		

Duration- 3Hours

Max. Marks- 20+80

Min.Marks-8+32

Pattern of Examination	Bifurcation of Marks
Part A	10 × 2 = 20
Part B	15 × 4 = 60
Total	80

***Note:**

1. Internal assessment will be as per University Norms.
2. End Semester Examination question paper will comprise of two parts : Part A and Part B.
3. Part A will comprise of TWO questions consisting Map Work and Multiple-Choice Questions (MCQs)/ Short Answer type questions.
4. Part B will comprise of FOUR descriptive questions with Internal choice from each unit.
5. In all student will have to attempt total 6 questions, 2 questions from Part A and 4 questions from Part B.

Unit – I

Definition, Scope & Development of Physical Geography. Origin of the Earth-The Big-Bang Hypothesis; The Interstellar Dust Hypothesis. Geological History of the Earth. Origin of the Continents & Oceans- Continental Drift Theory; Plate Tectonic Theory.

Unit– II

Interior of the Earth.Earth Movements–Endogenetic&Exogenetic.Isostasy–viewsofAiry; Pratt & Holmes. Volcanoes & Earthquakes.

Unit– III

Mountain Building Theories– Kobber & Holmes. Rocks– Classifications & Characteristics. Denudation- Erosion & Weathering; Cycle of Erosion– views of W.M. Davis & W. Penck. Drainage System & Pattern.

Unit– IV

Erosional & Depositional Work and Topographies of River, Underground Water, Glaciers, Wind & Oceanic Waves.

Recommended Readings:

- Bloom, A.L.(2003).Geomorphology:ASystematicAnalysisofLateCenozoicLandforms.New Delhi: Prentice-Hall of India.
- Christopherson, Robert W.(2011).Geo-systems:AnIntroductiontoPhysicalGeography8Ed. England: Macmillan Publishing Company.
- Ernst,W.G.(2000).Earthsystems:ProcessandIssues.Cambridge:CambridgeUniversityPress.
- Gautam, A. (2010). Bhautik Bhugol. Meerut: Rastogi Publications.
- Kale, V.S.andGupta,A.(2001).IntroductiontoGeomorphology.Hyderabad:OrientLongman.
- Selby, M.J.(2005).Earths Changing Surface. United Kingdom: OUP.
- Singh, S.(2009).Bhuatic Bhugolka Swaroop. Allahabnad: Prayag Pustak.
- Skinner,BrianJ.andStephen,C.(2000).TheDynamicEarth:AnIntroductiontophysicalGeology, John Wiley and Sons.
- Strahler ,A.N. and Strahler, A.H.(2005).Modern Physical Geography. John Wiley & Sons. Revised edition.
- Thorn bury, W.D.(1968).Principles of Geomorphology. Wiley.

Course Learning Outcomes:

By the end of the course ,students should be able to:

1. Identify the concepts of Origin of Earth and landforms
2. Illustrate the different force sacting over the Earth.
3. Compareandanalyzethedifferentcyclesoflandformerosionandtheirprocesses
4. Build competency and academic excellence for competitive exams

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GEO-51P-102-Practical-I

Code of Course	Title of the Course	Level of the Course	Credits of the Course
	Practical-I	5	2
Types of the Course	Delivery type of the Course		
Major	60contacthrs-Laboratorylecturesandfieldstudyincludingdiagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To make the students understand about the relief eat uresth rough scale and relief representation techniques.		

Duration- 4Hours

Max. Marks- 10+40

Min.Marks-4+16

Pattern of Examination	Bifurcation of Marks	Time
Written Test	20	2 Hours
Model/Chart and Viva-Voce	7+3	2 Hours
Record Work and Viva-Voce	7+3	

***Note-**

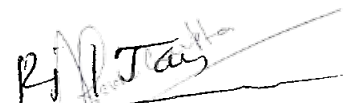
- 1. The students will have to prepare **B4 Size Record Book** which will be simultaneously checked by the Teacher in the class after teaching und evaluated during the examinations.*
- 2. There will be 6 questions (3 questions from each unit) in written paper out of which student have to compulsorily attempt 2 questions from each unit.*
- 3. The student will have to prepare Model/Chart **INDIVIDUALLY** form the practical syllabus of Geography and have to submit during the examination.*
- 4. Simple Calculatoris permitted impractical examination.*

Unit- I

Definition and Types of Scale: Simple, Comparative, Diagonal and Vernier. Methods of Relief Representation: Hachure, Hill-shading, Bench mark, Spot- Height, Form-lines and Contours.

Unit- II

Representation of Relief features through Contours and description – Conical hill, Plateau, Ridge, Cliff, Escarpment, Gorge, Waterfall, V-shaped valley, U- shaped valley and Hanging valley, Typesof Slopes-Gentle, Steep, Uniform, Undulatingand Terraced; Lake, Caldera, Spur.


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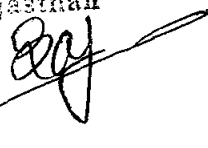
Recommended Readings:

- Monk house, F.J .and Wilkinson, H.R.(1973).Maps and Diagrams. London: Methuen.
- Rhind, D.W. and Taylor,D.R.F.(2000).Cartography:Past,PresentandFuture.International Cartographic Association.
- Robinson,A.H.,(2009).ElementsofCartography.NewYork:JohnWileyandSons.
- Robinson, A.H.(2000).Elements of Cartography. U.S.A. :John Wiley & Sons.
- Sarkar, A.K.(2005).PracticalGeography:ASystematicApproach.Calcutta:Oriental Longman.
- Sharma, J.P.(2010).Prayogik Bhugol. Meerut: Rastogi Publishers.
- Singh, R.L. and Dutt, P. K.(2010).Elements of Practical Geography. New Delhi: Kalyani Publishers.

Course Learning Outcomes:

By the end of the course, students should be able to:

1. To make students aware about the measurements and representative distances.
2. To develop skills and competency regarding area analysis and map making with relief features.


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Syllabus

B.A.(UG9101)/B.Sc. Biology(UG0802)/B.Sc. Maths (UG 0803)

Semester II (2023-24)

GEO-52T-103-Human Geography

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-52T-103	Human Geography	5	4
Types of the Course	Delivery type of the Course		
Major	Lecture, 60 Lectures including diagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To provide understanding of numerous dimension so human geography and cultural landscapes from global to local level.		

Duration- 3Hours

Max. Marks- 20+80

Min.Marks-8+32

Pattern of Examination	Bifurcation of Marks
Part A	10 × 2 = 20
Part B	15 × 4 = 60
Total	80

***Note:**

1. Internal assessment will be as per University Norms.
2. End Semester Examination question paper will comprise of two parts: Part A and Part B.
3. Part A will comprise of TWO questions consisting Map Work and Multiple-Choice Questions (MCQs)/ Short Answer type questions.
4. Part B will comprise of FOUR descriptive questions with Internal choice from each unit.
5. In all student will have to attempt total 6 questions, 2 questions from Part A and 4 questions from Part B.

Unit I

Human Geography: Definition, Nature, Scope and Principles. Inter-disciplinary approach. Understanding of Cultural landscape, Man- Nature Relationship: Determinism, Possibilism, Neo-Determinism.

Unit II

Cultural regions; Race (Griffith Taylor's Classification), Tribes-Eskimo, Bushman, Pygmy, Santhal, Nagas, Bhil. Religious and Linguistics composition of World Population.

Unit III

World Population: Growth, Distribution, Density, Sex-Ratio and Literacy. Population Growth Theory (Malthusian and Demographic Transition Theory). Human Development Index (HDI).

Unit IV

Factors, Types and Consequences of Migration, Griffith Taylor's Migration Theory. Trends and Patterns of Urbanisation of the World. Settlements-Types and Patterns. Christaller's Central Place Theory.

Recommended Readings:

- Bergwan, Edward E. (1995). Human Geography: Culture, Connections and Landscape. New Jersey: Prentice-Hall.
- Carr, M. Patterns. (1987). Process and change in Human Geography. London: MacMillan Education.
- Chandna, R.C. (2010). Population Geography. New Delhi: Kalyani Publisher.
- De Blij, H.J. (2000). Human Geography, Culture, Society and Space. New York: John Wiley.
- Fellman, J.L. (1997). Human Geography: Landscapes of Human Activities. USA: Brown and Benchmark Pub.
- Hassan, M.I. (2005). Population Geography. Jaipur: Rawat Publications.
- Hussain, Majid (2012). Manav Bhugol. Jaipur: Rawat Publications.
- Johnston, R.J. (2000). Dictionary of Human Geography. New York: Oxford.
- Kaushik, S.D. (2010). Manav Bhugol. Meerut: Rastogi Publication.
- Maurya, S.D. (2012). Manav Bhugol. Allahbad: Sharda Pustak Bhawan.
- Mc Bride, P.J. (2000). Human Geography Systems, Patterns and Change. U.K.
- Michael, Can. (1997). New Patterns: Process and Change in Human Geography.
- Singh, K.N. (2000). People of India. An Introduction Seagull Books.

Course Learning Outcomes:

By the end of the course, students will be able to:

1. Identify branches of human geography and distinguish between the different concepts of man environment relationship.
2. Classify the different tribes of the world and use various factors to interpret the spatial distribution of population.
3. Visualize the various patterns of migration, settlements and summarize the major problems of urbanisation in World.

GEO-52P-104-Practical-II

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-52P-104	Practical-II	5	2
Types of the Course	Delivery type of the Course		
Major	60contacthrs-Laboratorylecturesandfieldstudyincludingdiagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To attain the knowledge about the geographical data representation with the help of cartographical skills.		

Duration- 4Hours

Max. Marks- 10+40

Min.Marks-4+16

Pattern of Examination	Bifurcation of Marks	Time
Written Test	20	2 Hours
Field Survey and Viva	7+3	2 Hours
Record and Viva	7+3	

***Note-**


1. The students will have to prepare **B4 Size Record Book** which will be simultaneously checked by the Teacher in the class after teaching and evaluated during the examinations.
2. There will be 6 questions (3 questions from each unit) in written paper out of which student have to compulsorily attempt 2 questions from each unit.
3. The student will have to prepare Survey Sheet **INDIVIDUALLY** during the examination.
4. Simple Calculatoris permitted in practical examination.

Unit- I

Definition and Types of Profiles: Serial, Superimposed, Projected and Composite. Weather instruments with description and diagrams, Weather Symbols, Interpretation of Indian daily Weather maps (July and January).

Unit- II

Graphs: Hythergraph and Climograph, Climatograph, Water budget graph, Wind rose. Surveying: Meaning, Classification and Significance. Chain and Tape Surveying: Open Traverse and Tie-line.


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Recommended Readings:

- Mishra, R.P & Ramesh. (1986).A Fundamentals of Cartography. New Delhi: McMillan Co.
- Monk house, F.J. and Wilkinson , H.R.(1973).Maps and Diagrams. London: Methuen.
- Rhind, D.W. and Taylor, D.R.F.(2000).Cartography :Past, Present and Future. International Cartographic Association.
- Robinson,A.H.,(2009).ElementsofCartography.NewYork:JohnWileyandSons.
- Robinson, A.H.(2000).Elements of Cartography. U.S.A. :John Wiley & Sons.
- Sarkar ,A.K. (2005).Practical Geography: A Systematic Approach. Calcutta: Oriental Longman.
- Sharma, J.P.(2010).Prayogic Bhugol. Meerut: Rastogi Publishers.
- Singh, R.L. and Dutt, P.K.(2010). Elements of Practical Geography. New Delhi: Kalyani Publishers.

Course Learning Outcomes:

By the end of the course, students will be able to:

1. Developskillsandcompetencyregardingstatisticalanalysisandrepresentationof geographical data.
2. Understandabouttheweatherinstrumentsandvariousclimaticconditions.

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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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JAIPUR

Dr. Rekha Gupta
Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur

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(NEP-2020)



SYLLABUS

SCHEME OF EXAMINATION AND COURSE OF STUDY

UNDER NEP 2020

for

(SEMESTER SCHEME: I & II Semester)

FACULTY OF SCIENCE

UG0803-Three/Four Year Bachelor of Science (Maths
Group)

Medium of Instruction: Hindi and English

EXAMINATION 2023-2024 AND ONWARDS

Dr. Regha Gupta
Principal
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R.K. Vishwan (PG) Mahavidyalaya
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Jaipur

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Name of University	University of Rajasthan, Jaipur
Name of Faculty	Science
Name of Programme	UG0803-Three/Four Year Bachelor of Science (Maths Group)
Name of Discipline	Mathematics

PROGRAMME PREREQUISITES

Mathematics course of XIIth std. of Central Board of Secondary Education or equivalent.

PROGRAMME OUTCOMES (PO)

The program would enable students to take on advanced courses in Mathematics with global needs and to serve as a formidable skill-force in research, academia, industry, government, and other sectors where Mathematics is reckoned as a strong devising and design tool with diverse interdisciplinary applications.

Scheme of Examination-

1 credit = 25 marks for examination/evaluation

Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous Assessment (CA) (20% weightage) and End of Semester Examination (EoSE) (80% weightage).

1. Continuous Assessment will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study.
2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration. Each question will carry equal marks and have two parts as -
 - Part-A of the question paper shall consist first question with 08 short answer type questions of 3 marks each, two from each of the units. The first question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
 - The Part-B of the question paper shall consist four questions of 24 marks each, one from each unit. Each Question will have four parts. A Candidate is required to attempt all four units by taking any two parts from each question.

75% Attendance is mandatory for appearing in EoSE.

4. To appear in the EoSE examination of a course/subject student must appear in the Continuous Assessment (CA) and obtain at least a "C" grade in the course/subject.

5. Credit points in a Course/Subject will be assigned only if, the student obtains at least a C grade in CA and EoSE examination of a Course/Subject

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Contact Hours –

15 Weeks per Semester

L – Lecture	(1 Credit = 1 Hour/Week)
T – Tutorial	(1 Credit = 1 Hour/Week)
S – Seminar	(1 Credit = 2 Hours/Week)
P – Practical/Practicum	(1 Credit = 2 Hours/Week)
F – Field Practice/Projects	(1 Credit = 2 Hours/Week)
SA – Studio Activities	(1 Credit = 2 Hours/Week)
I – Internship	(1 Credit = 2 Hours/Week)
C – Community Engagement and Service	(1 Credit = 2 Hours/Week)

Exit and Entrance Policy

1. Students who opt to exit after completion of the first year and have secured 48 credits will be awarded a **UG Certificate** if, in addition, they complete one internship of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.
2. Students who opt to exit after completion of the second year and have secured 96 credits will be awarded the UG diploma if, in addition, they complete one internship of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.
3. Students who wish to undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 150 credits and satisfying the minimum credit requirement.
4. A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 200 credits and have satisfied the minimum credit requirements.
5. Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University/College. The research project/dissertation will be in the major discipline. The students who secure 200 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

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Letter Grades and Grade Points

Letter Grade	Grade Point	Marks Range (%)
O (outstanding)	10	91 - 100
A+ (Excellent)	9	81 - 90
A (Very good)	8	71 - 80
B+ (Good)	7	61 - 70
B (Above average)	6	51 - 60
C (Average)	5	40 - 50
P (Pass)	4	
F (Fail)	0	
Ab (Absent)	0	

When students take audit courses, they may be given a pass (P) or fail (F) grade without any credits.

Name of University	University of Rajasthan, Jaipur
Name of Faculty	Science
Name of Programme	UG0803-Three/Four Year Bachelor of Science (Maths Group)
Name of Discipline	Mathematics

Syllabus: UG0803-Three/Four Year Bachelor of Science (Maths Group)

I-Semester-Mathematics (2023-2024 & onwards)

Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (CA + EoSE)	Minimum Passing Marks (CA + EoSE)
Theory	UG0803-MAT-51T-101-Discrete Mathematics & Optimization Techniques	1 Hrs-CA 3 Hrs-EoSE	30 Marks-CA 120 Marks-EoSE	12 Marks-CA 48 Marks-EoSE

Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
I	UG0803-MAT-51T-101	Discrete Mathematics & Optimization Techniques	5	6
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	UG	Lecture, Ninety lectures		
Prerequisites	Mathematics course of XII std. of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	The objective of the course is to expose discrete structures and involved topology, an optimization of real world problems.			

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Syllabus

UG0809-MAT-51T-101-Discrete Mathematics & Optimization Techniques

Teaching: 6 Hours per Week

Duration of Examination: 3 Hours

Maximum Marks (CA + EoSE): 30 Marks-CA and 120 Marks-EoSE

Minimum Passing Marks (CA + EoSE): 12 Marks-CA and 48 Marks-EoSE

The Question Paper will be divided into two parts, Part-A and Part-B.

Part-A: Part-A contains one compulsory question consisting of 8 short answer type questions, each carrying 3 marks. These 8 short answer questions are selected from all the units, with two questions from each unit. The Part-A of the question paper evaluates the candidate's knowledge, understanding, and application of the topics/texts covered in the syllabus.

Part-B: Part-B comprises four questions with one question from each unit, each carrying 24 marks. Each question in Part-B has four subparts. The candidate must attempt all four units by selecting any two subparts from each question. Each subpart within a question carries equal marks.

Note: The question Paper will be set in both Hindi and English.

Unit –I

Relations on a set, Equivalence class, partial order relations, Chains and Anti-chains. Lattices, Distributive and Complemented Lattices. Boolean algebra, conjunctive normal form, disjunctive normal form. Pigeon hole principle. Principle of inclusion and exclusion. Propositional calculus, Basic logical operations, Truth tables, Tautologies and contradictions.

Unit -II

Discrete numeric functions, Generating functions, Recurrence relations, linear recurrence relation with constant coefficients and their solutions, Total solutions, Solution by the method of generating functions. Basic concepts of graph theory, Types of graphs, Planar graphs, Walks, Paths & Circuits, Shortest path problem.

Unit –III

Planar graphs, Operations on graphs (union, join, products). Matrix representation of graphs, Adjacency matrices, Incidence matrices. Hamiltonian and Eulerian graphs. Tree, Spanning tree, Minimum spanning tree, Distance between vertices, Center of tree, Binary tree, Rooted tree.

Unit-IV

Linear programming problems. Basic solution. Some basic properties and theorems on convex sets. Simplex algorithm, Two-phase method. Duality. Solution of dual problems. Transportation problems. Assignment problems.

Suggested Books and References –

1. V.K.Balakrishnan, Introductory Discrete Mathematics, Prentice-Hall, 1996.
2. N. Deo, Graph Theory with Applications to Computer Science, Prentice-Hall of India.
3. C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, 1986.
4. Kenneth H. Rosen, Discrete Mathematics and Its Applications, Tata Mc-GrawHills, New Delhi, 2003.
5. G. Hadley, Linear Programming, Narosa Publishing House, New Delhi, 2002.
6. Hamdy A. Taha, Operations Research, An Introduction (9th edition), Prentice-Hall, 2010.

Course Learning Outcomes:

The course would enable the student

1. To understand the ideas in discrete structures viz. Partially ordered sets, Lattices, Graphs etc. and allied conceptual intricacies with applications.
2. To understand mathematical formulation of optimization problems and allied theoretical concepts for solution methodologies.

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Karnal

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Syllabus: UG0803-Three/Four Year Bachelor of Science (Maths Group)

II-Semester-Mathematics (2023-2024 & onwards)

Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (CA + EoSE)	Minimum Passing Marks (CA + EoSE)
Theory	UG0803-MAT-52T-103-Calculus	1 Hrs-CA 3 Hrs-EoSE	30 Marks-CA 120 Marks-EoSE	12 Marks-CA 48 Marks-EoSE

Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
II	UG0803-MAT-52T-103	CALCULUS	5	6
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	UG	Lecture, Ninety Lectures		
Prerequisites	Mathematics course of XII std. of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	The objective of the course is to provide students with a comprehensive understanding of the fundamental concepts of calculus as a tool for dynamic systems.			

Syllabus

UG0809-MAT-52T-103-Calculus

Teaching: 6 Hours per Week

Duration of Examination: 3 Hours

Maximum Marks (CA + EoSE): 30 Marks-CA and 120 Marks-EoSE

Minimum Passing Marks (CA + EoSE): 12 Marks-CA and 48 Marks-EoSE

The Question Paper will be divided into two parts, Part-A and Part-B.

Part-A: Part-A contains one compulsory question consisting of 8 short answer type questions, each carrying 3 marks. These 8 short answer questions are selected from all the units, with two questions from each unit. The Part-A of the question paper evaluates the candidate's knowledge, understanding, and application of the topics/texts covered in the syllabus.

Part-B: Part-B comprises four questions with one question from each unit, each carrying 24 marks. Each question in Part-B has four subparts. The candidate must attempt all four units by selecting any two subparts from each question. Each subpart within a question carries equal marks.

Note: The question Paper will be set in both Hindi and English.

Unit I

Taylor's theorem. Maclaurin's theorem. Power series expansion of a function. Power series expansion of $\sin x$, $\cos x$, e^x , $\log_e(1+x)$, $(1+x)^n$. Derivative of the length of an arc. Polar equation

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homogeneous functions. Chain rule of partial differentiation. Total differentiation, Differentiation of implicit functions.

Unit II

Envelopes: One parameter family of curves when two parameters are connected by a relation. Maxima and Minima of functions of two variables. Lagrange's method of undetermined multipliers. Asymptotes: Definition, Parallel to coordinate axes, General rational algebraic curves, inspection method, Intersection of a curve and its asymptotes. Multiple points. Curve tracing of standard curves (Cartesian and Polar curves).

Unit III

Beta and Gamma functions, Reduction formulae (simple standard formulae), Double integrals in Cartesian and Polar Coordinates, Change of order of integration. Triple integrals. Dirichlet's integral. Rectification, Area, Volume and Surface of solids of revolution.

Unit IV

Scalar and Vector point functions. Differentiation of vector point functions Directional derivative. Differential operators. Gradient, Divergence and Curl. Integration of vector point functions. Line, Surface and Volume integral, Theorems of Gauss, Green, Stokes (without proof) and problems based on these theorems.

Suggested Books and References –

1. Shanti Narayan and P.K. Mittal, Integral Calculus, S. Chand & Co., N. D., 2013.
2. H.S.Dhami, Differential Calculus, Age Int. Ltd., New Delhi, 2012.
3. M. J. Strauss, G. L. Bradley and K. J. Smith, Calculus (3rd Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007.
4. H. Anton, I. Bivens and S. Davis, Calculus (7th Edition), John Wiley and sons (Asia), Pt Ltd., Singapore, 2002.
5. G.B. Thomas, R. L. Finney, M. D. Weir, Calculus and Analytic Geometry, Pearson Education Ltd, 2003.

Course Learning Outcomes:

By the end of the course, students should be able to:

1. Understand the concept of curvature and pedal equations.
2. Understand the concept of maxima-minima, double triple integration and its applications.
3. Understand the concept of vector calculus viz. operators, vector integration.

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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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① A

Name of University	University of Rajasthan, Jaipur
Name of Faculty	UG0803-B. Sc. (Maths Group)
Name of Discipline	Physics

SEMESTER-WISE PAPER TITLES WITH DETAILS

UG0803-B. Sc. (Maths Group)									
#	Level	Semester	Type	Title	Credits				
					L	T	P	Total	
1.	5	I	MJR	UG0803-PHY-51T-101-Mechanics & Oscillations	4	0	0	4	
2.	5	I	MJR	UG0803-PHY-51P-102-Physics Lab-I	0	0	2	2	
3.	5	II	MJR	UG0803-PHY-52T-103-Electromagnetism	4	0	0	4	
4.	5	II	MJR	UG0803-PHY-52P-104-Physics Lab-II	0	0	2	2	
5.	6	III	MJR	UG0803-PHY-63T-201-Optics	4	0	0	4	
6.	6	III	MJR	UG0803-PHY-63P-202-Physics Lab-III	0	0	2	2	
7.	6	IV	MJR	UG0803-PHY-64T-203-Thermodynamics & Statistical Physics	4	0	0	4	
8.	6	IV	MJR	UG0803-PHY-64P-204-Physics Lab-IV	0	0	2	2	
9.	7	V	MJR	UG0803-PHY-75T-301-Electronics and Solid-State Devices	4	0	0	4	
10.	7	V	MJR	UG0803-PHY-75P-302-Physics Lab-V	0	0	2	2	
11.	7	VI	MJR	UG0803-PHY-76T-303-Quantum Mechanics and Spectroscopy	4	0	0	4	
12.	7	VI	MJR	UG0803-PHY-76P-304-Physics Lab-VI	0	0	2	2	
13.	8	VII	MJR	UG0803-PHY-87T-401-Solid State Physics	4	0	0	4	
14.	8	VII	MJR	UG0803-PHY-87T-402-Mathematical Physics	4	0	0	4	
15.	8	VII	MJR	UG0803-PHY-87P-403-Physics Lab-VII	0	0	2	2	
16.	8	VIII	MJR	UG0803-PHY-88T-404-Nuclear Physics	4	0	0	4	
17.	8	VIII	MJR	UG0803-PHY-88T-405-Numerical Methods and Computer Programming	4	0	0	4	
18.	8	VIII	MJR	UG0803-PHY-88P-406-Physics Lab-VIII	0	0	2	2	

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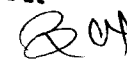
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**Syllabus: UG0803-B.Sc.
I-Semester- Physics
(2023-2024)**

Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
Theory	UG0803-PHY-51T-101- Mechanics & Oscillations	1 Hrs-MT 3 Hrs-EoSE	20 Marks-MT 80 Marks-EoSE	8 Marks-MT 32 Marks-EoSE
Practical	UG0803-PHY-51P-102- Physics Lab-I	2 Hrs-MT 4 Hrs-EoSE	10 Marks-MT 40 Marks-EoSE	4 Marks-MT 16 Marks-EoSE

Semester	Code of the Course	Title of the Course/Paper	NHEOE Level	Credits
I	UG0803-PHY-51T-101	Mechanics & Oscillations	5	4
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major/Minor	Lecture, Sixty Lectures including diagnostic and formative assessments during lecture hours.		
Prerequisites	Physics and Mathematics courses of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	Objectives of the Course in Mechanics: The objective of the course is to provide students with a comprehensive understanding of classical mechanics, including the laws of motion, frames of reference, forces, motion of particles and rigid bodies, oscillations, and central forces. The course aims to develop their knowledge and skills in analyzing and solving problems related to these topics, using appropriate mathematical formalism and physical concepts.			


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Detailed Syllabus

PHY-51T-101-Mechanics & Oscillations

Unit - I

Physical Law and frame of Reference: (a) Inertial and non-inertial frames, Transformation of displacement, velocity, acceleration between different frames of reference involving translation. Galilean transformation and invariance of Newton's laws. (b) Coriolis Force: Transformation of displacement, velocity and acceleration between rotating frame, Pseudo forces, Coriolis force, Motion relative to earth, Foucault's pendulum. (c) Conservative Forces: Introduction about conservative and non-conservative forces, Rectilinear motion under conservative forces, Discussion of potential energy curve and motion of a particle. (15 Lectures)

Unit -II:

Centre of Mass: Introduction about Centre of Mass. Centre of Mass Frame: Collision of two particles in one and two dimensions (elastic and inelastic), Slowing down of neutrons in a moderator, Motion of a system with varying mass, Angular momentum concept, conservation and charge particle scattering by a nucleus.

Rigid body: Equation of a motion of a rotating body. Inertia coefficient. Case of J not parallel to ω . The kinetic energy of rotation and the idea of principal axes. The precessional motion of the spinning Top. (15 Lectures)

Unit -III

Motion under Central Forces: Introduction about Central Forces, Motion under central forces, gravitational interaction. Inertia and gravitational mass, General solution under gravitational interaction. Kepler's laws, Discussion of trajectories, Cases of elliptical and circular orbits, Rutherford scattering.

Damped Harmonic Oscillations: Introduction about oscillations in a potential well, Damped force and motion under damping. Damped Simple Harmonic Oscillator, Power dissipation, Anharmonic oscillator and simple pendulum as an example. (15 Lectures)

Unit-IV

Driven Harmonic Oscillations: Driven harmonic oscillator with damping, Frequency response. Phase factor, Resonance, Series and parallel of LCR circuit, Electromechanical Galvanometer.

Coupled Oscillations: Equation of motion of two coupled Simple Harmonic Oscillators, Normal modes, motion in mixed modes. Coupled behavior, Dynamics of a number of oscillators with neighbor interactions. (15 Lectures)

Suggested Books and References –

1. Mechanics, Berkeley Physics, Vol.1, Kittel, Knight, et.al. 2007, Tata McGraw-Hill
2. An introduction to Mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill
3. Feynman Lectures, Vol. I, R.P. Feynman, R.B. Leighton, M. Sands, 2008, Pearson Education.
4. Course of Theoretical Physics, Vol-I Mechanics, L.D. Landau, E.M. Lifshitz, Butterworth-Heinemann
5. Mechanics, D.S. Mathur, S. Chand and Company Limited,
6. Theoretical Mechanics, M.R. Spiegel, 2006, Tata McGraw Hill.
7. Introduction to Classical Mechanics: With Problems and Solutions, David Morin

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8. Classical Mechanics, Herbert Goldstein, Charles P. Poole, and John L. Safko
9. Classical Mechanics, John R. Taylor
10. Mechanics, Keith R. Symon
11. The Physics of Waves & Oscillations, Bajaj
12. Waves, A. P. French

Suggested E-resources:

1. Online Lecture Notes and Course Materials:

- MIT OpenCourseWare: Classical Mechanics - This resource provides lecture notes, problem sets, and solutions for a complete course on classical mechanics: <https://ocw.mit.edu/courses/physics/8-01sc-classical-mechanics-fall-2016/>
- HyperPhysics - This online resource provides concise explanations and interactive simulations for various topics in mechanics: <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>

Course Learning Outcomes:

By the end of the course, students should be able to:

1. Understand the concept of inertial and non-inertial frames of reference and their implications on the laws of motion.
2. Apply transformations of displacement, velocity, and acceleration between different frames of reference involving translation.
3. Explain the Galilean transformation and the invariance of Newton's laws.
4. Analyze the motion in rotating frames, including the transformation of displacement, velocity, and acceleration, and the effects of pseudo forces such as the Coriolis force.
5. Analyze the motion of a Foucault pendulum and understand its relation to the rotation of the Earth.
6. Define conservative and non-conservative forces and analyze rectilinear motion under conservative forces.
7. Analyze potential energy curves and understand the motion of particles under conservative forces.
8. Explain the concept of the center of mass and its relevance in the motion of systems of particles.
9. Apply the concept of conservation of angular momentum and analyze particle scattering by a nucleus.
10. Understand the equations of motion for rotating bodies and the concept of the moment of inertia.
11. Analyze the kinetic energy of rotation and the motion of spinning tops.
12. Understand the motion under central forces, including gravitational interaction, and apply Kepler's laws.
13. Analyze damped harmonic oscillations and understand the effects of damping on oscillatory motion.
14. Analyze driven harmonic oscillators with damping and understand frequency response and power dissipation.
15. Explain the behavior of coupled oscillators and analyze systems of oscillators with neighbor interactions.

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Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
I	UG0803-PHY-51P-102	Physics Lab-I	5	2
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major/Minor	Practical, Sixty hours of practical including diagnostic and formative assessment during practical hours.		
Prerequisites	Physics and Mathematics courses of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	The objective of the physics lab-I, with the mentioned experiments, is to provide students with hands-on experience in conducting experiments related to oscillations, damping, coupled oscillators, and properties of materials. The lab aims to reinforce theoretical concepts learned in the classroom, develop practical skills, and enhance the understanding of physics principles through experimentation.			

UG0803-PHY-51P-102: Physics Lab-I

The colleges are free to set new experiments of equivalent standards. This should be intimated and approved by the Convener, Board of Studies before the start of the academic session. It is binding on the college to have an experimental set-up of at least ten experiments listed below. In case the number of experiments performed by the student is less than eight, his marks shall be scaled down in the final examination on a pro-rata basis. Laboratory examination paper will be set by the external examiner out of eight or more experiments available at the centre

List of Experiments –

1. Study the variation of the time period with amplitude in large-angle oscillations using a compound pendulum.
2. To study the damping using a compound pendulum.
3. To study the excitation of normal modes and measure frequency splitting into two coupled oscillators.
4. To study the frequency of energy transfer as a function of coupling strength using coupled oscillators.
5. To study the viscous fluid damping of a compound pendulum and determine the damping coefficient and Q of the oscillator.
6. To study the electromagnetic damping of a compound pendulum and to find the variation of damping coefficients with the assistance of a conducting lamina.
7. Study of normal modes of a coupled pendulum system. Study of oscillations in mixed modes and find the period of energy exchange between the two oscillators.
8. To determine Young's modulus by bending of the beam.
9. To determine Y , σ and n by Searle's method
10. To determine the modulus of rigidity of a wire using Maxwell's needle.
11. To determine the moment of Inertia of a fly-wheel.
12. To find the motion of a spring and calculate (a) Spring constant (b) Acceleration due to gravity (g) (c) Modulus of Rigidity

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Suggested Books and References –

Suggested E-resources.

Course Learning Outcomes:

Through these experiments, students will develop practical skills in experimental techniques, data collection, analysis, and interpretation. They will also enhance their understanding of fundamental concepts and principles in oscillations, damping, coupled oscillators, and material properties. The lab experiences will foster critical thinking, problem-solving abilities, and the application of theoretical knowledge to real-world scenarios.

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**Syllabus: UG0803-B.Sc.
II-Semester- Physics
(2023-2024)**

Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
Theory	UG0803-PHY-52T-103- Electromagnetism	1 Hrs-MT 3 Hrs-EoSE	20 Marks-MT 80 Marks-EoSE	8 Marks-MT 32 Marks-EoSE
Practical	UG0803-PHY-52P-104- Physics Lab-II	2 Hrs-MT 4 Hrs-EoSE	10 Marks-MT 40 Marks-EoSE	4 Marks-MT 16 Marks-EoSE

Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
II	UG0803-PHY-52T-103	Electromagnetism	5	4
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major/Minor	Lecture, Sixty Lectures including diagnostic and formative assessments during lecture hours.		
Prerequisites	Physics and Mathematics courses of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	Objectives of the Course in Electromagnetism: The objective of the course is to provide students with a comprehensive understanding of the fundamental concepts and principles of electromagnetism. It aims to develop their knowledge and skills in analyzing scalar and vector fields, electric and magnetic fields, and their interactions, as described by Maxwell's equations. The course will also cover important topics such as electric potential, polarization, magnetostatics, and electromagnetic waves.			


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Detailed Syllabus

UG0803-PHY-52T-103-Electromagnetism

Unit I

Scalar and Vector Fields: Concept of Field, Scalar and Vector Fields, Gradient of scalar field, Physical significance and formalism of Gradient, Divergence and Curl of a vector field, Cartesian co-ordinates system, Problems based on Gradient, Divergence and curl operators. Concept of Solid angle, Gauss divergence and Stoke's theorem. Gauss law from inverse square law. Differential form of Gauss law.

Electric Field and Potential Energy: Invariance of Charge, Potential energy of system of (i) Discrete N-charges (ii) Continuous charge distribution. Energy required to built a uniformly charged sphere, classical radius of electron, Electric field due to a short electric dipole, Interaction of electric dipole with external uniform and non-uniform electric field, potential due to a uniformly charged spherical shell.

Poisson's and Laplace equations in Cartesian co-ordinates and their applications to solve the problems of electrostatics. Electric field measured in moving frames, Electric field of a point charge moving with constant velocity. (15 Lectures)

Unit II

Electric field in matter: Multipole expansion, definition of moments of charge distribution, Dielectrics, Induced dipole moments, polar non polar molecules, Free and bound charges. Polarization, Atomic polarizability, electric displacement vector, electric susceptibility, dielectric constant, relation between them.

Electric potential and electric field due to a uniformly polarized sphere (i) out side the sphere (ii) at the surface of the sphere (iii) inside the sphere, Electric field due to a dielectric sphere placed in a uniform electric field (a) out side the sphere (b) inside the sphere, Electric field-due to a charge placed in dielectric medium and Gauss law. Clausius-Mossotti relation in dielectrics. (15 Lectures)

Unit III

Magnetostatics and Magnetic field in matter: Lorentz force, properties of magnetic field, Ampere's law, field due to a current carrying solid conducting cylinder (a) out side (b) at the surface and (ii) inside the cylinder. Ampere's law in differential form, Introduction of Magnetic Vector potential, Poisson's equation for vector potential, Deduction of Bio-Savart law using Magnetic Vector potentials, Differential form of Ampere's law, Atomic magnet, Gyromagnetic ratio, Bohr-magneton, Larmor frequency, induced magnetic moment and dia-magnetism, spin magnetic moment, para and ferro. magnetism, Intensity of Magnetization, Magnetic permeability and Susceptibility, free and bound current densities, Magnetic field due to a uniformly magnetized material and Non-uniformly magnetized material. (15 Lectures)

Unit IV

Maxwell's Equations and Electromagnetic waves: Displacement current, Maxwell's Equations, Electromagnetic waves, Electromagnetic waves in an Isotropic medium, Properties of electromagnetic waves, Energy density of Electromagnetic waves, Pointing vector, Radiation pressure of free space, Electromagnetic waves in Dispersive medium, Spectrum of Electromagnetic waves. (15 Lectures)

Suggested Books and References –

1. Electricity & Magnetism; A.S. Mahajan & Abbas A. Rangwala, Tata McGraw-Hill
2. Introduction to Electrodynamics; D. Griffiths, Wiley

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3. Berkley Physics Course, Vol. II, Edward M. Purcell
4. Fundamental University Physics Vol II: Fields and Waves; M. Alonso and E.J. Finn: Addison-Wesley Publishing Company

Suggested E-resources-

1. MIT OpenCourseWare: Electricity and Magnetism - This resource offers lecture notes, assignments, and exams for a complete course on electricity and magnetism: <https://ocw.mit.edu/courses/physics/8-02sc-physics-ii-electricity-and-magnetism-spring-2011/>
2. HyperPhysics - This online resource provides concise explanations and interactive simulations for various topics in electrostatics and electric fields: <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>

Course Learning Outcomes:

By the end of the course, students should be able to:

1. Understand the concept of scalar and vector fields and their physical significance.
2. Demonstrate knowledge of gradient, divergence, and curl operators and their applications in electromagnetism.
3. Apply Gauss divergence and Stoke's theorems to analyze electric and magnetic fields.
4. Explain the behavior of electric fields and potential energy in different charge distributions.
5. Analyze the interaction of electric dipoles with external electric fields and calculate the resulting potentials.
6. Solve problems related to Poisson's and Laplace's equations in electrostatics.
7. Describe the behavior of electric fields in different types of matter, including dielectrics and polarized spheres.
8. Understand the concept of electric displacement, susceptibility, and dielectric constant.
9. Analyze the behavior of magnetic fields in various materials and the effects of currents on magnetic fields.
10. Apply Ampere's law and the magnetic vector potential to calculate magnetic fields in different scenarios.
11. Explain the properties of electromagnetic waves and their behavior in isotropic and dispersive media.
12. Calculate the energy density and radiation pressure of electromagnetic waves.
13. Understand the spectrum of electromagnetic waves and its implications.

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Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
II	UG0803-PHY-52P-104	Physics Lab-II	5	2
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major/Minor	Practical, Sixty hours of practical including diagnostic and formative assessment during practical hours.		
Prerequisites	Physics and Mathematics courses of Central Board of Secondary Education or equivalent.			
Objectives of the Course:	<ol style="list-style-type: none"> 1. To provide hands-on experience in conducting experiments related to electricity and magnetism. 2. To develop practical skills in using various electrical components and instruments. 3. To reinforce theoretical concepts learned in the corresponding lecture course through practical applications. 4. To enhance problem-solving and analytical skills by analyzing experimental data and interpreting results. 5. To promote scientific inquiry, critical thinking, and the ability to design and execute experiments. 6. To foster teamwork and collaboration in conducting experiments and analyzing results. 7. To develop skills in accurately measuring and recording experimental data. 			

UG0803-PHY-52P-104: Physics Lab-II

The colleges are free to set new experiments of equivalent standards. This should be intimated and approved by the Convener, Board of Studies before the start of the academic session. It is binding on the college to have an experimental set-up of at least ten experiments listed below. In case the number of experiments performed by the student is less than eight, his marks shall be scaled down in the final examination on a pro-rata basis. Laboratory examination paper will be set by the external examiner out of eight or more experiments available at the centre

List of Experiments –

1. To study the Faradays Law of electromagnetic induction.
2. To study the variation of power transfer by two different loads by a D.C. source and to verify the maximum power transfer theorem.
3. To study the variation of charge and current in an RC circuit with a different time constant (using a DC source).
4. To study the behaviour of an RC circuit with varying resistance and capacitance using AC mains as a power source and also to determine the impedance and phase relations.
5. To study the rise and decay of current in an LR circuit with a source of constant emf.
6. To study the voltage and current behaviour of an LR circuit with an AC power source. Also determine power factor, impedance and phase relations.
7. To study the magnetic field along the axis of a current-carrying circular coil. Plot the necessary graph and hence find the radius of the circular coil.
8. To study the frequency response of a series LCR series circuit and to estimate the resonance frequency and find out Q-factor and band width.

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9. To study the frequency response and to find resonant frequencies of L-C-R parallel circuits. Also to find the quality factor and band width in L-C-R series circuit.
10. To determine the specific resistance of a material and determine the difference between two small resistance using Carey Fosters Bridge.
11. To convert a galvanometer into an ammeter of a given range.
12. To convert a galvanometer into a voltmeter of a given range.

Suggested Books and Reference –

Suggested E-resources.

Course Learning Outcomes:

By the end of the course, students should be able to:

1. Demonstrate proficiency in using various electrical components and instruments required for conducting experiments.
2. Apply theoretical concepts of electricity and magnetism to design and execute experiments.
3. Analyze experimental data using appropriate mathematical and statistical techniques.
4. Interpret experimental results and draw conclusions based on data analysis.
5. Develop skills in accurately measuring physical quantities and recording experimental observations.
6. Communicate experimental procedures, results, and conclusions effectively in written reports.

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UNIVERSITY OF RAJASTHAN

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SYLLABUS

B.Com. Part –III

Examination 2024

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B.Com. (Pass) Course

SCHEME OF EXAMINATION

The number of papers and the maximum for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject paper, wherever prescribed, separately classification of successful candidates shall be as follows :

First Division 60%	} Of the aggregate marks prescribed at (a) Part-I Examination, (b) Part-II Examination (c) Part-III Examination, taken together
Second Division 48%	

All the rest shall be declared to have passed the examination if they obtain the minimum pass marks in each subject, viz., 36% No division shall be awarded at the Part-I and Part-II examination.

CONTENTS

1. Accountancy and Business Statistics	5
2. Business Administration	18
3. Economics Administration and Financial Management	25


Additional Optional Subjects

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2. Garment Production and Export Management	44

Add – on Subjects

1. Computer Applications	47
2. Tax Procedure and Practice	47
3. Principles and Practice of Insurance	53
4. Office Management and Secretarial Practice	55
5. Advertising Sales Promotion and Sales Management	57
6. Tourism and Travel Management	59
7. Foreign Trade Practice and Procedure	60
8. Tourism	63
9. Principals and Practice of Banking and Insurance	64
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B.Com Part- III Examination

Distribution of Marks

S.No	Name of the Subject/Paper	Duration Hours	Max Marks	Min. Pass Marks
1.	Accounting & Business Statistics			
	Paper-I Auditing & Management Accounting	3	100	36
	Paper-II Optional (Any one of the following)			
	Paper-II (1) Advanced Accountancy	3	100	36
	Paper-II (2) Advanced Cost Accounting	3	100	36
	Paper-II (3) Advanced Business Statistics	3	100	36
	Paper-II (4) Cost ^{and} Management Audit	3	100	36
	Paper-II (5) Direct Tax	3	100	36
	Paper-II (6) ^{and} JUDICIAL AND SERVICE TAX	3	100	36
	Paper-II (7) Computerized Accounting (For Regular Students only)	3	100	36
2	Business Administration			
	Paper-I Functional Management	3	100	36
	Paper-II Optional (Any one of the following)			
	Paper-II (1) Advertising & Sales Management	3	100	36
	Paper-II (2) E-Commerce	3	100	36
	Paper-II (3) Insurance	3	100	36
	Paper-II (4) Industrial Laws	3	100	36
	Paper-II (5) Organizational Behaviour	3	100	36
3.	Economics Administration & Financial Management			
	Paper-I Rural Development & Cooperation	3	100	36
	Paper-II Optional (Any one of the following)			
	Paper-II (1) Business Budgeting	3	100	36
	Paper-II (2) Public Economics	3	100	36
	Paper-II (3) International Finance	3	100	36
	Additional Optional Subjects			
4	Textile Craft			
5	Garment Production & Fashion Merchandising			

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Add-on Subjects :

1. Computer Application
2. Tax Procedure and Practice
3. Principles and Practice of Insurance
4. Office Management and Secretarial Practice
5. Advertising Sales Promotion and Sales Management
6. Tourism and Travel Management
7. Foreign Trade Practices and Procedures
8. Tourism
9. Principles and Practice of Banking and Insurance
10. Foreign Trade Procedure

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B.Com. Part III (Pass Course)

Paper I (Compulsory)

Auditing and Management Accounting

TIME: 3 hour

Max. Marks-100

Min. Marks 36

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit – I

Auditing: Meaning, Objects, Fraud and Errors, Relationship in between Book-Keeping Accounting and Auditing, Elementary Knowledge of Standards on Auditing Practices, Type of Audit.

Internal Control Measures.

Audit Programme.

Unit – II

Vouching, Verification and Valuation of Assets and Liabilities (including Practical Verification).

Company Auditor: Appointment, Removal and Remuneration.

Unit – III

Company Auditor: Audit and Auditors (brief Knowledge of Sections 139 to 148 of Companies Act, 2013), Rights, Duties and Liabilities.

Company Audit, Audit Report and Certificates.

Unit – IV

Management Accounting: Meaning, Nature, Objectives, Scope and functions.

Capital Structure: Determinants and Theories.

Leverages: Operating, Financial and Combines.

Unit – V

Financial Statement Analysis: Meaning, nature, importance and techniques of financial analysis: Comparative Statements, Common Size Statement and Trend Analysis.

Ratio Analysis: Preparation of Income Statement and Balance Sheet on the Basis of Ratio.

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

1. H.S. Khandelwal: Auditing.
2. T.R. Sharma: Auditing.
3. Batty J: Management Accountancy.
4. Manmohan & Goyal: Principles of MagementAccounting.
5. Jain and Khandelwal: Auditing and Management Accounting.
6. Maheshwari S. N: Management Accounting and Financial Control.
7. M.R. Agarwal: Management Accounting.
8. C.P. Jain & HS Khandelwal: Auding& Management Accounting.

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B.Com. Part III (Pass Course)

ABST Optional Paper I

Advanced Accountancy

TIME: 3 hour
Min. Marks 36

Max. Marks-100

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit – I

Departmental Accounts.
Branch Accounts including Foreign Branch.

Unit – II

Investment Accounts
Royalty Accounts

Unit – III

Accounts of Holding and Subsidiary Companies.

Unit – IV

Amalgamation of Companies (excluding inter company holdings)
Internal Reconstruction (without scheme)

Unit – V

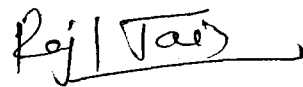
Liquidation of Companies : procedure contributories, statement of affairs, deficiency Accounts,
Liquidator and receivers Final Statement of Account
Double Account System (Excluding accounts of electricity supply companies)

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

- 1 R.L. Gupta; Advance Accounting
- 2 Shukla, Grewal; Advanced Accountancy
- 3 Agarwal, Sharma; Advanced Accounting
- 4 Sehgal and sehgal; Advanced Accounting Vol. II

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B Com.Part III (Pass Course) :

Optional Paper-II

Advance Cost Accounting

Time : 3 hours

Max. Marks.100

Min. Marks 36

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit-I

Accounting Treatment and Control of Waste, Scrap, Spoilage, Defective and Obsolescence. Accounting Treatment and Control of Administrative, Selling and Distribution Ovrthead, Research and Development Costs. Learning Curve Theory

Unit-II

Integrated and non-integrated cost accounts (Cost Ledger or Cost Control Accounts), Reconciliation of cost and financial accounting.

Unit-III

Process Costing : Accounting treatment of losses during processing, inter-process profit. By Product and Joint-Product. Equivalent Production, Uniform Costing and Inter-firm Comparison. Ratios useful for inter-firm Comparison.

Unit-IV

Meaning of concept of Marginal Costing : Break-even Analysis and Differential costing. Valuation of stock under marginal and absorption costing; Production decisions based on Marginal Costing (Make or Buy, Manual or Machine, Key Factor based product mix only)

Unit-V

Marketing decisions and other decision based on Marginal Costing (Own or lease, repair or replace, now or later, shut down or continue only) Standard Costing (sales & overhead) ✓

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

1. Maheswari and Mittal : Cost Accounting, Mahaveer Book Depot, Delhi
2. Praxad N.K : Principles and Practice of Cost Accounting
3. Saxena and Vashistha : Advanced Cost Accounts (Sultan Chand & Sons)
4. Ratanam P.V. : Costing Adviser (Kitab Mahal)
5. Ravi M. Kishor : Cost Accounting, Taxmann Publication, New Delhi
6. Oswal, Mangal, Bidawat : Advanced Cost Accounting



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B.Com. Part III (Pass Course)

ABST Optional Paper III

Advanced Business Statistics

TIME: 3 hour
Min. Marks 36

Max. Marks-100

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit – I

Analysis of time series : Meaning, components of time series, methods of measuring trend, seasonal and cyclical variations, Multiple correlation and regression.

Unit – II

Theory of probability: Elementary problems based on permutations and combinations, additive and multiplicative rules. Bays Theorium:

Unit – III

Theoretical Frequency Distributions : Binomial, Poisson and Normal distribution, Moments & Kurthosis

Unit – IV

Sampling: Meaning, Sample of attributes and variables, Test of significance, large samples and small samples, t-test, and chi-square test.

Unit – V

Analysis of variance: One way and two way classifications, design of experiment. Statistical quality control

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

1. Matur, Khandelwal, Gupta: Business Statistics
2. Kailash Nath Nagar : Business Statistics
3. S.P. Gupta – Statistical Methods
4. Sancheti & Kapoor- Statistical Methods

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B.Com. Part III (Pass Course)

ABST Optional Paper IV

Cost and Management Audit

TIME: 3 hour

Max. Marks-100

Min. Marks 36

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit – I

Cost Audit; Meaning, Evolution, Scope, Aspects, Objects, Nature, Advantages, Difference between Statutory Audit and Cost Audit, Application of Cost Accounting Standards, Cost Auditor and Professional Ethics.

Unit – II

Cost Audit Programme, Cost Accounting Records Rules, Verification of Cost Records and Reports.

Unit – III

Cost Audit Report and its Review, Cost Audit leading to other services: Productivity, Energy, Inventory, Environmental Pollution Control and Corporate Service, Peer Review.

Unit – IV

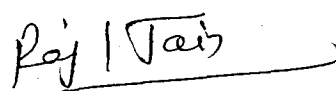
Management Audit: Meaning, Need, Difference between Statutory Audit and Management Audit, Purpose/objects, Scope, Aspects, Techniques and Procedures of Management Audit, Review of Management Functions: Production, Distribution, Development, Personnel and Industrial Relations, Research and Development, Cost Accounting and Finance and General Management Functions.

Unit – V


Review of Purchasing Operations, Review of Manufacturing Operations, Appraisal of Management Decisions, Corporate Social Audit.

Books Recommended:

1. Chaudhary D: Management Audit and Cost Audit,
2. Ramanathan: Cost and Management Audit,
3. Rose T.G.: Management Audit
4. Kamal Gupta: Contemporary Audit
5. Saxsena&Vasisth : Cost & Management Audit.


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ABST Optional Paper V

Direct Tax

TIME: 3 hour
Min. Marks 36

Max. Marks-100

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit –I

Advance Payment of Tax, TDS, Interest on Taxes and Tax Refund Procedure or E filing or return

Unit –II

Assessment of Trust, Assessment of Local Authorities

Unit –III

Assessment of Non- residents and Representative Assessee.

Advance Ruling, Double Taxation Relief and Foreign Collaboration

Unit –IV

Assessment of Co-operative Societies

Penalties and Prosecutions, Appeal, Revision and Tax Authorities

Unit –V

Assessment of Companies

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

1. Singhanian V.K : Direct Taxes
2. Girish Ahuja : Direct Taxes
3. Lal B.B. : Income Tax Law and Practice
4. Lakhota R.N : Assessment of Companies and their officers
5. Patel & Choudhary : Corporate Tax

B.Com. Part III
ABST Optional Paper VI
GOODS AND SERVICES TAX

TIME: 3 hour
Min. Marks 36

Max. Marks-100

Unit –I

Introduction of GST, IGST Act, 2017. Definition, Benefits, Constitutional Aspects and Legal Framework of GST Including CGST, IGST, SGST and UTGST.

Unit –II

Identification of Nature of Supply- Inter State and Intra State Supply, Composite and Mixed Supply, Continuous Supply and Zero Rated Supply, Taxable and Non- taxable Supply, Exemptions, Composite Scheme of GST, Applicable Rates of GST.

Unit –III

Concept Relating to Input Tax Credit and Computation of Input Tax Credit.

Unit –IV

Procedure of Registration Under GST, Maintenance of Books and Records, Filing of Returns, Computation of GST, Payment of Tax, Reverse Charge, Refund of Tax.

Unit –V

Administration of GST Regime, Assessment, Demand and Recovery, Inspection, Search, Seizure, Provisions with Respect to offences and Penalties.

Books Recommended:

1. Nitya tax associates:Basics of GST, Taxman, Delhi.
2. Dr. Harsh Vardhan :Goods & Service Tax, Bharat Publication, Delhi
3. Shah and Mangal :Goods and Service Tax, RBD, Jaipur
4. Goods and Service Tax : P.C. Publications, Jaipur.
5. Bangar and Bangar :Beginor's guide to GST, Aadhya Publication, Allahabad.

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B.Com. Part III (Pass Course)
ABST Optional paper – VII

Computerized Accounting

(Theory- 50 Marks and Practical 50 Marks For Regular Students only)

Unit –I

Basics of Accounting: Introduction, Double Entry System of Book-Keeping, Types of Accounts, Mode of Accounting, Financial Statements, Manual Accounting v/s Computerized Accounting, Accounting with Tally: Introduction, Company Creation, Company Features and Configurations.

Unit –II

Creating Accounting Masters in Tally: List and Charts of Accounts, Creation of Groups and Ledgers, Display and Alter of Groups and Ledgers, Accounting vouchers, Accounting Voucher Entry. Use of Excel in Accounting.

Unit –III

Creating Inventory Masters in Tally: Creation of Stock Group, Stock Categories, Units of Measures, Godowns, Stock Items, Inventory Vouchers, Inventory Voucher Entry of Invoicing, GST Tax Calculations, Input Tax Credits, GST Returns.

Unit –IV

Financial Report Generation Through Tally, Accounting Through DBMS (Data Base Management System).

Unit –V

Technological Advantages of Tally: Security Controls, Backup and Restore, Export and Import of Data & Printing Reports.

Practical

Syllabus will cover above topics. Practical will be conducted by Internal as well as external examiner. External Examiner Will be Appointed by the University.

Books Recommended:

- Tally, Shridharan, Narmadha Publications.
- Tally, ERP 9 With GST, Tally Education Pvt. Ltd.

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ABST

Paper-II Optional Papers

Paper- II (1)	Advanced Accountancy
Paper- II (2)	Advanced Cost Accounting
Paper- II (3)	Advanced Business Statistics
Paper- II (4)	Cost and Management Audit
Paper- II (5)	Direct Tax
Paper- II (6)	Goods and Service Tax
Paper- II (7)	Computerised Accounting (Theory- 50 Marks and Practical 50 Marks For Regular Students only)

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B.Com Part III-
Business Administration
Paper I Functional Management

Unit I

Meaning, Scope, Role and Functions of Human Resource Management, Organisation of Human Resources Department, Human Resource Planning, Recruitment, Selection, Placement and Induction.

Unit II

Job Analysis, Job Enlargement and Job Enrichment, Training and Development, Performance Appraisal and Merit Rating.

Unit III

Marketing-Meaning, Evolution, Modern Concept, Scope and Importance, Product Planning and Development; Marketing Research; Channels of Distribution; Pricing Policies and Strategies.

Unit IV

Finance Functions; Importance and Scope of Financial Management; Functions and Role of Finance Manager; Financial Planning and Capital Structure; Sources of Finance; Working Capital and its Sources.

Unit V

Meaning, Nature, Scope and Importance of Production Management; Production Process, Production Planning and Control; Quality Control; Product Design and Product Research; Meaning, Scope and Functions of Materials Management; Inventory Planning and Control.



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Books Recommended:

1. Gupta C.B. : Human Resource Management, Sultan Chand and Sons, New Delhi
2. P. Subba Rao: Essentials of HRM and Industrial Relations
(Himalaya Publishing House)
3. Butta, E.S. : Modern Production Management
4. Dutta, S. K. : Materials Management
5. Gopal Krishanan and Sonderiam : Integrated Material Management
6. Kotler, Keller, Koshy, Jha: Marketing Management (Pearson)
7. शर्मा, शर्मा, सुराणा : मानव संसाधन प्रबन्ध (रमेश बुक डिपो)
8. जी.एस. सुधा : क्रियात्मक प्रबन्ध (रमेश बुक डिपो)
9. भद्रादा, पारवाल : विपणन प्रबन्ध के सिद्धान्त एवं व्यवहार (रमेश बुक डिपो)
10. अग्रवाल, अग्रवाल : वित्तीय प्रबन्ध (रमेश बुक डिपो)
11. पौरवाल, सुथार : उत्पादन प्रबन्ध (रमेश बुक डिपो)
12. पौरवाल, सुथार : सामग्री प्रबन्ध के सिद्धान्त एवं व्यवहार (रमेश बुक डिपो)

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B.COM Part IIIrd

Paper II Optional Paper

1. Advertising and Sales Management

Unit I

Advertising Concepts; Objectives and Significance of Advertising; DAGMAR Approach; 5M Model; Types of Advertising.

Unit II

Advertising Budget, Advertising Campaign Planning; Advertising Message.

Unit III

Advertising Media Planning; Reach, Frequency, Media Scheduling, Factors Affecting Selection of Media; Measuring Advertising Effectiveness; Advertising Agency- Structure and Functions.

Unit IV

Role of selling in a Planned Economy; Selling as a Career; Qualities of a Salesman; Product Knowledge; Effective Speaking, Customer Relations; Sales Organisation; Recruitment and Selection of Salesman; Training, Motivation, Remuneration of Salesman.

Unit V

Planned Selling Approach- steps involved; sales call; sales Forecasting, Sales Quotas and Territories; Consumer Psychology; Buying Motives, Control of Sales Operations; Salesman's Reports; Meeting Selling Costs and Sales Cost Control.

Books Recommended:

1. Batra, Myres and Akar: Advertising Management, Prentice Hall of India, New Delhi
2. Chunawalla and Sethia: Foundations of Advertising, Himalaya Publishing House, New Delhi
3. S. Shyam Prasad & Sumit Kumar: Advertising Management, Ramesh Book Depot, Jaipur

४ आर. एस. नीलखा : विक्रय सवर्धन एवं विक्रय प्रबन्ध (रमेश बुक डिपो)

५ जी. एस. सुधा : विक्रय सवर्धन एवं विक्रय प्रबन्ध (रमेश बुक डिपो)

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B.COM. Part IIIrd

Optional Paper

2. E-Commerce

Unit I :

Meaning, Characteristics, Origin, Process, Key Drivers of E-Commerce, Elements, Traditional Commerce Vs E-Commerce, Benefits, Standards, Technologies, E-Commerce Models, Mobile Commerce, Barriers to E-Commerce.

Unit II :

Internet and E-Commerce, Networking-LAN, WAN, Business Uses of Internet, www, Protocols, Intranet and Internet, Multimedia Application. Hardware and Software.

Unit III :

Electronic Payment Systems- Methods, Security Issues, Electronic Banking, Electronic Stock Trading.

Unit IV :

Data Warehousing, Client-Server Computing, Data Mining, Website Management - Steps.

Unit V :

ERP - Meaning, Functions, SAP Applications, Business Intelligences, Ethics, Security and E-Governance.

Books Recommended:

1. C.S. Rayudu: E-Commerce and E-Business, Himalaya Publishing House.
2. V.D. Dudeja: Information Technology : E Commerce & E-Business, Commonwealth Publisher, New Delhi
3. B. Bhasker: Electronic Consumer Framework- Technologies and Applications, Tata McGraw-Hill
4. Parag Diwan and Sunil Sharma: Electronic Commerce A Managers Guide to E-Business, Vanity Books International, New Delhi

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B.COM. Part IIIrd

Optional Paper

3. Insurance

Unit I :

Insurance: An Introduction, Risk Management and Insurance, Principles of Insurance Contract, Types of Insurance Contract.

Unit II :

Fire Insurance, Marine Insurance, Life Insurance, Development of Life Insurance in India.

Unit III :

Life Insurance Corporation of India, Life Insurance Agents, Life Insurance Plans, Life Insurance Selling and underwriting.

Unit IV :

Premium Calculation in Life Insurance, Settlement of Claims in Life Insurance, General Insurance, The General Insurance Corporation of India.

Unit V :

Liberalisation and Insurance, The Insurance Act, 1938; The Insurance Regulatory and Development Authority (IRDA), Prospects and Challenges in Insurance Sector.

Books Recommended :

1. Mishra, M.N.: Principles & Practice of Insurance, S.Chand & Company, New Delhi.

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Optional Paper

4. Industrial Laws

Unit I :

The Factories Act, 1948; The Payment of Wages Act, 1936.

Unit II :

The Minimum Wages Act, 1948.

The Indian Trade Union Act, 1926.

Unit III :

The Industrial Disputes Act, 1947

The Payment of Bonus Act, 1965

Unit IV :

Workmen's Compensation Act, 1923.

Employees State Insurance Act, 1948.

Unit V :

Employee's Provident Fund and Miscellaneous Provision Act, 1952.

Gratuity Act, 1972. Maternity Benefit Act, 1961

Books Recommended :

1. Inderjeet: Labour Laws
2. Sarkar: Labour Laws of India
3. D. P. Gupta: Industrial and Labour Laws
4. Taxmann's Labour Laws
5. शर्मा, सक्सेना, पोरवाल : औद्योगिक सन्धियम
6. कुमावत : औद्योगिक सन्धियम

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B.COM. Part IIIrd

Optional Paper

5. Organizational Behaviour

Unit I :

Meaning and Concept of Organization Behaviour, Role of OB in Today's Business organization, Challenges and Opportunities, Theories of Organizational Behaviour, Scope of Organisational Behaviour.

Unit II :

Perception, Nature, Importance, Difference between Sensation and Perception; Personality: Meaning, Determinants of Personality, Personality Traits and Types, Values, Attitudes and Job Satisfaction.

Unit III :

Interpersonal Behaviour, Group Dynamics- Meaning, Norms and Role, Types of Groups, Cohesiveness, Dynamics of Informal Group, Team and Team building.

Unit IV :

Conflict: Meaning, types process of conflict, approaches to conflict, conflict stimulation and resolution strategies. Stress- causes, effects, management of stress.

Unit V :

Meaning, Nature and factors of Organizational Change, Planned Change, Resistance to Change, Change Agent, Concept of Organizational Development, Organizational Development Interventions.

Books Recommended :

1. Prasad, L.M., Organizational Behaviour, S. Chand, New Delhi.
2. Robbins, Stephen P., Organizational Behaviour: Concept, Controversies, Applications, Prentice Hall of India, Pvt. Ltd. New Delhi.
3. Luthans Fred: Organizational Behaviour, McGraw-Hill.
4. P. S. Kumar, Anukriti Sharma and K. S. Krishna: Organizational Behaviour, Jahanvi Publications.



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B. COM PART - III

PAPER - I

Rural Development and Cooperation

Time : 3 hours.

Min. Marks : 36

Max. Marks : 100

- Unit-I Concept and significance of Rural Development, Strategy of Rural Development; Current issues.
Rural Development Administration -- Rural Development Agencies. Village level. Block level and District level Administration for Rural Development. District Rural Development Agencies.
- Unit-II Constitutional Provisions regarding Panchayati Raj, 73rd Constitutional Amendment. Sailable Features of Rajasthan Panchayati Raj Act., 1994.
Rural Infrastructure Development : Rural Roads, Rural Markets, Electrifications, Water Supply, Education and health.
- Unit-III Rural Development Programmes: Critical study of Rural Development Schemes : Swarnajayanti Gram Swarajgar Yojana (SGSY), Jawahar Gram Samridhi Yojana (JGSY), Sampurna Gramin Rojgar Yojana (SGRY), Pradhan Mantri Gram Sadak Yojana (PGSY), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Main features and achievement of these schemes.
- Unit-IV Programmes related to Tribal Welfare, Drought Prone Area Development, Desert Development, Nature and forest conservation, Woman and child development.
- Unit-V Concept of Co-operation, Principles of Co-operation, An evaluation of co-operative principles and modifications therein from time to time. Co-operation v/s Capitalism and Socialism.
Co-operative credit, marketing, consumers, housing and industrial cooperatives. State and Co-operation. A study of Rajasthan State Co-operative Bank. (Apex Co-op. Bank) and RAJFED.

Books Recommended:

1. B.S. Mathur : Co-operation in India
2. R.D. Bedi : Theory History and Practice of Cooperation
3. F.R. Fay : Co-operation at Home and Abroad.
4. बी.एस. माथुर सहकारिता
5. बी.पी. गुप्ता सहकारिता के सिद्धांत एवं व्यवहार
6. V. Sharda . The Theory of Co-operation.

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PAPER – II (1)
Business Budgeting

Time : 3 hours.
Min. Marks : 36

Max. Marks : 100

- Unit-I** Business Budgets and Budgeting : Meaning, Nature, Objectives, Advantages and Limitations of Budgets and Budgeting. Budget Terminology, Preparation of Budgets. Budget Co-ordination. Essentials of an Effective Budgeting. Types of Budgets : Fixed and Flexible Budget, Finance Budget Master Budget, Sales Budget, Production Budget, Cost of Production Budget-Direct Material Budget, Direct Labour Budget and Overhead Budget, Performance Budgeting, Zero Base Budgeting.
- Unit-II** Business Forecasting : Meaning, Theories, Importance and Limitations of Business Forecasting. Techniques and Tools of Business Forecasting. Essentials of Business Forecasting.
- Unit-III** Cash Budgeting : Meaning, Importance and Forms of Cash Budget. Preparation of Cash Budget. Methods of Preparing Cash Budget. Budgetary Control : Meaning, Characteristics, Objects and Benefits of Budgetary Control; Budgetary Control v/s Standard Costing- Sales Variances, Material Variances, Labour Variances.
- Unit-IV** Product and Production Decision : Meaning, Product, Product Decision areas, use of alternative production facilities, determination of the profitable level of production. Utilization of full production capacity. Starting a new product in place of existing product. Determination of product mix on the basis of key factor.
- Unit-V** Project Planning and Feasibility Study : Types of projects, Analysis of projects, profitability estimates of projects, feasibility-Economic Financial and Technical.
Cost of Capital : Computation of Cost of Debt Fund, Preference Share Capital, Equity Share Capital, Retained Earnings and Weighted Average Cost of Capital.

Books Recommended:

1. Gupta S.P. : Management Accounting
2. Kulshrestha N.K. : Theory and Practice of Management Accounting.
3. Man Mohan Goyal : Principles of Management Accounting.
4. अग्रवाल, विजय एवं सुरोलिया व्यवसायिक बजटन (Hindi and English editions)
5. अग्रवाल, एम.आर. व्यावसायिक बजटन

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

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PAPER – II(2)
Public Economics

Time : 3 hours.
Min. Marks : 36

Max. Marks : 100

- Unit-I** Nature and scope of Public Economics. Role in augmenting allocative efficiency, distributive justice and economic stability in the economy. Meaning and importance of fiscal policy, current fiscal policy of India.
- Unit-II** The Principle of Maximum Social Advantage. Public Expenditure, canons and effects on production, distribution and consumption recent trends in public expenditure.
- Unit-III** Sources of Public Revenue, Taxation – meaning, classification, canons and effects of taxation, Social justice.
Taxable capacity : Meaning, concept and classification.
- Unit-IV** Public Debt : Loan v/s Tax, Debt as a source of development, internal and external debts.
Deficit Financing, Non Tax Revenues, Profits from Public Enterprises. Recent Trends in Fiscal Deficit.
- Unit-V** Theory of Federal Finance. Centre-State Financial Relations Role of Finance Commission, Study of Current Finance Commission Financial Administration – Centre and States : Budgets-Tax Evasion and parallel Economy. Concept and implications of VAT and GST

Books Recommended:

1. L.N. Nathuramka – कराधान एक सैद्धान्तिक विवेचन
2. R.N. Bhargava – Theory and Working of Union finances in India (Chaitanya, Allahabad)
3. Dalton – Public Finance
4. Findlay Shirras – Public Finance
5. पी.एन. शर्मा – लोक वित्त
6. एण्डले एव सुन्दरम – लोक वित्त
7. Philip E. Taylor – The Economics of Public Finance
8. R.A. Musgrave – Theory of Public Finance
9. R.C. Agarwal – Public Finance – Theory and Practice

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PAPER – II(3)
International Finance

Time : 3 hours.
Min. Marks : 36

Max. Marks : 100

- Unit-I** International Finance : Meaning, importance need, scope, methods of payment, letter of credit – types, parties, procedure.
- Unit-II** International Financial Market : Meaning and functions of Financial market : Difference between Domestic and Foreign Financial Market, International debt instruments – Euro notes, Euro commercial papers, Euro bonds.
International Monetary System : Gold Standard, Gold Bullion Standard, Bretton Woods System, Post Bretton Wood agreements.
- Unit-III** IMF & World Bank, IFC & IDA, ADB – Objectives, Recent Developments, Progress and Criticism.
- Unit-IV** Determination of exchange rates – Equilibrium Rate of exchange – Mint Parity Theory – PPP Theory and Balance of Payment Theory. Causes of fluctuations in exchange rates. Fixed and flexible exchange rates.
Foreign Exchange Transaction : Spot, Forward Exchange, Futures, Options, and Arbitrage.
- Unit-V** Exchange Control : Meaning, Features, Objectives. Methods, Merits and Demerits. FEMA.
Foreign Aid to India : Role, Impact of Foreign Aid on India's Economic Development and Problems of Foreign Aid. WTO- Introduction, Objectives, Functions. India & WTO.

Books Recommended

1. Mithani D.M. : Introduction to International Economics, Himalaya Publishing House, Mumbai.
2. Seth M.L. : Money, Banking, International Trade and Public Finance – Lakshmi Narain Agarwal Educational Publisher, Agra.
3. S.K. Vargheese : Finance of Foreign Trade And Foreign Exchange.
4. M.C. Vaish : International Economics.
5. S.K. Mathur : International Trade and Finance, Shivam Book House (P) Ltd., Jaipur
6. Cherunilam Francis : International Economics, Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Avadhani V.A. : International Finance Theory and Practice, Himalaya Publishing Company, New Delhi



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TEXTILE CRAFT

B.Com. Part III – 2017

SCHEME: BA/B.Com PART-III

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	
	Paper -II	3Hrs	30	22
2. Practical:	Paper -I	3Hrs	35	
	Paper-II	3Hrs	35	25
3. Submission:	Paper -I		35	
	Paper-II		35	25

Paper-I : Weaving Theory II

UNIT-I

1. Types of Spinning: Mechanical and Chemical
Mechanical spinning process: picking, ginning, combing/carding, drawing etc. Types of chemical spinning-melt spinning, dry spinning and wet spinning.
2. Types of Yarns: Simple and Fancy
Simple yarn: single and double/plied/folded yarn
3. Calculation of resultant count for folded yarn

UNIT-II

1. Manmade and Synthetic fibres
Man-made fibres: Basic methods of producing rayon fibre, Different types of man-made fibres
Synthetic fibres: Different types of synthetic/chemical fibre, method of their production. properties of polyester fibre, nylon fibre, glass fibre.
2. Silk and Wool
Production, spinning, properties and uses of silk, different types of silk
Classification of wool, wool spinning process, difference between woollen and worsted fabric
3. Concept of Mixing and Blending, Basic difference between mixing and blending.
Concept of Staple and Filament fibre; difference between staple fibre and filament fibre

UNIT-III

- 1 Derivatives of Twill weave: Broken weave, Herringbone weave and Diamond weave
- 2 Towel weaves: Huckaback and Honeycomb; quality of yarn and weave selected for towels
- 3 Concept of shedding mechanism; Dobby and Jacquard shedding mechanism

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Paper-II: Dyeing Theory II

UNIT-I

1. Dye molecule; Concept and Importance of Chromophores and Auxochrome in a dye
2. Objectives of Fabric finishes; different mechanical and chemical fabric finishes: Determinants of finishes
3. Different types of natural and synthetic dyes.

UNIT-II

4. Method of direct printing: Screen printing; colour preparation and screen preparation
5. Discharge and Resist printing; different styles of discharge and resist printing
6. Factors affecting colour fastness: composition of fibre, chemical structure of dye, techniques of dyeing/printing, addition of other useful additives

UNIT-III

7. Importance of fabric finishes
8. Different types of chemical finishes- crease resistant finish, water proof finish, fire proof finish, moth proofing finish and absorbency finish.
9. Determinants of fabric finishes.

Practical (Paper-I)

1. Concept of yarn twist(S twist and Z twist) and plied yarn(single and double yarn)
2. Calculation of Ends and Picks per inch in given piece of fabric
3. Towel weaves preparation using paper strips

Practical (Paper-II)

1. Screen preparation (simple tracing method)
2. Table cover preparation by screen printing

Submission (paper-I)

1. Assessment of yarn and fabric samples
2. Assessment of weave samples

Submission (paper-II)

1. Assessment of samples
2. Any one article using screen printing

Practical Examination Scheme:

Major Problem: 20 Marks

Minor Problem: 15 Marks

Reference books:

Booth, J.E. (1996) Principles of Textile Testing, 1st edition, CBS publishers & distributors PVT.Ltd New delhi

Sahnai, V.A. (1980) Technology of Dyeing, Sevak publications. Mumbai

Sahnai, V.A. (1979) Technology of printing, Sevak publications. Mumbai

Sahnai, V.A. (1999) Technology of finishing, Sevak publications. Mumbai

5. GARMENT PRODUCTION & EXPORT MANAGEMENT

B.Com. Part III – 2025

PAPER – 1 : APPAREL TECHNOLOGY

B.A./B.Com. – M.M 40

B.Sc.- M.M. 50

Hrs. – 3

OBJECTIVES:

1. To create awareness on the basics of Fashion
2. To study the psychological effects of clothing on the individual in social situation.
3. To develop understanding of manufacturing technology of the garment Industry.
4. To understand the fundamental concepts of dyeing and printing.

SECTION-A : INTRODUCTION TO FASHION

1. Fashion terminology, sources of fashion, factors influencing fashion.
2. Fashion forecasting and fashion cycle.
3. India and international fashion designers (five each).
4. Sociological and psychological significance of clothing

SECTION-B : MANUFACTURING TECHNOLOGY

5. Product development, design development, developing a sample garment.
6. Apparel production
 - I. Costing a garment
 - II. Purchasing pattern making
 - III. Production scheduling
 - IV. Spreading and cutting procedure
 - V. Contracting
 - VI. Garment assembly
7. Introduction to industrial machines-
 - I. cutting : round , straight and band
 - II. fusing: collars, facing
 - III. sewing: chain stitch, lock stitch, button hole, blind stitching
8. Use of components and trims --
 - (i) Performance and properties of components and trims.
 - (ii) labels and motifs
 - (iii) linings and interlinings
 - (iv) face, braids, elastics
 - (v) fasteners; loops
 - (vi) seam binding and tapes
 - (vii) shoulder pads, eyelets

SECTION –C : DYEING AND PRINTING

Application of design:

7. i. Printing methods – block, screen, stencil, roller.
ii. Styles of printing – direct, discharge and resist.
8. Dyeing – introduction to natural and synthetic dyes (acid, basic, sulphur, vat, reactive and direct dyes)
9. Stages of dyeing : Fiber, yarn and fabric

References:

1. Rouse Blizabeth, 1999, Understanding Fashion, Blackwell science.
2. Carr Harold and John pomerory, 1996. Fashion design and product development. Blackwell science.
3. Jain Ruby and Rathore Girja, Design, Fashion and Garment Production, CBH publication Jaipur 2019.

PAPER- II : INTERNATIONAL MARKETING

B.A./ B.Com.- M.M. 40

B.Sc. – M.M. 50

Hrs. -3

OBJECTIVES:

1. To study the importance of marketing to the global economy
2. To develop insight into the development of marketing strategies for international markets
3. To Identify business opportunities in an international business environment

SECTION –A

1. International Marketing: nature and scope of international marketing.
2. International marketing v/s domestic marketing.
3. Importance of international marketing.
4. Problems and challenges of international marketing.
5. Selection of agents.

SECTION – B

6. Identification of markets for readymade garments.
7. Market entry conditions.
8. Channels of distribution.
9. Direct and indirect export
10. Trade fair and Exhibitions.

SECTION – C

11. Pricing, role of price and non price factors, factors influencing pricing, price quotation, information needed for export pricing.
12. Role of trading and export houses.

13. Institutional segments and packaging for exports: packing material, boxing and pressing department, machinery and equipments used in packaging department.
14. Quality control
15. Labeling and consumer protection meaning and its role.

References :

1. R. K. Kothari, B. S. Rathore, P. C. Jain (2009) International Marketing (2009) 1st ed. Ramesh Book Depot, Jaipur, New Delhi
2. R. Kothari and P. C Jain (2009) International Management 1st ed. Ramesh Book Depot, Jaipur, New Delhi
3. M. J. Methew International Marketing (Procedures and practices) 1st ed RBSA publishers. Jaipur

PRACTICAL – 1 : APPAREL PRODUCTION

B.A/B.Com.-M.M.60

B.Sc.-M.M. 25

Hrs.- 4

OBJECTIVES :

1. To develop basic adult drafts of bodice, sleeve and collar.
2. To develop various patterns of textile techniques
3. Guidance for preparation of portfolio

CONTENT

1. Prepare an adult's bodice and sleeve block.
2. Sketching and designing of men/women garments (5 each)
3. To prepare with specific details of necklines and sari blouses. (20)
4. To identify patterns and its application for women designer dress on fashion figures:
5. Types of patterns include --
 - I. Structural
 - II. Geometrical
 - III. Stripes and plaids
 - IV. Floral
6. Design and prepare an adult dress for fashion shows.

Examination Scheme:

B.A./B.Com. -Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

Internal :-10

B.Sc:-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5

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PRACTICAL – II : DYEING AND PRINTING

B.A/B.Com.-M.M. 60

B.Sc.- M.M. 25

Hrs.- 4

OBJECTIVES:

1. To learn the various types of skills in dyeing
2. To develop various textile printing techniques
3. Guidance of practical knowledge of export houses

Contents

1. Prepare and article of each: Tie and dye, stencil printing, block printing and batik
2. Field trips to Export houses and mass production centers.
3. Exhibition ;

References:

1. Bhargava, Ritu, 2005, fashion illustration and rendering, Jain Publications Pvt. Ltd. New Delhi.
2. Ireland, fashion designing drawing and presentation.
3. Prayag: Technology of textile printing.
4. Shenai: Technology of dyeing

Examination Scheme :

B.A.\B.COM:-Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

Internal :-10

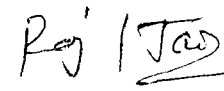
B.SC:-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5

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COMPUTER APPLICATION (VOCATIONAL COURSE) FOR

B.A./B.Com/B.Sc. Part III

Paper-I

Paper Name : Web Authoring tools

Unit I

Data communication, Components of Data Communication System, Transmission Media- Coaxial, UTP, Optical-Fiber, Wireless, Transmission Mode- Simplex, Half Duplex, Full Duplex, Introduction to networking, LAN, MAN, WAN, network topologies.

Unit II

Evolution of Internet, Basic internet terms (Client, Server, MODEM, Web page, Web site, Home page, Browser, URL, ISP, Web server, Download & Upload, Online & Offline etc), Internet applications (Remote login, VoIP, Video Conferencing, Audio-Video streaming, Chatting etc). E-Mail, Advantages, working, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol.

Unit III

Introduction to World Wide Web: History, Working of Web Browsers, Its functions, Search engine category, Concept of Hyper Text Transfer Protocol (HTTP), Web Servers, Internet Explorer, Component of Web Publishing, Site and Domain Name, Overview of Intranet and its applications. Introduction to Advanced Technologies: Big Data, Cloud Computing, Internet of Things, Artificial Intelligence(Introduction only).

Unit IV

HTML, Designed Tools, HTML Editors, Issue in Web Site Creations and Maintenance, FTP S/W for Upload Website, Elements of HTML & Syntax, Building HTML Documents, Use of Font Size and Attributes, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, Use of Frames and Forms in Web Pages.

Unit V

Basic of Cyber Security and Cyber Crime: Computer Ethics and Application Programs, Cyber Law, Introduction to IT laws & Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy, Intellectual property, Legal System of Information Technology, Mail Bombs, Bug Exploits. Software Piracy, Firewall, Threats, Hacking and Cracking (basic concepts only for these topics).

Recommended Books:

1. The Complete Reference: HTML & XHTML.; Thomas A. Powell, 4th Edn.
2. Mastering HTML 4.0 by Deborah S. Ray and Eric J. Ray From BPB
3. Mastering Java Script, BPB publication.
4. Internet and web technology by Raj Kamal, TMH Publication 2. Steven Holzner,
5. The Complete Reference Java Scripts., Tata McGraw – Hill, 3rd Edn.
6. Java Script, Don Gosselin, Vikas publications

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Paper-II

Paper Name : Software Engineering & E-Commerce

Unit I

Introduction to software engineering: What is software engineering, software engineering principles, Software characteristics, applications. Software Development life-cycle, Models: Waterfall model, Incremental model, spiral model, Prototyping Model.

Unit II

Software requirements: Functional- non-functional requirements, User requirement, System requirements, Software requirements documentation, Software Requirement engineering process, Feasibility studies, Requirements elicitation and analysis, software prototyping, Software Reliability, Software Reusability. Software design: Basics of software design, Software Design Techniques, Data design, Data Flow Diagram.

Unit III

A strategic approach to software testing, test strategies for convention software, Black-box and white box testing, validation and system testing, and debugging; System implementation, maintenance and documentation;

Unit IV

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Security Threats of E-Commerce, E-Commerce models.

Unit V

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash. Introduction to e-banking and support services.

Recommended Books:

1. Pressman, Roger (2001) Software Engineering; A Practitioner's Approach, 8th ed. M Graw-Hill, 2014.
2. Girdhari Singh, Shalinipuri; Software Engineering; 2022 Edn. Genius Publications
3. Jalote, Pankaj (7) An integrated Approach to Software Engineering 2nd Ed.
4. Simon Bennett, Steve McRobb and Ray Farmer, " Object-Oriented Systems Analysis and Design Using UML " 4th Edition, McGraw Hill Education, 2010
5. Ravi Kalakota, "Electronic Commerce: A Manager's Guide", Addison-Wesley Professional, Edition 2012.
6. Ian Daniel, "E-Commerce get it Right", Neuro Digital Publication, 2011.
7. Lexis Leon; Enterprise Resource Planning; TMH

Paper-III

Paper Name : Web Authoring Tools Lab
Content : Lab practical's based on paper I.

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Add-on Subjects

I. COMPUTER APPLICATIONS

Paper I : Computer Aided Drafting	50	65
Paper II : Advanced Topics in Computer	50	65
Paper III : Report, Report on the Job training and entrepreneurship, Development	50	70

The duration of these papers will be 3 hours each

Paper I : COMPUTER AIDED DRAFTING

Introduction to AUTOCAD/ROBOCAD or a similar package
Advanced features of these package. Drawing the plan of building
using AUTOCAD etc. Analysis features of AUTOCAD.

Paper II : ADVANCED TOPICS IN COMPUTER

Computer animation. Artificial intelligence. Desiccated computers
ATMs. Data encryption. Data communication and networking
(course to be modified every year to take care of the latest
development) Visits to computer industry

Practical :

Design of layout of a building. Design of interior of its rooms
Printing and plotting the prepared drawings
It will also include Project Report. Report on the job training and
Entrepreneurship development

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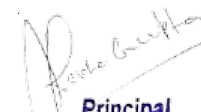
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2. TAX PROCEDURE AND PRACTICE
MODEL FOR PREPARATION OF OUTLINE OF COURSES

1. Subject title TAX PROCEDURE AND PRACTICE (16 weeks)
2. Subject objectives : **General objectives**
 - (a) To familiarize the students with the Indian Tax System.
 - (b) To acquaint the students with the procedure and practices of direct and indirect taxes.
3. Job Potential
 - (i) Self Employment : Prepare returns and relevant documents for small traders, small industries and people engaged in small and medium business, necessary under direct and indirect tax law
 - (ii) Wage Employment : Junior level positions in the various

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organisations such as :

- (a) Practising chartered Accountant firms.
 - (b) Business Houses.
 - (c) Industrial undertakings and establishments.
 - (d) Sales Tax and Income tax departments.
 - (e) Custom and Excise departments.
 - (f) Accounts departments of various central, state, local and Government societies etc.
4. (i) This cannot go with Science subjects.
(ii) It can go with commerce (B.Com. Pass).
(iii) It can go with B.A., provided a student has done 10+2 with Accounting and Business studies of Commerce.
5. (i) Contents:
- (a) Syllabus (Theory & Practical - enclosed).
 - (b) Business Lab should be equipped with the following :
 - (i) All Bare Acts related to direct and indirect taxes and various tax forms/returns documents.
 - (ii) Reference Books.
 1. Palkiwala : Income Tax
 2. Chaturvedi & Pathisana : Income Tax
 - (iii) Text Books :
 1. Singhania : Direct Taxes
 2. H.C. Mehrotra : Income Tax Law & Practice.
 - (iv) Journals :
 1. The Institute of Chartered Accountants
 2. Central Excise Law System
 3. Taxman.

Note : In addition to the above books the new text books should be prepared on the lines of the prescribed syllabi. Equipment computer facilities must be made available in the business Lab.

- (v) On the Job Training (After 1 year).
Proper training should be given to students, to prepare various returns/ forms/ documents etc. related to Income Tax and Sales Tax/ Excise duty to enable the students be acquired necessary skills so that they can prepare these documents independently. Students can be taught for the

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purpose of training with local industrial houses, Excise and Custom departments; Income and Sales tax departments, and practising firms of the Chartered Accountants.

(vi) On the job Training (After 2nd years) :

Students should be prepared for practical training with the organisations as suggested in (ii). Students can prepare the necessary documents/ returns/ forms, etc. related to direct and indirect taxes.

6. Unit cost for 30 students :

(a) Building as per norms of the UGC.

(b) Rupees one lakh for books, journals and equipments.

7. Modalities of Examination and Evaluation :

(a) Weightage between theory and practicals should be 70% and 30% respectively.

(b) Continuous evaluation : Assignments, surprise test quiz.

Paper-I : INDIRECT TAX—PROCEDURE & PRACTICE

Max. Marks : 100

3 hrs. duration

Min. Marks : 36

Section-A

1. Nature of meaning of Central Excise—Excise and Central Excise: Distinction between Central Excise duties and Customs. Sales Tax. Octroi duty.
Basis of Excise Duty : Specific duty, advalorem duty, levy of slabs, compounded duty.
Leviability : on what duty is leviable and who is liable to discharge the duty liability.
Kinds of excise duty : Basic additional duty of excise, special duty.
2. Organisation of Central Excise in India Administrative operational authorities.
3. Regulatory Framework—An overview of Central Excise and Salt Act, 1944; An overview of Central Excise (amendment) Act, 1985 Central Excise Rules, 1944.
Important terms and definitions. Assessee. Assessable value, excisable goods, manufacturer, manufacturer.

Section-B

4. General procedure under Control Excise :

A. Registration for Central Excise—Purpose and procedure there-

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of, exemption from registration, filling and declaration for claiming exemption, forms of application for registration and filling and filing of the same.

- B. Classification lists—filling and submission of classification lists and its approval. Form—I : Classification lists of excisable goods provided.
- C. Price lists—When prior approval of price lists required, when submission of price lists not required; submission of price lists under Part-I and Part-VII. Valuation of excisable goods—Items included and excluded in the value.
- D. Maintenance of production records—R.G.I. Register of daily production : Stock Register for issue of raw materials under form No. RG 23A (Pt.I) : Account of raw material in Form No.4.
5. Clearances : Types of clearances :
Clearances of excisable goods under physical control; self removal procedure; compounding scheme; clearance of non-excisable goods; removal of goods for home consumption; removal of goods for exports.
- (i) Removal of goods for home consumption.
- (a) Clearance under physical control—making an application under Form No. AR1 to Circle Inspection before removal of goods.
Preparation of TR6 and depositing the duty, removal of excisable goods under GP I.
- (b) Removal of goods under compounded levy scheme
Application for exercise of this option.
- (c) Self removal procedure applicability and its salient features—Record based control and production based control.
Depositing of excise duty under challan TR 6.
Preparation of GP I and Maintenance of other records of removal like P.L.A., TG 23A Part-II Register.
- (d) Clearance of non-excisable goods.
- (ii) Removal of goods for export :
Export of excisable goods. excise concession in case of exporter. Types of exporter.
Export of excisable goods under claim for rebate, export under bond and procedures thereof. Form No. A4 and A4A.

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Section-C

CENVAT

What is CENVAT, Salient features of CENVAT.

CENVAT declaration for claiming CENVAT.

Small Scale Industry:

- (i) Eligibility of SSI which are exempted from licensing control.
- (ii) SSI availing concession rate of duty. General exemption in small scale Exemption Scheme under Notification No. 175/86.

Books of Accounts, Records and their preservation :

- (a) Records—RGI, EB-4 for daily production and clearance.
- (b) Account of principal raw material.
- (c) CENVAT and proforma Credit Record.
- (d) Personal ledger account.
- (e) Goods received for reprocessing.
- (f) Excise Control code No.

Return :

Periodical/Quarterly Return of material used.

For obtaining excisable goods for special industrial purposes without payment of whole or part of the duty and state the nature and quantity of such goods used for finalized products. monthly returns.

Paper-II : INDIRECT TAX II-PROCEDURE & PRACTICE

Max. Marks : 100

3 hrs. duration

Min. Marks : 36

Section-A

1. Role of customs in international trade.
2. Organisation of customs in India—administrative and operational authorities.
3. Regulatory framework—An overview of customs Act, 1962; An overview of customs Tariff Act, 1975.
Important terms and definitions
Assessable value; baggage; bill of entry; bill of exports suitable goods; duty exporter; foreign going vessel; aircraft goods; import; import manifest; importer; prohibited goods; shipping bill; stores; bill of loading; export manifest; DOS, FAS, CIF, GATT; Letter of Credit.

Section-B

4. Kinds of duties—basic, auxiliary, additional or counter moving:

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Basis of levy – adalorem, specific duties's.

5. Prohibition of exportation and importation of goods and provisions regarding notified and specified goods.
6. Import of goods : Free import and restricted import: types of restricted import – prohibited goods, canalised goods; import against licensing. Types of import: import of cargo, import of personal baggage, import of stores.
Import of cargo; (a) import by land, sea or air route, (b) by post. Clearance procedure – for home consumption, for warehousing exbond clearancy.

Section – C

7. Steps and documents to be prepared and filed, viz. Bill of entry---
 - Form No. 22 bill of entry for home consumption.
 - Form No. 23 bill of entry for warehouse.
 - Form No. 24 shipping bill for expound clearance for home consumption and other accompanying document.
 - Clearance procedure for Import by post.
 - Clearance of baggage ; import of baggage-meaning and kinds of baggage, rule and procedure of import thereof – general passenger, tourist passenger and transfer of residence passenger, (Form No. 37: for baggage declaration).
8. Export of goods : Free export and restricted exports; types of restricted exports; canalised export of cargo; export of baggage; types of exporters : manufacturer exporter and merchant exporter.

Export of cargo : (a) by land, sea and air route

(a) by post

Clearance procedure : Procedure and filling and filing of relevant documents

- Form No. 94 : Shipping bill for export of suitable goods.
- Form No. 95 : Shipping bill for export duty free goods.
- Form No. 96 : Shipping bill for export of duty free goods exbond.
- Form No. 98 : Bill of export of dutiable goods.
- Form No. 99 : Bill of Export of duty free goods.
- Form No. 100 : +Bill of Export for export of duty free goods exbond.

Syllabus : B.Com. Pt.-III

- Duty Drawback : Meaning/Scheme, procedure and documentation thereof.
- Form No. 93 : Shipping bill for export of goods under claim for duty drawback.
- Form No. 97 : Bill of export for export of goods under claim for duty drawback.

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3. PRINCIPLES AND PRACTICE OF INSURANCE

Note : Candidates are required to attempt at least one question from each unit and five questions in all.

Scheme :

Max. Marks : 200 Min. Pass Marks : 72

Paper-I 3 hrs. duration Marks 100

Paper-II 3 hrs. duration Marks 100

Paper I : PROPERTY AND LIABILITY INSURANCE

Max. Marks : 100 3 hrs. duration Min. Pass Marks : 36

Section-A

1. Introduction : Risk and Insurance : Insurable and non-insurable risks : Nature of property and liability insurance. crop and cattle insurance. Types of liability insurance, Reinsurance

Section-B

2. Basic Concepts of Liability Insurance :
 - (a) Basic concept : Specific and all risk insurance : Valuation of risk : Indemnity contracts and specific value contracts; Average and contribution: Excess and short insurance careers.
 - (b) Liability Insurance : Procedure for obtaining liability insurance. Legal position of insurance agent, Construction and issue of policy: Reports of liability insurance; Policy conditions.

Section-C

3. Types of Liability--Insurance Policy : Mandatory Public Liability Insurance
4. Dwelling property Losses : business interruption and related losses. Theft insurance contracts Budgetary covers Auto Insurance Medical Benefit Insurance: Dishonesty, disappearance and destruction insurance, employees liability; Aviation insurance: personal and residential insurance, Boiler machinery insurance: Commercial enterprises and industrial property insurance.

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Section-D

5. **Insurance Problems of Institutions** : Insurance problems of educational and religious institutions - hospitals, clubs and association; professional package contracts; Errors and omissions insurance; Professional liability insurance; Accountants' liability insurance; Limits in amount of insurance, Marketing and underwriting of liability insurance; Finance of liability insurance.

Section-E

6. **Adjustment of Losses and Claims Compensation** : Adjustment of losses and their adjustment; Procedure of adjustment; Functions of adjuster's : Responsibilities of adjuster's Survey of losses; Procedure for preparing claims statements, Documents in use in claim settlement. Requirement of the insured in the event of loss. Appointment and loss valuation; statutory control over liability insurance in India. Liability policies by General Insurance Corporation of India.

Books Recommended :

1. Rodda : Property and liability Insurance (Prentice Hall, New Jersey)
2. John Carydon I. : Introduction to liability claims Adjusting Cinenati (The National Underwriting Co.)
3. Long and Gregg : Property and Liability Insurance (Hand book, Homewood, Richard D. Irwin)

Note : Candidates are required to attempt at least one question from each unit and five questions in all

Paper-II : **GROUP INSURANCE & RETIREMENT BENEFIT SCHEMES**

Max. Marks : 100 3 hrs. duration Min. Pass Marks : 36

Section-A

Introduction

Section-B

Superannuation Scheme I.
Superannuation Scheme II.
Superannuation Scheme III.

Section-C

Gratuity Scheme

Section-D

Group Life Insurance schemes

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Group Life Insurance scheme II.
Provident Fund and Employee's family pension and Deposit-linked
Insurance Schemes.

Section E

Taxation Treatment of Provisions of Retirement Benefit-I.

Taxation Treatment of Provisions of Retirement Benefit-II.

Group Schemes and Data Processing.

Note : Candidates are required to attempt at least one question from
each unit and five questions in all.

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4. OFFICE MANAGEMENT & SECRETARIAL PRACTICE

Paper-I : OFFICE PRACTICE

Part (A) Theory

Maximum Marks : 75

Duration : 2½ Hrs.

Unit-1. Office Stationery :

Types of papers and envelopes, control of consumption of papers, ink, typewriting ribbons, carbon papers, pins, clips, erasers etc. issue thereof, stock and stock record.

Unit-2. Duplication Methods :

Photocopying.

Unit-3. Meeting :

Notice, Agenda, Physical facilities, quorum, providing Secretarial assistance.

Unit-4. Using information :

Working knowledge of making use of information from different sources :

Telephone Directory, Post Office Guide, Railway Time Table, Teleprinter, Telex, Facsimile telegraphy.

Unit-5. Making travel arrangement :

Preparing tour programme, railway and air reservation, booking hotel accommodation, filling of form for tour advance, preparing T.A. Bills.

Part-(B) Practice-Max. Marks : 25

Practicals

1. Practice on Operating Following machines :

- | | |
|-----------------|---------|
| i. Duplicator | 6 hrs. |
| ii. Photocopier | 6 hrs. |
| Word Processor | 20 hrs. |

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Scanner 6 hrs.

2. Working in the Office :
 - Maintenance of Register
 - Preparation of Notice, Agenda, Resolutions
3. Telephone handling.

Paper-II : Computer Application Theory and Practice

Part-(A) Theory

Maximum Marks : 75

Duration : 2 1/2 Hrs.

Note : Candidates are requested to attempt five questions out of nine questions.

Computer concepts : Computer system structure, Input-Process-Output (I-P-O), Principle input output processing and storage devices classification of computers. Working of the computers. Software (s/w) concepts.

Disk Operating System (DOS) : History, Philosophy and purpose, File system, simple commands, more involved commands, advanced options, hardware (h/w) and software (s/w) support.

MS Window Operating System : History, Philosophy and purpose. File system-changed conventions, simple options, more involved options, advanced options, h/w and s/w support.

Office Automation : Modern office setup, changed management hierarchy, expectations and demands from an automated office tools used, using MS word as the word processor, using Tally/Ex as the Accounting S/W.

Advance Office Automation : Advance option in MS word. Advance accounting options in Tally/Ex. Tracking inventory Tables and Charts. Using MS Power points for per print simple business presentations, using the printer

Electronic applications : History (Telephone and Telegraph, etc.) the Facsimile, computer networks, E-mails-sending and receiving and Internet Business, browsing the Internet.

Precautions, Emerging Trends and New Technologies : Computer virus, dealing with computer virus, paperless office on line Transaction processing (O.I.I) E-Commerce.

Part-(B) Practical

Max. Marks : 25

Note : Students are required to attain sufficient practical knowledge of the above course contents.

This practical will be supervised by the external examiner appointed by the University.

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5. ADVERTISING , SALES PROMOTION AND SALES MANAGEMENT

Objectives :

This course is intended to impart knowledge and develop skill among the participants in the field of marketing communication, so as to equip them to man age junior and lower-middle level position in the fast growing and challenging business areas of advertising, sales promotion, selling and sales management and public relations. The under – graduate programme in Indian Universities and other Institutions. The six papers are :

1. Marketing communication-I
2. Advertising I
3. Advertising II
4. Personal selling and salesmanship
5. Management of the sales-force
6. Sales promotion of public relations

All the papers will be handled so as to have practical, orientation, with Indian cases and examples.

Scheme :

Min. Pass Marks : 72

Max Marks : 200

Paper-I	3 hrs duration	100 Marks
Paper-II	3 hrs duration	100 Marks

Paper – I : MANAGEMENT OF THE SALES FORCE


Max. Marks : 100

3 hrs. duration

Min. Pass Marks : 36

- Importance of the sales force and its management
- Functions of Sales Manager
- Recruitment and selection
- Motivation and Compensation
- Appraisal of Performance
- Sales force – size, organisation of the sales department : Geographic, Product- wise, Market based.
- Sales planning and Central : Market analysis and sales forecasting, Methods of forecasting sales.

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- Sales Budget : Importance, process of sales budget, uses of sales budget.
- Sales territory : Considerations in allocation of sales territory.
- Sales quota : Objectives, principles of selling, sales quota, administration of sales quota. Uses of sales quota.
- Sales and cost analysis : Uses and methods.

Books Recommended :

1. Stanton and Biskirk : Management of the Sales force (Richard D. Irwin)
2. Philip Kotler : Marketing Management, 7th Ed. (Prentice Hall of India, Chap. 24)

Paper-II : SALES PROMOTION AND PUBLIC RELATIONS

- Nature and importance of sales promotion. Its role in marketing.
- Forms of sales promotion : Consumer oriented sales promotion, trade oriented sales promotion and sales force-oriented sales promotion.
- Major tools of sales promotion : Samples, Point of purchase. Displays and demonstrations, Exhibitions and Fashion shows, sales contests and games of chance and skill, lotteries, gifts, premium and free goods. Prince packs, rebates, patronage, rewards.
- Conventions, conference and Cashisms, specialities, novelties.
- Developing and sales promotion programmes, pre-testing implementing evaluating the results and making necessary modifications.
- Public relations : Meaning, features, growing importance, role in marketing, similarities of publicity and public relations.
- Major tools of public relations, news, speeches, special events, hand-bills and leaflets, audio-visual, public services activities, miscellaneous tools.
- Ethical and legal aspects of sales promotion and public relations.

Books Recommended :

1. Philip Kotler : Marketing Management 7th Ed. (Prentice Hall of India), (Chap. 23).
2. Stanton & Futrell : Fundamentals of Marketing. (McGraw Hill), (Chap-20).
3. JSK Patel : Salesmanship and publicity (Sultan Chand & Sons, New Delhi).

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6. TOURISM AND TRAVEL MANAGEMENT

Min. Pass Marks-72

Max. Marks-200

Paper-I

3 hrs. duration

70 Marks

Paper-II

3 hrs. duration

70 Marks

PAPER-I : TOURISM MARKETING

Max. Marks 70

3 hrs. duration

Min. Pass Marks 36

Internal Assessment Marks 30 (20 Project report, 10 viva voce)

TOURISM DEVELOPMENT

Max. Marks : 100

3 hrs. duration

Min. Pass Marks : 36

Section-A

Relevant concepts and preaches for effective tourism development

- National Development Council Report on Tourism Development
- National Action Plan, 1992
- New policies on Tourism and its improvisation.
- Destination development
- Substantiable development

Section-B

Man power development needs.

Section-C

Management strategies

Section-D

Tourism policy analysis

Section-E

Tourism legislation - a necessity.

Books Recommended :

1. National Development Council Report
2. National Action Plan, 1992
3. Reports of World Tourism Organisation
4. Report - Workshop on Tourism Legislation - August 10-11, 1987
5. Report - Workshop on Tourism Legislation - February, 23-23, 1988, IITM, New Delhi.

Paper-II : INFORMATION COMMUNICATION AND AUTOMATION

Introduction :

The course cover techniques of communication, presentation and

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Collection information DATA. It also includes basic knowledge of computers in Travel fields. The attitude and behaviour the pattern w.r.t. customer services and their expectations profile of visitors from various destination is part of the study.

- Consumer expectation and services and legislation.
- National Tourism Civil Aviation & Policy.
- Information Technology
- Market Research
- Data Collection
- Consortiums of Airlines, Hotel and wholesalers.
- Practical Training Project Report.

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7. FOREIGN TRADE PRACTICES AND PROCEDURES

Subject title : FOREIGN TRADE PRACTICES AND PROCEDURES

Subject Objectives :

1. To familiarise the students with the basic principles of foreign trade and the environment in which foreign trade takes place.
2. To familiarise the students with the position of India's foreign trade, import and export policies and various export promotion measures adopted by the Government.
3. To familiarise the students with the nature and scope of International marketing as also the four Ps of international marketing.
4. To familiarise the students with the various methods and procedures of foreign trade financing, foreign exchange rates, costing and pricing for exports and the various institutions involved in export finance.
5. To make the students aware of the shipping and insurance practices and procedure which constitute the essential services for the operation of foreign trade.
6. To familiarise the students with the basic documents involved in foreign trade, processing of an export order, customs clearance of export and import cargo and negotiation of documents.

Job potential :

1. Self employment—can start an export business either singly or in partnership with fellow students can take.
2. Can take up employment in exporting firms, banks, insurance companies or with freight forwarders.

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3. (i) Permissible combination of subjects :
B.A. - Any subject preferably with Economics, Psychology, Social Work, Foreign languages.
(ii) Pre-requisites of admission :
10 + 2 preferably with Economics or Commerce.

Paper I : SHIPPING AND INSURANCE PRACTICES AND PROCEDURES

Objectives :

To make the students aware of the shipping and insurance practices and procedures which constitute the essential services for the operation of foreign trade.

SECTION-A	Periods
- Role of shipping, liners and tramps, bills of lading and Charter Party	4
- Determination of freight	2
- Containerization and other developments	2

SECTION-B	Periods
- Air transport and procedures involved in the determination of freight and booking of cargo space	3
- Multi modal transport and the procedures involved	2
- Packing and marking for exports	2
- Forwarding and clearing agents and their operations	3

SECTION-C	Periods
- Cargo insurance, its importance, basic principles, types of cover, types of losses and determination of premium	8
- Obtaining a cover and filing a claim	4

Paper II : FOREIGN TRADE DOCUMENTATION AND PROCEDURES

Objectives :

To familiarise the student with the basic documents involved in foreign trade, processing of an export order, customs clearance of export and import cargo and negotiation of documents.

SECTION-A	Periods
- Need, rationale and types of documents	1
- Obtaining export and import licences	3
- Processing an export order	4

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SECTION-B

- Preshipment inspection and quality control 2
- Foreign exchange and GR formalities 3
- Excise and customs clearance of export cargo 4
- Shipment of goods and port procedures 3

SECTION-C

- Customs clearance of import cargo 3
- Post-shipment formalities and procedures 3
- Claiming duty drawbacks and other benefits 3
- Need, rationale and types of documents 4
- Obtaining export and import licences 3
- Processing an export order 4

Books Recommended :

1. Handbook of Import and Export Procedures
2. Export What, here and How by Paras Ram

ON THE JOB TRAINING

3 to 4 weeks each at the end of I year and at the end of II year

Total : 6 to 8 weeks

A report has to be submitted after the training to be evaluated out of 100 marks:

Journal : Indian Export Bulletin

Publications of Indian Trade Promotion Organisation

Equipment :

Overhead Projector, photo-copying machine, VCR with Television set.

Examination at year end : 7 Marks for each paper

30% marks for internal evaluation

10 marks for tests (occasional)

10 marks of home assignment

10 marks for class participation

Linkage :

Down - plus 2 students may take it up independently. Those having studied export procedure will find this course and a follow up of their earlier studies

Up - Those having passed B.A. or B.Com. with this course, may take up course like Postgraduate Diploma of the IIFT or MBA courses.

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8. Tourism

PAPER-I : TOURISM MANAGEMENT

Theory Paper : Max. Marks 70

Project Report : Max. Marks. 30

3 hrs duration for Theory Paper

- Concept of Entrepreneurship and Management. Corporate form in Tourism Industry.
- Management Functions : Human Resource Management in Tourism, Financial Management & Financial Operation, Tourism Marketing and Information & Technology in Tourism.
- Behavioural Issues in Tourism : Guest Host Relationship, Hospitality, Group and Inter group Behaviour, Supervisory Behaviour.
- Managerial Practices in Tourism 1 : Tour Operator, Travel Agencies and Public Relations.
- Managerial Practice in Tourism 2 : Catering & Food services, Tourist transport, Airlines, Airport & Railway Stations.
- Events Management in Tourism : Reservation & Booking, Strike & Political unrest, missing of language, theft etc.

References :

1. Kotler, Philip : Marketing Management
2. Dougler Foster : Travel & Tourism Management.
3. Negi, M.S. : Tourism and Heterliering.
4. Meclean, Hunger : Marketing Management (Tourism in your business).

PAPER-II : PROJECT REPORT

Every student shall have an appropriate topic selected for doing project Report at the beginning of the session and shall submit the same in triplicate at least 3 weeks before the commencement of theory examination. For this purpose each student shall undergo for field work/practical training in concerned organisations for 150 hrs. Viva-Voce shall be held within one month of the last of written examination. (Project Report 70 marks and Viva- Voce 30 marks.)

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9. PRINCIPLES AND PRACTICE OF BANKING AND INSURANCE

PAPER I : COMMERCIAL BANK MANAGEMENT

Theory Paper : Max. Marks 70

Project Report : Max. Marks 30

3 hrs. duration for Theory Paper

- Principles of Banking: Definition of bank; Creation of money; Present structure of commercial banking system in India; Brief history; Functions; Working during 1947-1990 and thereafter.
- Management Principles in Banks: Managerial functions in banks; Hierarchy, individual and group behaviour; Management of personnel-Functions of manager, inspector, local advisory committee, Recruitment; Selection; Training; Promotion; Control of staff.
- Management of Deposits and Advances: Deposit mobilization; Classification and nature of deposit accounts; Advances; Lending practice; Types of advances; Principles of sound bank lending; Preparation of reports; Credit plans; Planning customers; Limits of credit; Security.
- Investment Management: Nature of bank investment; Liquidity and profitability; Preparation of cheques; Bills; Endorsement; Government securities; Documents of title to goods railway receipt; Bill of lading; Book debts; Securities-Government and commercial.
- Management of Finance: Bank accounts; Records; Reports; Statement of advances; Evaluation of loan applications; Profit and Loss Account; Balance sheet and statutory reports regarding cash revenue.

Suggested Readings

1. Tannan M.L.: Banking - Law and Practice in India, Indian Law House, New Delhi.
2. Radhaswami M. and Basudevan A.: Textbook of Banking; S. Chand & Co. New Delhi.
3. Panikar K.K.: Banking - Theory & System: S. Chand & Co. New Delhi.

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4. Vinayakan N : Banking by 2000 A. D; Kanishka Publishers, Delhi.
5. Jessup P. F. : Innovations in Bank Management.
6. Reed E. W. : Commercial Bank Management
7. Desa: Vasant, Principles of Bank Management.
8. Khubchandani B. S. : Practice and Law of Banking; Macmillan, New Delhi.

OR

PAPER I : LEGISLATIVE INSURANCE FRAMEWORK

Theory Paper : Max. Marks 70

Project Report : Max. Marks 30

3 hrs. duration for Theory Paper

- Insurance Act, 1938
- LIC Act 1956
- Insurance Regulatory & Development Agency Act, 1999
- Consumer Protection Act, 1985.
- Ombudsman Scheme
- Income Tax Act, Married Women's Property Act, Contract Act as relevant to the conduct of insurance business
- Code of conduct in advertisement and publicity area.

References :

1. Mishra M.N. Insurance Principles & Practice, S. Chand & Co. New Delhi.
2. Insurance Regulatory Development Act, 1999.
3. LIC Act, 1956
4. Consumer Protection Act, 1985
5. Indian Contract Act, 1872.

PAPER-II : PROJECT REPORT

Every student shall have an appropriate topic selected for doing Project Report at the beginning of the session and shall submit the same in triplicate at least 3 weeks before the commencement of theory examinations. For this purpose each student shall undergo for field work/practical training in concerned organisations for 150 hrs. Viva-Voce shall be held within one month of the last date of written examination. (Project Report 70 marks and Viva Voce 30 marks).

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10. FOREIGN TRADE PROCEDURE

PAPER-I : EXPORT-IMPORT PROCEDURES AND DOCUMENTATION

Theory Paper : Max. Marks 70

Project Paper : Max. Marks 30

3 hrs duration for Theory Paper

- Documentation Framework for Exports and imports : Registration of an export firm and licensing regulations. Processing of an export order : Export documents need and types : Overview of various export documents.
- International Business Contracts : Types and Formation.
- Payment Term : Instruments and Methods of financing, including documentary credits and collection : Uniform Customs and Practices (UCP) 500.
- Export Finance : Facilities, incentives and procedures for pre and post shipment finance.
- Business Risk Coverage : Cargo, credit and foreign exchange risk coverage, Cargo Insurance; Role and scheme of ECGC and commercial banks.
- Foreign Exchange Regulations and Formalities.
- Quality Control and Pre-shipment inspection: Concept, scheme and procedures.

Suggested Readings :

1. Paras Ram, Export: What, where and How; Anupam Publishers, Delhi.
2. Uniform Customs & Practice for Documentary Credits, International Chamber of Commerce, Paris.
3. Handbook of Import – Export procedures; Ministry of Commerce , Government of India, New Delhi.
4. Mahajan M.I. Exports : Do it yourself, Snowwhite Publication, Mumbai.
5. Export Documentation and Procedures: Nabhi Publications, New Delhi.

PAPER-II ; PROJECT REPORT AND VIVA-VOCE

Every student shall have an appropriate topic selected for doing Project Report at the session and shall submit the same in triplicate at least 3 weeks before the commencement of theory examinations. For this purpose each student shall undergo for field work/practical training in concerned organisations for 150 hrs. Viva-Voce shall be held within one month of the last date of written examination. (Project Report 70 marks and Viva-Voce 30 marks).

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SYLLABUS

B.Com. Part –II

Examination 2024

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Distribution of Marks


S. No.	Name of the Subject/Paper	Duration Hours	Max. Marks	Min. Pass Marks
1.	Accountancy & Business Statistics			
	Paper I – Income Tax and Practice	3	100	36
	Paper II – Cost Accounting	3	100	36
2.	Business Administration			
	Paper I – Company Law & Secretarial Management	3	100	36
	Paper II – Management	3	100	36
3.	Economic Admin.& Financial Management			
	Paper I - Economics Environment in Rajasthan	3	100	36
	Paper II – Element of Financial Management	3	100	36

Additional Optional Subject


1.	Textile Craft			
	Paper I	3	30	
	Paper II	3	30	22
	Practical	6	70	25
	Submission		70	25
2.	Garment Production & Export Management			
	Paper I – Fashion and Apparel Design		30	13
	Paper II – Element of Marketing and Finance		50	18
	Practical – I & II		120	52

Add on Subject

1.	Computer Application			
	Paper I – Data Base Management System	3	50	8
	Paper II – Structured Programming and Computer Graphics		65	29
	Practical		70	75


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S. No.	Name of the Subject/Paper	Duration Hours	Max. Marks	Min. Pass Marks
2.	Tax Procedure and Practice			
	Paper I-Direct Tax-I : Procedure and Practice	3	100	36
	Paper II-Direct Tax-II : Procedure and Practice	3	100	36
3.	Principles and Practice of Insurance			
	Paper I-Fire and Marine Insurance	3	100	36
	Paper-II-Insurance Finance and Legislation	3	100	36
4.	Office Management and Secretarial Practice			
	Paper I-Office Practice and Office Procedure	3	100	36
	Paper II-Typewriting and Shorthand Theory	-	35	36
	Practice	-	65	
5.	Advertising Sales Promotion and Sales Management			
	Paper I-Advertising (II)	3	100	36
	Paper II-Personal Selling and Salesmanship	3	100	36
6.	Tourism and Travel Management			
	Paper I-Tourism Marketing	3	100	36
	Paper II-Travel Agency, Tour Business and Accommodation	3	100	36
7.	Foreign Trade Practices and Procedures			
	Paper I-Elements of Export Marketing	3	100	36
	Paper II-Foreign Trade Financing and Procedures	3	100	36
8.	Tourism			
	Paper I : Tourism Services	3	70	30
	Paper II : World Tourism	3	70	30
9.	Principles and Practice of Banking and Insurance			
	Paper I : Rural Banking	3	70	30
	Paper II : Insurance Management	3	70	30
10.	Foreign Trade Procedure			
	Paper I : Elements of Export Marketing	3		
	Paper II : Foreign Trade Financing and Procedures	3		

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UG SYLLABUS

B.COM (PASS COURSE) Part – II

EXAMINATION

Economic Administration and Financial Management

Scheme of Examination

The number of papers and the maximum marks for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as practical part of a subject/paper, wherever prescribed, separately, classification of successful candidates shall be as follows:

First Division	60%	of the aggregate marks prescribed at (a) Part I Examination, (b) Part II Examination, (c) Part III Examination taken together
Second Division	48%	

All the rest will be declared to have passed the examination if they obtain the minimum pass mark in each subject viz. 36%. No division shall be awarded at the Part I and the Part II Examination.

There will be five questions in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or).

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B.COM. PART – II
ABSTPAPER – I
INCOME – TAX LAW AND PRACTICE

- UNIT – I Introduction, Residential Status and Income from Salaries
- UNIT – II Income from House Property and Income from Business and Profession.
- UNIT – III Income form Capital Gain and Income from Other Sources.
- UNIT – IV Clubbing, Set off and Carry Forward of Losses and Deduction from Gross Total Income, Assessment of Individual.
- UNIT – V Assessement of Hindu Undivided Family and Firms, Advance Payment of Tax, TDS, Procedure of E-Filling of Return.

Books recommended:

- Singhania and singhania: Student's guide to Income tax, taxman.
- Gupta and Gupta: Student's notes to Income Tax, Taxbooks.
- Ahuja and Gupta: Direct Taxes.
- Bangar and Bangar: Income Tax, AadhyaPublicaiton, allahbad.

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B.COM. PART – II (Pass Course)

ABSTPAPER – II

Cost Accountancy

TIME: 3 hour
Min. Mark36

Max. Marks-100

Note: There will be five question in all. The candidate will require to attempt all the questions selecting one question from each unit with an internal choice (either/or)

Unit – I

Introduction: Meaning and definition of cost, cost centre, costing, cost accounting and accountancy, Objectives, significance and limitations of cost accounting. Systems, methods and techniques of cost accounting. Distinction between Financial and Cost Accounting, Material purchasing and storing. Valuation and issue of material, Material cost control.

Unit – II

Labour: Recording of time and wages, Methods of remuneration, incentive plans. Allocation of wages, labour turnover and treatment of idle time and overtime. Overhead: Meaning, collection, Classification, Allocation, Apportionment and Absorption of Overhead.

Unit – III

Unit Costing: Cost sheet, statement of cost per unit, computation of tender price by preparing statement of cost. Operating Costing: Meaning and Objectives. Preparation of statement of operating cost only related to transportation for passengers and goods only.

Unit – IV

Job Costing and Contract Costing: Cost-plus contract, escalation clause, work in progress, profit on completed, incomplete and contracts nearer to completion. Process Costing: Meaning and significance, treatment of normal and abnormal losses in process accounts. Inter process profit (Excluding Joint product, By-product & Equivalent Production).

Unit – V

Marginal Costing: Meaning, concept, significance and limitations of marginal costing as well as BEP analysis. CVP and BEP analysis, Break even Charts (Excluding stock valuation under marginal costing and absorption costing and advanced problems related to managerial decisions). Standard Costing: Meaning, concept, significance and limitations of standard costing. Setting standards and computation of material and labour variances only.

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Books Recommended:

1. Saxena, and Vashist :- Cost Accounting
2. B.K. Bhar :- Cost Accounting
3. Agarwal and Chaturvedi:- Cost Accounting (Volume I & II)

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B.COM. Part IInd (Pass Course)

Paper I

Company Law and Secretarial Practice

Paper II

Management

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B.COM. Part IInd (Pass Course)

Paper I Company Law and Secretarial Practice

Unit I

Meaning, Characteristics of a Company, Lifting of Corporate veil, types of Company, Privileges of a Private Company.

Unit II

Formation of a Company, Functions and Duties of Promoters, Memorandum of Association : Contents and Alterations, Articles of Association.

Unit III

Prospectus, Share Capital, Types of Shares and Debentures, Membership, Provisions of Dividend.

Unit IV

Directors- Qualifications and Disqualifications, Appointment and Removal, Power and Duties, Managing Director, Wholetime Director.

Meetings of the Company, Proxy, Agenda, Resolution, Minutes, Methods of winding-up.

Unit V

Company Secretary- Qualifications, Role and Position, Secretarial Practice relating to allotment of shares, transfer and transmission of shares, payment of dividend.

Note: All Provisions as per Companies Act, 2013.

Books Recommended:

1. अर सी. अग्रवाल एवं एन. एस. कोठारी : कम्पनी अधिनियम एवं सचिवालय पद्धति
2. एस.एम. शुक्ला एवं सहाय : कम्पनी अधिनियम एवं सचिवालय पद्धति
3. S.A. Sharlekar : Secretarial Practice.
4. J.C. Bahl : Secretarial Practice.
5. N.D. Kapoor : Company Law.
6. M.C. Kuchhal : Secretarial Practice.
7. Avvatar Singh : Company Law
8. माधुर, जयशंकर, कम्पनी अधिनियम एवं सचिवालय पद्धति (संशोधित संस्करण, जयपुर)
9. रामें जयशंकर लीला : कम्पनी अधिनियम (अजमेरा बुक कम्पनी, जयपुर)

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B.COM. Part IIInd (Pass Course)

Paper II Management

Unit I

Management: Concept, Nature, Principles, Importance and Process; Schools of Management Thought; MBO; Planning-Importance, Process and Components; Decision Making- Process, Types and Techniques.

Unit II-

Organisation-Goals, Structure, Importance, Process and Principles; Theories of Organisation; Environment and Organisation; Formal and Informal Organisation; Organisational Change and Development; Authority and Responsibility; Power and Authority; Sources of Authority; Delegation of Authority; Centralisation and Decentralisation; Span of Control.

Unit III-

Communication-Significance, Channels, Types, Process, Barriers and Remedies; Co-ordination and Co-operation; Co-ordination as an essence of management; Principles and Techniques of co-ordination; Obstacles in co-ordination; Direction-Essentials of effective co-ordination; Direction-Concept, Importance and Principles.

Unit IV-

Leadership-Functions, Qualities, Styles and Theories; Motivation-Importance, Types, Process and Techniques; Theories of Motivation (Maslow, Herzberg, McGregor); Sound Motivation System.

Unit V-

Control-Nature, Process, Techniques and Essentials of Effective Control; Business Process Re-engineering; TOM, Six Sigma.

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800 Recommended:

1. B. S. Mathur: Principles of Management. (1978)
2. Satya Saran Chatterjee : Introduction of Management.
3. Mritunjoy Banerjee : Business Administration.
4. Richard, Hatman Tuwence P. Hogan and John Wholipan : Modern Business Administration
5. S. Sarlekar : Business Management.
6. Koontz O' Donnel: Essentials of Management
7. जे.पी. सिंघल : प्रबंध, अजमेरा बुक कम्पनी, जयपुर
8. P. Subba Rao: Management-Theory and Practice, HPH.

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3. E.A.F.M.

B.COM PART – II

Paper- I

Economic Environment in Rajasthan

Time : 3 hours.

Min. Marks : 36

Max. Marks : 100

Unit-I Economic Environment – Meaning, factors affecting Economic Environment, Basic features of Indian Economy. Rajasthan Economy an Overview : Population, Area, Agriculture, Land Reforms, Crops, Animal Husbandry, Dairy Development, Mineral Resources, occupational Structure and Human Resource Development; Current Environmental Issues.

Unit-II Planning in Rajasthan, Rajasthan Budget, Rural Development schemes- Evaluation & Impact of Development programmes; Human development Index; Problems of Rajasthan Economy- Poverty and Unemployment, Panchayati Raj Institutions.

Unit-III Agriculture – Agriculture policy of Rajasthan, Significance, new agriculture strategy. Agriculture inputs, food management, major schemes for agriculture sector. Agriculture Finance, Agriculture Insurance, Agriculture productivity, Commercialisation of Agriculture, minimum support price, demand and supply of agriculture products and their effect on general price level with reference to Rajasthan.

Unit-IV Infrastructure Development in Rajasthan: Road, Energy, Water Transport, social Infrastructure-Education, Health, Tourism Development in Rajasthan- Challenges and Prospects, Main Tourist places in Rajasthan, Socio-Economic Impact of Tourism.

Unit-V Industrial Development in Rajasthan – Industrial Policy, Role of cottage and Small industries in Rajasthan, Credit flow to Industrial Sector.

Rural Finance- Concepts, need and importance, Main source of Rural Finance in Rajasthan, Problems and Prospects of Rural Finance.

Books Recommended:

1. रुद्रदत्त एवं सुन्दरम : भारतीय अर्थव्यवस्था
2. ए.एन. अग्रवाल : भारतीय अर्थव्यवस्था
3. लक्ष्मीनारायण नाथूरामका : भारतीय अर्थव्यवस्था
4. Rudra Dutt and Sundaram : India's Economy
5. वी.एल. ओझा : राजस्थान की अर्थव्यवस्था
6. Mishra and Puri : Indian Economy
7. Budget Study, an overview of Rajasthan's Economy and other publication by Directorate, Economics and Statistics Rajasthan.



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PAPER – II
Elements of Financial Management

Time : 3 hours.

Min. Marks : 36

Max. Marks : 100

- Unit-I** Meaning, Scope, Importance and Limitations of Financial Management, Tasks and Responsibilities of a Modern Finance Manager. Financial Analysis: Financial Statements – Income Statement and Balance-sheet. Techniques of Financial Analysis.
- Unit-II** Ratio Analysis, Liquidity, Activity, Profitability and Leverage Ratios. Fund Flow analysis: Changes in working capital, sources and uses of fund : Cash flow analysis: sources and uses of cash. Cash flow statement as per AS(Accounting Standard)-3.
- Unit-III** An Introduction of Financial Planning and Forecasting. Break-even Analysis. Sources of Short-term and Long-term Finance. Equity v/s Debt.
- Unit-IV** Working Capital Management-Concept and Significance. Determinants and Estimation of Working Capital, Adequate Working Capital, Merits and Demerits. Management of Cash and Marketable Securities.
- Unit-V** Receivables and Inventory Management. Elementary Study of Capital Budgeting including Methods of Evaluating Capital Expenditure proposals under uncertainty. Dividend Policy.

Books Recommended :

1. Financial Management: M.R. Agarwal (English & Hindi Version)
2. Elements of Financial Management : M.D. Agarwal & N.P. Agarwal (English & Hindi Version)
3. वित्तीय प्रबंध के मूल तत्व : जाट, गुप्ता, मेन्दीरत्ता, मिश्रा, सैनी

Note: The candidate shall be permitted to use battery operated pocket calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

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Textile Craft

B.Com. Part-II

SCHEME : B.A/B.Com/B.Sc. PART-II

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	22
	Paper-II	3 Hrs	30	
2. Practical :	Paper-I	3Hrs	35	25
	Paper-II	3 Hrs	35	
3. Submission	Paper-I		35	25
	Paper-II		35	

Paper-I : Weaving Theory-I

UNIT-I

Yarn numbering system –Indirect (cotton, metric, woollen and worsted count) and Direct (Tex and Denier)

Yarn Twist and their types, Balance of fabric

Methods of fabric construction: Braiding & Lacing, knitting, felting and weaving

UNIT-II

Types of loom- Shuttle & Shuttle less; introduction to shuttleless looms- airjet, waterjet, projectile and rapier loom

Preparation of Warp and Weft for weaving

Draft, Peg plan, Weave, Repeat, Design

UNIT-III

Derivatives of Plain weave- Rib and Basket

Derivative of twill weave- Regular, Irregular, Left hand, Right hand, Pointed and curved twill

Fabric defects, Selvedge, Types of Selvedge's

Paper-II: Dyeing Theory –I

UNIT-I

Difference between dyeing and printing

Mechanical finishes- basic process of beating, singeing, napping, calendaring and embossing.

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UNIT-II

Stages of Dyeing (fibre, yarn & fabric)

Wool dyeing and silk dyeing

Dyeing machines- Jigger and Winch dyeing machine

UNIT-III

Steps of printing- preparation of cloth & colour

Methods of Direct printing- Block & Roller printing

Thickeners and types of thickeners

Practical (Paper-I)

1. Thread count and Balance of the cloth
2. Weave samples of derivatives of plain and twill weave

Practical (Paper-II)

1. Introduction to motif, repeat and layout
2. Block printing- samples preparation
3. Batik-spot, crack, scratch and painting (samples)

Submission (Paper-I)

1. Assessment of samples
2. Preparation of weave samples

Submission (Paper-II)

1. Any one article using block
2. Any one article using batik

Examination Scheme:

One Major Problem: 20 Marks

One Minor Problem: 15 Marks

Reference books :

Sahnai, V.A. (1989) Theory of Dyeing, Sevak publications. Mumbai

Trotman, E.R. (1985) Technology of Dyeing, John wiley & sons Inc London. London

Pryag, R.S. (1994) Technology of Printing, India publisher.

Pryag, R.S. (1995) Technology of Finishing, India publisher.

Bucker, (1998) Textiles, Abhishek publications.

Kulkarni, M.M., Weaving technology, Virindra publication, Jalgon

Garment Production & Export Management

B.Com. Part-II

B.A/B.Com.– Maximum Marks 40

Hrs.3

B.Sc. Maximum Marks 50

THEORY PAPER – 1

Fashion and Apparel Design

OBJECTIVES :-

1. To Develop Sensitivity & Understanding towards Historical World Costumes.
2. To Focus on Design Elements & Principles and their Details on Garments.
3. To Create Awareness About the Techniques of Pattern Making & Principle of Fittings.

SECTION –A

TRADITIONAL COSTUMES

1. Study of traditional costumes of various regions of India.
2. History of costumes of Indian civilization.
3. Brief knowledge of world costumes ; French German, Greek, European

SECTION –B

TECHNIQUES IN PATTERN MAKING

4. Eight head theory – principles and advantages.
5. Pattern making techniques- drafting, draping , flat pattern.
6. Colour and colour schemes, psychological effects of colour on clothes.
7. Fitting – principles of fitting, factors to be considered while fitting, common fitting problems, remedying fitting defects of bodice, sleeves, and skirts.

SECTION – C

DESIGN

8. Classification of design – structural and decorative
9. Elements and principles of design.
10. Layout of design of fabric in cutting - floral , checks, plaids, lines.

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References :

1. Erwin, M. D., Kinchen, L.A. & Peters, A. (1979). Clothing for moderns. Macmillan publishing new York.
2. Jo, K. M. (1985). Clothing construction I&II. Prentice Hall.
3. Mathews, M. (1974). Practical clothing construction part I & II. Chennai, Cosmic press.
4. Doogaji, & Deshpandey, R. (1988). Basic process and clothing construction. Raaj Prakashan.

THEORY PAPER – II

ELEMENTS OF MARKETING AND FINANCE

B.A./B.Com.-Maximum Marks 40

Hrs. – 3

B.Sc. – Maximum Marks 50

OBJECTIVES :

1. To create awareness about the procedures to select, proceed & start the Small Scale Industry.
2. To guide the process of product development according to the market needs.
3. To become familiar with the methods of payment in foreign trades & about types or bills.

SECTION A

1. Market structure- Types of market, market survey, elements of cost.
2. History of readymade garment industry, Problem and prospects in global market
3. Branded versus non -branded market.
4. Types of garments exported.

SECTION B

5. Elementary knowledge of working capital factors affecting working capital, operating cycle.
6. Sources of finance.
7. Letter of credit
8. Methods of payment in foreign trade
9. Various typed of bills.
10. Insurance

SECTION C

Brief study of ;

11. ECGC (export credit and guarantee corporation)

12. EIC (export inspection council)
13. IIP (Indian institute of packaging)
14. ICA (Indian of arbitration)

References :

1. Srivastav, & Aggarwal. (). Vipdan prabandh.
2. Mamoria, C.B., Joshi, R. L. & Mulla, N.I. (2003). Principles & practice of marketing in india. Kitab Mahal distributors.
3. Satya narayan; Sales management.
4. Daver R.S. (2009). Salesmanship and Publicity. Vikas publishing house Pvt Limited.

PRACTICAL- 1 APPAREL DESIGNING

B.A/B.Com.–Maxmium Marks 60

Hrs.- 4

B.Sc. – Maxmium Marks 25

OBJECTIVES :

To familiarize with basics of color

To develop expertise in drawing croquis and drawing dresses on them.

Contents:

1. Colour wheel and colour scheme .
2. Introduction to eight head theory and stick figure 9.5”, 10.5”.
3. Developing an adult croquis from block figure.
4. Draping of garments on croquis (at least 8 sheets) using different colours schemes and occasions.
5. Preparation of a portfolio.

Examination Scheme :

B.A.\B.COM:-Max Marks:-60

B.S.C:-Max Marks:-25

1. Major Problems-30

1. Major Problem:-10

2. Minor Problems:-20

2. Minor Problems:-10

Internal:-10

Internal:-5

PRACTICAL – II
CLOTHING CONSTRUCTION

B.A./B.Com.–Maximum Marks 60

Hrs- 4

B.Sc. – Maximum Marks - 25

OBJECTIVES :

1. To be able to make basic drafts of bodice, sleeve and collar.
2. To learn the knowhow of stitching and all basic processes and ornamentation techniques.

Contents :

1. Pattern making
 1. Child basic block and sleeve block.
 2. Sleeve variations; slash and spread method-puff, bell, legomutton, bishops sleeves.
 3. Sleeve bodice combination; Magyar, raglan, dolman sleeves.
 4. Different types of collars.
 5. Different types of yokes
2. Stitching of each sleeve, collar and yokes on bodice block.
3. Fashion designing (5 each) on sheet baby frocks, a line frocks , rompers. sun suits skirts and tops, bush -shirts with shorts.
4. Redesigning of old garment using the idea such as; to consider factors such as money, creativity, individuality, skills, needs,
 - (i) Patchwork
 - (ii) Ornamental fabric.
 - (iii) Decorative embroideries
 - (iv) Trims
 - (v) Paints and dyes
 - (vi) Introduction of fashion designing in fashion shows.
5. Introduction fashion designing in fashion shows.

References :

1. Jo, K.M. & Beazley. (1985).The sewing book of a complete guide. Prentice Hall.
2. Ireland, P. J. (1982). Fashion designing drawing and presentation. Batsford Ltd. 4th Revised edition.
3. Chase, R.W. (1997). CAD for fashion design. Prentice Hall; Pap/DSKT edition.

Examination Scheme :

B.A.\B.Com.-Max Marks:-60

1. Major Problems-30

2. Minor Problems:-20

Internal:-10

B.Sc:-Max Marks:-25

1. Major Problem:-10

2. Minor Problems:-10

Internal:-5

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Add – On Subjects

1. COMPUTER APPLICATION

	Max. Marks
	Com.
Paper I Data Base Management System	50
Paper II Structured Programming and Computer Graphics	65
Practical Programming Laboratory On – the-Job training (4 Weeks)	
The Duration of these papers will be 3 hours	

Paper I : Data Base Management System

Categorization of DEMS systems. Network.
Hierarchical and relational databases. Application of
DEMS system.

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COMPUTER APPLICATION (VOCATIONAL COURSE) FOR

B.A./B.Com/B.Sc. Part II

Paper-I

Paper Name : Operating System

Unit I

Concepts: Operating System & its need, Objectives of Operating System, Functions of Operating System, Types of OS: Simple Batch Systems, Multi-programmed Batch System, Time Sharing Systems, Parallel System, Distributed Systems and Real-Time Systems, Booting Process of OS, Operating System Structure.

Unit II

Process Management: Process Concept, Process States, Process Scheduling.
CPU Scheduling Algorithms: Basic Concepts, Scheduling Criteria, FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multiple Feedback Queue, Multiple- Processor Scheduling.

Unit III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Unit IV

Memory Management: Background, Why use memory management in OS, Logical versus Physical Address Space, Swapping, Contiguous Allocation (Fragmentation), Paging, Segmentation, Basic concept of Virtual Memory and Demand paging.
Introduction to File System : File Concepts(Operations and Attributes), Directory Structure, File System Structure

Unit V

Introduction of different Operating System(Linux, Unix, Windows Server), Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Input and Output, Inter Process Communication, network Structure, Security.

Recommended reference books:

1. A. Silberschatz and P.Galvin, "Operating System Concepts", Addison-Wesley, 5th Ed., 2001.
2. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition), Pearson Education, 2000.
3. Tanenbaum A.S., Modern Operating Systems, PHI Publ.
4. Peterson Richard, " The Complete Reference Linux " Tata McGraw Hill.
5. Simitabha Das, "Unix/Linux Concepts & Applications". Tata McGraw Hill
6. Achyut S. Godbole: Operating Systems, Tata Mc-Graw Hill Publishing Company Limited, 2000.
7. Harvey M. Deitel, Operating Systems, Pearson Education, 2001 .

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Paper-II

Paper Name : Database Management System

Unit I

Data, Data Processing, Merits and demerits of file organisation. Database Overview, Purpose of the Database system, File systems Vs. Database Systems, View of Data: Data Abstraction, Instances, Schema, Data Models: Overview of Network, Hierarchical, and Relational Model, Database Architecture and Administrators, Codd's Rules.

Unit II

ER Model: Basic Terminology, Entity, Entity sets, attributes and keys, Relation and Relationship sets, Entity-Relationship Diagram, Weak and Strong entity types, Features of E-R Model, Specialization, Generalization Aggregation, Creating table from ER diagram.

Unit III

Basic Concept of functional dependencies, loss less decomposition and dependency preservation. Normalization and its types: 1NF, 2NF, 3NF and BCNF. Introduction to transactions, Transaction States.

Unit IV

Query Languages: DDL, DML, DCL, Introduction to SQL, Data Types, Basic SQL commands like Create, Alter, Drop, Truncate, Insert, Update, Delete etc.

Unit V

Transaction management and Concurrency control, Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), database recovery management.

Recommended Books:

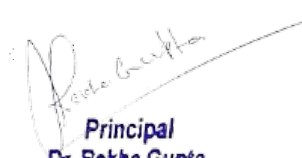
1. Korth H F and Silberschatz A, System Concepts, Sixth Edition; McGraw Hill, 2010
2. Leon, and Leon, SQL Tata McGraw Hill Pub. Co. Ltd.
3. Ivan Bayross; SQL/PL 4th Edn: BPB, 2009
4. Navathe S.B. Elmasri R.; Fundamentals of Database Systems, 5th Edn, Pearson 2011.
5. Ramakrishan and Gharke, Database Management Systems, 3rd Ed, TMHI, 2007.
6. Singh S.K.; Database Systems; 1 Edition; Pearson, 2006.

Paper-III

Paper Name : DBMS Lab

Content : Lab practical's based on paper II.

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(b) To acquaint the students with the procedure and practice of direct and indirect taxes.

3. Job Potential :

(i) Self Employment :

Prepare returns and relevant documents, for small traders, small Industries and people engaged in small medium business, necessary under direct and indirect tax law.

(ii) Wage Employment :

Junior level portions in the various organisations such as --

(a) Practising Chartered Accountant firms.

(b) Business Houses.

(c) Industrial undertaking & establishment.

(d) Custom and Excise departments.

(e) Accounts department of various Central, State, Local self Government departments of various Central, State, Local self Government, Societies etc.

4. (i) This cannot be associated with Science subjects.

(ii) It can go with commerce (B.Com. Pass)

(iii) It can go with B.A. provided a student has done 10+2 with Accounting and Business studies of Commerce

5. (i) Contents :

(a) Syllabus (Theory & Practicals - enclosed)

(b) Business Lab should be equipped with the following ;

(i) All Bare Acts related to direct and indirect taxes and various tax forms / returns/ documents.

(ii) Reference Books :

1. Palkiwala – Income Tax

2. Chaturvedi & Pathisana : Income Tax

(iii) Text Books :

1. Singhania – Direct Taxes

2. H.C. Mehrotra : Income Tax Law & Practice4

(iv) Journals :

1. The Institute of Chartered Accountant of India.

2. Central Excise Law System.

3. Taxman.

Note : In addition to the above books the new text books should be prepared on the lines of the prescribed syllabi.

(ii) On the Job Training (After Ist year)-

Proper training should be given to students, to prepare various returns/ forms/ documents etc. related to Income Tax and Sales Tax / Excise duty to enable the students to acquire necessary skills so that they can prepare these documents independently. Students can be attached for the purpose of training with local industrial excise departments, income and sales tax departments, and practising firms of the Chartered Accountants.

(iii) On the Job Training (After 2nd year) –

Students should be attached for practical training with the organisation as suggested in (ii). Students can prepare the necessary documents/ returns/ forms etc. related to direct and indirect taxes.

5. Unit cost for 30 students—

- (a) Building as per the norms of the UGC.
- (b) Rupees one lakh for books, journals and equipments.

6. Modalities of examination and evaluation.

- (a) Weightage between theory and practicals should be 70% and 30% respectively.
- (b) Continuous evaluation – assignment surprise test quiz.

Paper-I : Direct Tax-I, Procedure and Practice

Max. Marks 100

3 hrs. duration

Min. Pass Marks : 36

Section – A

1. Regulatory frame work-An overview of Income Tax Act, 1961 and Income Tax Rules, 1962
2. Income Tax Authorities.
3. Basis of Charge – who is liable to pay income-tax –person, assessee, assessment year, previous year, residential status and incidence of tax.
4. Permanent Account No. – Procedure for obtaining Permanent Account No. (PAN) – filling and filing of application under form No. 49A.

Section – B

5. Computation of total income for filing of return – Head of Income Deductions under Chapter VIA Computation of Tax in case of individual, Hindu Undivided Family, Firm, Companies, Rebate of Income Tax under Section 88.
6. Payment of Tax : Tax deducted at source, Advance Tax, Self Assessment Tax.
 - (a) Tax deducted at source : filling and filing of application form for obtaining TDS number under form No. 49B – obligation of the person making payment, who and when the person is liable to deduct tax at source. Procedure and rate of Tax deducted at source on various payments.

Employers Obligations :

Stage-I : Certificate to be issued to the recipients – filing and issue of the various TDS forms (16, 16A and 16B)

Stage-II : deposit of tax deducted at source – filling and filing of the challan and deposit of tax.

Stage-III : Submission of returns of TDS under Form No. 26,26A,26B,26BB,26D, 26E.

Recipients Obligations :

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- A. To obtain TDS certificate from payer; filling and filing of relevant certificates for lower or no deduction of tax at source (Form No. 13C, 14, 14B, 15, 15A, 15AA, 15B, 15D, 15E, 15F, 15G, 15H, 15I).

2. TAX PROCEDURE AND PRACTICE

MODEL FOR PREPARATION OF

OUTLINE OF COURSES

1. Subject Title ; Tax Procedure Practice 15 weeks.

2. Subject Title : General Objectives.

(a) To familiarise the students with the Indian Tax system.

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Section – C

7. Advance Tax – who is liable to pay advance tax, computation of advance tax, instalment and due date of Advance Tax, Interest Payable by the assessee. Filling of challan and deposit of Advance Tax.
8. Self Assessment Tax - Filling of the challan and depositing of the tax there of, interest under self-assessment.
Return of Income : who is liable to file return of income, time limit, return of loss, related return. Revised return, Defective return, Return by who to be signed, filling and filing of Income under :

Form No. 1 in case of companies other than those claiming exemption under section II

Form No. 2 for assesses (other than companies and those claiming exemption under Section 11). Whose total income include profit & gain from business and profession.

Form No. 3A For assesses including companies claiming exemption under Section 11

Paper – II : Direct Tax – II, Procedure and Practice

Max. Marks : 100

3 hrs. duration

Min Marks : 36

Section – A : Wealth Tax

1. Regulatory frame work ; An overview of Wealth Tax Act. 1957 and Wealth Tax Rules 1957.
2. Wealth Tax Authorities.
3. Important terms and definitions- valuation date, assessment year, meaning of Assets.
4. Exempted Assets, Valuation of invaluable property and Jewellers computation of Net Wealth, Computation of Wealth Tax, Filling of challan for payment of Wealth Tax, and deposit tax.
5. Return of Wealth tax, limit for filing return, filling and filing of return of Wealth under Form A & B.
6. Assessment and Post Assessment Procedure in brief.

Section – B : Income Tax

7. Assessment Procedure : Inquiring before Assessment. Assessment under Section 143(1). Regular Assessment under Section 143(2). Best Judgement Assessment, income escaping Assessment, issue of notice where income has escaped assessment, Time limit for Notice. Time limit for compilation of assessment and re-assessment.

Section – C

Post Assessment Procedure :

8. Refund : who can claim refund, Form No. 30 for Refund, Time limit for claiming refund, Refund on appeal, Interest on refunds.
9. Rectification of mistake (s).
10. Appeals and revision : When an assessee can file appeal, appellate authorities, procedure for filing appeal, filling and filing of form No. 35, Form No. 36. Time limit for filing appeal. Revision by Income Tax Commissioner.

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SYLLABUS

(Three/Four Year Under Graduate Programme in Commerce)

I & II Semester

Examination-2023-24

As per NEP - 2020

Rj / Taw

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(Academic)
University of Rajasthan
JAIPUR

Dr. Rekha Gupta
Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur



UNIVERSITY OF RAJASTHAN, JAIPUR

Four Year Undergraduate Programme

Faculty of Commerce

Programme Name:

UG0202 – Four Year Bachelor of Commerce

B. Com.

Subject/Discipline - ABST

(Syllabus as per NEP – 2020 and Choice Based Credit System)

Medium of instruction: Hindi/English

w.e.f. Academic Session 2023-24


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Principal
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R.K. Vigyan (R.G.) Mahavidyalaya
Kalwar, Jaipur

**Programme Name: UG0202 - Four Year Bachelor of Commerce
B. Com.**

S. No.	Discipline / Subject	Page No.
1.	Programme Prerequisite and Outcome	2
2.	Scheme of Examination	3
3.	Contact Hours	3
4.	Exit and Entrance Policy	3
5.	Letter grade and Grade Points	4
6.	Semester wise Paper Titles	4
7.	Detailed Syllabus of Semester I and II (ABST)	5-8

Name of University	University of Rajasthan, Jaipur
Name of Faculty	Commerce
Name of Programme	UG0202-B.Com.
Name of Discipline	ABST

PROGRAMME PREREQUISITES
12 th Standard pass from CBSE, RBSE or a recognized board of education in any stream.
PROGRAMME OUTCOMES (POs)
Program Outcome in B.Com.(Pass Course):
<ol style="list-style-type: none"> 1. Accounting Knowledge: Students will acquire a comprehensive understanding of accounting principles, concepts, and practices, including financial accounting, cost accounting, management accounting, auditing, and taxation. 2. Financial Statement Analysis: Students will develop skills in analyzing and interpreting financial statements, assessing the financial health of organizations, and making informed decisions based on financial information. 3. Taxation: Students will gain knowledge of tax laws, regulations, and procedures, both for individuals and businesses. They will learn about income tax, goods and services tax (GST), tax planning, and compliance. 4. Auditing and Assurance: Students will understand the principles and practices of auditing, including the role of auditors, audit procedures, internal controls, risk assessment, and ethical considerations in auditing. 5. Accounting Software and Technology: Students will be familiar with accounting software and technology tools used in the field, such as Tally, MS Excel, spreadsheets, financial management software and data analytics tools. 6. Financial Management: Students will learn about financial management principles, including capital budgeting, capital structure, working capital management, financial forecasting, and risk management. 7. Communication and Interpersonal Skills: Students will enhance their communication skills, both written and oral, and develop the ability to work effectively in teams, present financial information, and communicate with stakeholders. 8. Analytical and Problem-Solving Skills: Students will develop strong analytical and problem-solving skills, enabling them to analyze complex financial data, identify issues, and propose appropriate solutions. 9. Research Skills: Students will be equipped with research skills to gather and analyze relevant accounting information, conduct financial research, and stay updated with changing accounting standards and regulations.
These program outcomes are designed to prepare B.Com. Graduates for careers in accounting, finance, auditing, taxation, financial analysis, consulting, and related fields.


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Scheme of Examination-

1 credit = 25 marks for examination/evaluation

Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous Assessment (20% weightage) and (End of Semester Examination) EoSE (80% weightage).

1. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study.
2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration. The question paper will have three parts as: -
 - Part-A of the paper shall have 10 very short answer type questions of 02 marks each.
 - Part-B of the paper shall consist of 04 short answer type questions selecting one question from each unit of 10 marks. The student shall attempt any two questions.
 - Part-C of the paper shall consist of 04 questions. The 04 questions will be set with one from each of the units with internal choice. Each question carries 20 marks.
3. 75% Attendance is mandatory for appearing in EoSE.
4. To appear in the EoSE examination of a course/subject student must appear in the mid-semester examination and obtain at least a "C" grade in the course/subject.
5. Credit points in a Course/Subject will be assigned only if, the student obtains at least a C grade in midterm and EoSE examination of a Course/Subject.

Contact Hours:15 Weeks per Semester

L – Lecture	(1 Credit = 1 Hour/Week)
T – Tutorial	(1 Credit = 1 Hour/Week)
S – Seminar	(1 Credit = 2 Hours/Week)
P – Practical	(1 Credit = 2 Hours/Week)
F – Field Practice/Projects	(1 Credit = 2 Hours/Week)
SA – Studio Activities	(1 Credit = 2 Hours/Week)
I – Internship	(1 Credit = 2 Hours/Week)
C – Community Engagement and Service	(1 Credit = 2 Hours/Week)

Exit and Entrance Policy

1. Students who opt to exit after completion of the first year and have secured 48 credits will be awarded a **UG Certificate** if, in addition, they complete one internship of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.
2. Students who opt to exit after completion of the second year and have secured 96 credits will be awarded the UG diploma if, in addition, they complete one internship of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.
3. Students who wish to undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 150 credits and satisfying the minimum credit requirement.
4. A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 200 credits and have satisfied the minimum credit requirements.
5. Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the

University/College. The research project/dissertation will be in the major discipline. The students who secure 200 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

Letter Grades and Grade Points

Letter Grade	Grade Point	Marks Range (%)
O (outstanding)	10	91 - 100
A+ (Excellent)	9	81 - 90
A (Very good)	8	71 - 80
B+ (Good)	7	61 - 70
B (Above average)	6	51 - 60
C (Average)	5	40 - 50
P (Pass)	4	
F (Fail)	0	
Ab (Absent)	0	

Semester wise Paper Titles

Programme Name: UG0202 - Four Year Bachelor of Commerce												
S. N.	Level	Semester	Type	Title	UG0202-B.Com.				Credits			
					L	T	P	Total				
1	5	I	MJR	UG0202-ABS-51T-101-Financial Accounting	6	0	0	6				
2	5	II	MJR	UG0202-ABS-52T-107-Business Statistics	6	0	0	6				
3	6	III	MJR	UG0202-ABS-63T-201-Cost Accounting	6	0	0	6				
4	6	IV	MJR	UG0202-ABS-64T-209-Income Tax Law & Practice	6	0	0	6				
5	7	V	MJR	UG0202-ABS-75T-301-Auditing	6	0	0	6				
6	7	VI	MJR	UG0202-ABS-76T-307-Goods and Services Tax (GST)	6	0	0	6				
7	8	VII	MJR	UG0202-ABS-87T-401-Research Methodology-I	6	0	0	6				
8	8	VIII	MJR	UG0202-ABS-88T-407- Research Methodology-II	6	0	0	6				

**Syllabus: UG0202-B.Com.
Semester-I ABST (2023-24)**

Course Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
DCC (Major)	UG0202-ABS-51T-101- Financial Accounting	Midterm-1 Hr EoSE-3 Hrs	Midterm-30 Marks EoSE-120 Marks	Midterm-12 Marks EoSE-48 Marks

Name of the Programme: Four Year Bachelor of Commerce

Title of the Course: Financial Accounting

Paper Code: UG0202-ABS-51T-101

Semester: I

Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
I	UG0202-ABS-51T-101	Financial Accounting	5	6
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major	Lecture-Six Hours Per Week, Total Ninety Hours		
Duration of Examination		Maximum Marks	Minimum Marks	
Midterm -1 Hr EoSE-3 Hrs		Midterm-30 Marks EoSE-120 Marks	Midterm-12 Marks EoSE-48 Marks	

Detailed Syllabus

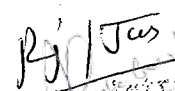
Objectives of the Course:

1. To impart conceptual knowledge of financial accounting.
2. To provide knowledge and understanding of financial statements of a business.
3. To prepare departmental profit and loss account and balance sheet.
4. To explain various methods of preparing branch accounts.
5. To explain the process of valuation of loss of stock, consequential loss of profit and amount to be claimed from the insurance company in the event of a fire accident.
6. To explain the steps involved in conversion of single entry into double entry system of bookkeeping with all the relevant adjustments.
7. To prepare accounts for transactions related to Hire Purchase, Instalment and Lease System.

UNIT-I

Accounting: Meaning, Concept, Importance and Scope of Accounting, Basic Accounting Principles, Conventions, Concepts, Procedures, Methods, Forms of Accounting and Uses of Accounting information.

Accounting equations and Types of accounts, Rules of recording business transactions. Preparation of Journal, Subsidiary Journal Books, Ledger and Trial Balance, Preparation of Trading Account, Profit & Loss Account and Balance sheet with adjustments.


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UNIT-II

Departmental Accounting: Meaning and objective of departmental accounts; Basis of allocation of common expenses; Inter-departmental transfers; Preparation of departmental trading and P&L account (Including general P&L account and balance sheet).

Branch Accounting: Meaning, Objective and Methods including Debtor system, Stock and Debtor system, Final Account system; Wholesale Branch system and Independent Branch system excluding Foreign Branches; Difference between branch and departmental accounting.

UNIT-III

Insurance Claims: Meaning of Insurance claims, Need, Loss of Stock policy, Consequential Loss policy, Comprehensive Loss policy, steps for ascertaining insurance claims, Computation of loss of stocks with abnormal items including consequential loss of profit and application of average clause.

Accounting from Incomplete Records: Converting single entry into double entry system, steps in conversion, ascertainment of sales, purchases, stocks, cash and bank balances, capital etc., preparation of final accounts.

Accounting for Investments.

UNIT-IV

Accounting for Hire Purchase: - Meaning and importance of hire purchase system, Provisions of Hire Purchase Act 1972, Preparation of hire purchase accounts: - Journal entries and Ledger accounts in the books of hire-purchaser and hire-vendor.

Accounting for Instalment System: Meaning and importance of Instalment system, Difference between hire purchase and instalment system, Preparation of instalment payment accounts: Journal entries and Ledger accounts in the books of Purchaser and Vendor.

Accounting for Lease: Meaning and importance, Difference between Hire purchase and lease, Differences in accounting treatment, Types of leases: Financial lease and Operating lease – Accounting treatment in the books of lessor and lessee.

Note: The student shall be permitted to use Battery operated calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.

Suggested Books and References:

1. Sharma, Shah, Mangal, Agarwal: Financial Accounting, RBD, Jaipur.
2. Jain, Khandelwal, Pareek, Dave: Financial Accounting, Ajmera Book Company, Jaipur.
3. Agrawal, Sharma, Purohit, Sharma: Financial Accounting, Shivam Book House, Jaipur.
4. Tulsian: Financial Accounting: Sultan Chand & Sons, New Delhi.
5. Shukla & Grewal: Advance Accounts, Sultan Chand & Sons, New Delhi.
6. Maheshwari S.N.: Financial Accounting, Vikas Publishing House Pvt. Ltd, New Delhi.
7. Sehgal A. and Sehgal D.: Advanced Accounting, Taxman Publication, New Delhi.
8. Jain S.P. and Narang K.L.: Financial Accounting, Kalyani Publisher, Delhi.
9. Monga J.R.: Financial Accounting, Mayur Paper Book, New Delhi.
10. Gupta, R.L.: Advanced Financial Accounting, S. Chand & Sons, New Delhi.
11. Kumar A.S.: Advanced Financial Accounting, Himalaya Publication House.
12. Paul Sr. K.: Accountancy, Volume-I and II, New Central Book Agency, Kolkata.

Course Learning Outcomes:

1. Understanding of the basic concepts and process of accounting.
2. Ability to prepare various subsidiary books, trial balance and final accounts of a sole proprietorship business.
3. Ability to prepare departmental profit and loss account and balance sheet.

4. Have deeper understanding with various methods of preparing branch accounts.
5. Understanding of the process of valuation of loss of stock, consequential loss of profit and amount to be claimed from the insurance company in the event of a fire accident.
6. Understanding of the steps involved in conversion of single entry into double entry system of bookkeeping with all the relevant adjustments.
7. Ability to prepare accounts for transactions related to Hire Purchase, Instalment and Lease system.

**Syllabus: UG0202-B.Com.
Semester-II ABST (2023-24)**

Course Type	Paper code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
DCC (Major)	UG0202-ABS-52T-107- Business Statistics	Midterm-1 Hr EoSE-3 Hrs	Midterm-30 Marks EoSE-120 Marks	Midterm-12 Marks EoSE-48 Marks

Name of the Programme: Four Year Bachelor of Commerce

Title of the Course: Business Statistics

Paper Code:UG0202-ABS-52T-107

Semester: II

Semester	Code of the Course	Title of the Course/Paper	NHEQF Level	Credits
II	UG0202-ABS-52T-107	Business Statistics	5	6
Level of Course	Type of the Course	Delivery Type of the Course		
Introductory	Major	Lecture-Six Hours Per Week, Total Ninety Hours		
Duration of Examination		Maximum Marks	Minimum Marks	
Midterm -1 Hr EoSE-3 Hrs		Midterm-30 Marks EoSE-120 Marks	Midterm-12 Marks EoSE-48 Marks	

Detailed Syllabus

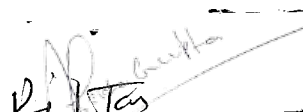
Objectives of the Course:

1. Familiarize the students with various statistical data analysis tools that can be used for effective decision making in business.
2. Describe and discuss the key terminology, concepts, tools and techniques used in business statistical analysis.
3. Identify and apply appropriate statistical techniques for presenting, analyzing, interpreting business data to decide on various practical problems in business.
4. Provide comprehensive knowledge to calculate the measures of central tendency, dispersion, skewness, correlation coefficient and regression.
5. Understand time series, index numbers and explain its uses and methods.

UNIT -I

Meaning, Definition, Features, Importance and limitations of Statistics. Meaning, uses and difference between primary and secondary data, Data collection methods, Classification and tabulation of data. Presentation of Data: Diagrams / Graphs of frequency distribution - Ogive and Histograms.

Meaning, application and limitation of Central Tendency. Measures of Central Tendency- Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean, and partition values- quartiles, octiles, deciles, percentiles.


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UNIT -II

Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation and their Coefficient, Combined Standard Deviation, Coefficient of Variation, Uses and interpretation of measures of dispersion.

Meaning of Skewness, difference between dispersion and skewness, Methods of computing Skewness and their coefficient - Karl Pearsons and Bowleys. Moments & Kurtosis.

UNIT-III

Meaning, importance and uses of Correlation, Different methods for computing correlation- Scatter Diagram, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation, Concurrent Deviation Method.

Meaning, importance and uses of Regression Analysis, Comparison between Correlation and Regression, Computation of two Regression Equations.

UNIT-IV

Meaning, importance and uses of Index Numbers, Simple and Weighted Price Index Numbers, Methods of Construction: Average of Relatives, Aggregative Method, Fishers Ideal Index Number, Base Shifting and Conversion, Deflating, Splicing.

Meaning, uses and components of Time Series, Additive and multiplicative models, Measurement of trend - Graphical method, Semi-average method, Moving average method, Least squares method. Measurement of Seasonal Variation - Method of Simple averages, Ratio to trend method, Ratio to moving average method.


Note: The student shall be permitted to use Battery operated calculator that should not have more than 12 digits, 6 functions and 2 memories and should be noiseless and cordless.


Suggested Books and References:

1. S. P. Gupta Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Khanna and Gupta, Business Statistics, Prantice Hall.
3. Chikkodi & SatyaPrakash: Business Statistics, Himalaya Publishing House Pvt. Ltd.
4. Naval Bajpai: Business Statistics, Pearson Education.
5. Goyal, Ranga, Gupta, Jain, Gupta: Statistics, Ajmera Book Company, Jaipur.
6. Sharma, Jain, Pareek: Business Statistics, Shivam Book House, Jaipur.
7. Oswal, Agrawal, Modi and Bhargawa : Business Statistics, Ramesh Book Depot, Jaipur.
8. R. S. N. Pillai and Bagavathi, S. Chand and Company Limited, New Delhi.
9. J. K. Sharma, Business Statistics, Vikas Publishing House Pvt. Ltd., New Delhi.

Course Learning Outcomes:

1. Understand the basics of statistics and its applications.
2. Understand various statistical tools for business decision-making.
3. Select the appropriate method for data collection, presentation, analysis, and interpretation to make informed decisions.
4. Analyse the relationship between two variables of various managerial situations.
5. Compute basic statistical parameters and predict the values of regression, correlation, time series and index numbers.
6. Solve problems for business decision-making and interpret solutions with various statistical techniques.


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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Commerce)

I & II Semester

Examination-2023-24

As per NEP - 2020

R. K. Vigyan
Dr. Registrar (Acad.)
University of Rajasthan
JAIPUR

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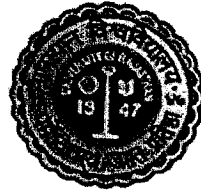
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R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur

UG0202-Three/Four Year B.Com. (Bachelor of Commerce)

As per
UGC Curriculum and Credit Framework for Undergraduate Programmes
Under NEP 2020

Medium of Instruction: Hindi/English

w.e.f. Academic Session 2023-24.



UNIVERSITY OF RAJASTHAN, JAIPUR

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Kalwar, Jaipur

SEMESTER-I

3

Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA/Practical Marks	Total Marks
ABS-51T-101	5	Financial Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-51T-102	5	Principles of Business Management	DCC (Major)	90	4	2	0	6	120	30	150
EFM-51T-103	5	Business Economics	DCC (Major/Minor)	90	4	2	0	6	120	30	150
104		Language-Hindi	AEC	60	4	0	0	4			
105			SEC	30	2	0	0	2			
106			VAC	30				2			
								Total Credit	26		

SEMESTER-II

Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA/Practical Marks	Total Marks
ABS-52T-107	5	Business Statistics	DCC (Major)	90	4	0	2	6	100	50	150
BDM-52T-108	5	Business Laws	DCC (Major)	90	4	2	0	6	120	30	150
EFM-52T-109	5	Indian Banking and Financial System	DCC (Major/Minor)	90	4	2	0	6	120	30	150
110		Language-English	AEC	60	4	0	0	4			
111			SEC	30	2	0	0	2			
112			VAC	30				2			
								Total Credit	26		

Credits offered for 1-year certificate: Year I Internship

Total credits 52 4 = 56

For exit after 1st year, minimum credit requirement is 48 from the course and 4 credits from the internship, hence the certificate is @52 credits. For 1st year Internship is mandatory for exiting at this stage.

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Name of the Programme: Bachelor of Commerce (B. Com.)

Course Code : BDM-51T-102

Name of Course : Principles of Business Management

Semester : I

Level	Course Credits	No. Of Hours per Week	Total No. of Teaching Hours
5	6 Credits	6 Hours	90 Hours

OBJECTIVES:

1. To make the students aware of the universality of management and need for formal management education.
2. To enable them to appreciate the evolutionary process of management thought.
3. To introduce them to the various managerial functions and the principles behind practicing them.
4. To acquaint the students with the recent changes in the field of management.

LEARNING OUTCOME OF THE COURSE:

1. Acknowledge the need for formal management education.
2. Acquire skills for becoming effective managers.
3. Acquire ability to apply basic business management principles to solve business and industry related problems.
3. Practice management principles wherever possible and utilize the available resources more productively.

SYLLABUS

UNIT 1: Introduction: Concept, Nature, Process and Significance of Management; Managerial Roles (Mintzberg); An Overview of Functional Areas of Management, Development of Management Thoughts - Classical, Neo-Classical and Contingency Approaches. Planning: Concept, Process, Types, Levels, Advantages, Disadvantages and Principles of Planning.

UNIT 2: Decision- Making: Concept and Process; Management by Objective (MBO). Organisation: Concept, Nature, Process and Significance, Authority and Responsibility Relationships. Centralization and Decentralization; Span of Management. Coordination: Meaning, Importance, Principles and Techniques.

UNIT 3: Control: Meaning & Principles. Motivation and Leading People at Work: Motivation-Concept, Importance, Theories of Maslow, Herzberg, McGregor and Ouchi. Leadership- Concept and Importance. Staffing: Meaning, Importance, Principles and Techniques.

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UNIT 4: Managerial Control: Concept and Process; Effective Control System; Techniques of Control. Management of Change: Concept, Nature, Types of Changes and Process of Planned Change, Resistance to Change and Methods of Reducing Resistance to Change.

Suggested Readings:

- Harold Knootz & Heinz Weirich: Essentials of Management, Tata McGraw Hill, New Delhi
- Vijay Kumar Kaul: Business Management, Vikas Publishing House, Noida (UP).
- Louis A. Allen : Management and Organisation, McGraw Hill, Tokyo
- Ansoff, H.I. : Corporate Strategy, McGraw Hill, New York
- Hampton David R. : Modern Management, McGraw Hill, New York
- James A.F. Stoner, R. Edward Freeman, Daniel R. Gilbert, Jr.: Management, Prentice Hall, New Delhi.
- Harsey, Paul and Blanchard Kenneth H: Management of Organizational Behaviour-Utilizing the Human Resources, Prentice Hall of India, New Delhi
- John M. Ivancevich, James H. Donnelly, Jr. James L. Gibson: Management Principles and Functions. AITBS Publishers and Distributors, New Delhi.
- George R. Terry, Stephen G. Franklin: Principles of Management, AITBS Publishers and Distributors, New Delhi.
- R.D. Agarwal: Organization and Management, Tata McGraw Hill, New Delhi.

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Name of the Programme: Bachelor of Commerce (B. Com.)

Course Code : BDM-52T-108

Name of Course : Business Laws

Semester : II

Level	Course Credits	No. Of Hours per Week	Total No. of Teaching Hours
5	6 Credits	6 Hours	90 Hours

OBJECTIVES:

1. To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.
2. To understand the applications of these laws to practical commercial situations.

LEARNING OUTCOME OF THE COURSE

1. Know rights and duties under various legal Acts.
2. Understand consequences of applicability of various laws on business situations.
3. Develop critical thinking through the use of law cases.

SYLLABUS

UNIT 1: The Indian Contract Act, 1872, Section 1 to 75

UNIT 2: Special Contracts; Indemnity; Guarantee; Bailment and pledge, Agency

UNIT 3: Indian Sale of Goods Act, 1930

UNIT 4: The Limited Liability Partnership Act, 2008

Suggested Readings:

- Desai, T.R. : Contract Act, Sale of Goods Act and Partnership Accounts, S.C. Sarkar & Sons Pvt. Ltd., Kolkata
- Kuchal, M.C. and Kuchhal Vivek : Business Laws, Vikas Publishing House, Noida (UP).
- Singh, Avtar : The Principles of Mercantile Law, Eastern Book Company, Lucknow
- Kapoor, N.D. : Business Law, Sultan Chand & Sons, New Delhi
- Tulsian P.C., Tulsian Bharat, Tulsian Tushar: Business Laws, S.Chand Publishing.
- Chandra, P.R. : Business Law, Galgotia, New Delhi
- The Indian Contract Act, 1872- Bare Act.
- The Sale of Goods Act, 1930- Bare Act.
- Commercial Law : - Pradeep K.Sharma, M.J. Mathur, Leena Bhatia (RBSA, Jaipur)

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SYLLABUS

(Three/Four Year Under Graduate Programme in Commerce)

I & II Semester

Examination-2023-24

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As per NEP - 2020

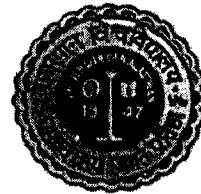
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UG0202-Three/Four Year B.Com. (Bachelor of Commerce)

As per
UGC Curriculum and Credit Framework for Undergraduate Programmes
Under NEP 2020

Medium of Instruction: Hindi/English

w.e.f. Academic Session 2023-24.



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SEMESTER-I

Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-51T-101	5	Financial Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-51T-102	5	Principles of Business Management	DCC (Major)	90	4	2	0	6	120	30	150
EFM-51T-103	5	Business Economics	DCC (Major/Minor)	90	4	2	0	6	120	30	150
104		Language-Hindi	AEC	60	4	0	0	4			
105			SEC	30	2	0	0	2			
106			VAC	30				2			
				Total Credit				26			

SEMESTER-II

Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-52T-107	5	Business Statistics	DCC (Major)	90	4	0	2	6	100	50	150
BDM-52T-108	5	Business Laws	DCC (Major)	90	4	2	0	6	120	30	150
EFM-52T-109	5	Indian Banking and Financial System	DCC (Major/Minor)	90	4	2	0	6	120	30	150
110		Language-English	AEC	60	4	0	0	4			
111			SEC	30	2	0	0	2			
112			VAC	30				2			
				Total Credit				26			

Credits offered for 1-year certificate: Year I Internship

Total credits 52 + 4 = 56

For exit after 1st year, minimum credit requirement is 48 from the course and 4 credits from the internship, hence the certificate is @52 credits. After 1st year Internship is mandatory for exiting at this stage.

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SEMESTER-III

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-63T-201	6	Cost Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-63T-202	6	Company Law	DCC (Major)	90	4	2	0	6	120	30	150
EFM-63T-203	6	Elements of Financial Management	DCC (Major/Minor)	90	4	2	0	6	120	30	150
ABS-63T-204 (MDEC)	6	1.Computer Application in Business 2.Business Communication Skills 3.The Economy of Bharat (Choose any one from MDEC Papers)	MDEC	60	2	0	2	4	50	50	100
BDM-63T-205 (MDEC)					4	0	0	4	80	20	100
EFM-63T-206 (MDEC)					4	0	0	4	80	20	100
207			SEC	30	2	0	0	2			
208			VAC	30				2			
				Total Credit				26			

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SEMESTER-IV

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-64T-209	6	Income Tax Law & Practice	DCC (Major)	90	4	0	2	6	100	50	150
BDM-64T-210	6	Fundamentals of Entrepreneurship	DCC (Major)	90	4	2	0	6	120	30	150
EFM-64T-211	6	Indian Economy	DCC (Major/Minor)	90	4	2	0	6	120	30	150
ABS-64T-212 (MDEC)	6	1. Business Data Analysis 2. E-Commerce 3. Personal Finance (Choose any one from MDEC Papers)	MDEC	60	2	0	2	4	50	50	100
BDM-64T-213 (MDEC)					4	0	0	4	80	20	100
EFM-64T-214 (MDEC)					4	0	0	4	80	20	100
215			SEC	30	2	0	0	2			
216			VAC	30				2			
				Total Credit				26			

Duration of internship: 120 hours or 3 weeks (4 Credits)

Credits offered for a two-year diploma:

Year I Year II Internship Total Credits

52 52 4 = 108

For exit after IInd year, the minimum credit requirement is 96 from the course and 4 credits from the internship, hence the UG Diploma @100 credits.

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SEMESTER-V

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-75T-301	7	Auditing and Management Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-75T-302	7	Principles of Marketing	DCC (Major)	90	4	2	0	6	120	30	150
EFM-75T-303	7	Public Finance	DCC (Major/Minor)	90	4	2	0	6	120	30	150
ABS-75T-304 (MDEC)	7	1. Financial Technology and analytics 2. Trade Union & Industrial Relations 3.Sustainable Development (Choose any one from MDEC Papers)	MDEC	60	2	0	2	4	50	50	100
BDM-75T-305 (MDEC)					4	0	0	4	80	20	100
EFM-75T-306 (MDEC)					4	0	0	4	80	20	100
Total Credit								22			

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SEMESTER-VI

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-76T-307	7	Goods and Services Tax (GST)	DCC (Major)	90	4	0	2	6	100	50	150
BDM-76T-308	7	Fundamentals of Human Resource Management	DCC (Major)	90	4	2	0	6	120	30	150
EFM-76T-309	7	Business Budgeting	DCC (Major/Minor)	90	4	2	0	6	120	30	150
310			SEC					2			
								Total Credit	20		

Credits offered for a 3-year UG degree:

Year I Year II Year III Internship Total Credits

52 52 42 4 = 150

For exit after IIIrd year, minimum credit requirement is 146 from the course and 4 credits from the internship, hence 3 years UG Degree @140 credits.

Minimum seats to be filled for running the course: 15

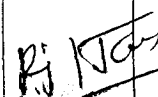
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SEMESTER-VII

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-87T-401	8	Advanced Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-87T-402	8	Production & Operations Management	DCC (Major)	90	4	2	0	6	120	30	150
EFM-87T-403	8	Rural Economics	DCC (Major/Minor)	90	4	2	0	6	120	30	150
ABS-87T-404 (MSDEC-1)	8	1. Advanced Cost Accounting	MSDEC		2	0	2	4	50	50	100
BDM-87T-405 (MSDEC-1)		2. Indian Ethos and Leadership			4	0	0	4	80	20	100
EFM-87T-406 (MSDEC-1)		3. International Trade and Finance (Choose any one from MSDEC Papers)			4	0	0	4	80	20	100
ABS-87T-407 (MSDEC-2)	8	1. Financial Reporting	MSDEC		2	0	2	4	50	50	100
BDM-87T-408 (MSDEC-2)		2. Advertising & Sales Management			4	0	0	4	80	20	100
EFM-87T-409 (MSDEC-2)		3. Project Management & Control (Choose any one from MSDEC- Papers)			4	0	0	4	80	20	100
								Total Credit	26		


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SEMESTER-VIII

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-88T-410	8	Advanced Business Statistics	DCC (Major)	90	4	0	2	6	100	50	150
BDM-88T-411	8	International Marketing	DCC (Major)	90	4	2	0	6	120	30	150
EFM-88T-412	8	Security Analysis and Portfolio Management	DCC (Major/Minor)	90	4	2	0	6	120	30	150
ABS-88T-413 (MSDEC-1)	8	1. Operational Research and Quantitative Techniques 2. Fundamentals of Retail Management 3. Management of Financial Services (Choose any one from MSDEC Papers)	MSDEC		2	0	2	4	50	50	100
BDM-88T-414 (MSDEC-1)					4	0	0	4	80	20	100
EFM-88T-415 (MSDEC-1)					4	0	0	4	80	20	100
ABS-88T-416 (MSDEC-2)	8	1. Tax Planning 2. Indian Management Thought & Thinkers 3. Digital Banking (Choose any one from MSDEC- Papers)	MSDEC		2	0	0	2	80	20	100
BDM-88T-417 (MSDEC-2)											
EFM-88T-418 (MSDEC-2)											
								Total Credit	24		

Credits offered for 4-year UG degree honours:

Year I	Year II	Year III	Year IV	Internship	Total Credits
52	52	42	50	4	= 200

For a 4-year UG degree Honours minimum credit requirement is 196 from the course and 4 from the internship, for hence 4-year UG degree Honours @200 credits. Students who score 75% or more in 3 year UG degree will be eligible for the 4th year of the 4-year UG "honours with research" programme.

Minimum seats to be filled for running the course: 15

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SEMESTER-VII

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Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
ABS-87T-401-HWR	8	Advanced Accounting	DCC (Major)	90	4	0	2	6	100	50	150
BDM-87T-402-HWR	8	Marketing Research	DCC (Major)	90	4	2	0	6	120	30	150
EFM-87T-403-HWR	8	Operation Research and Risk Analysis	DCC (Major/Minor)	90	4	2	0	6	120	30	150
								Total Credit	18		

SEMESTER-VIII

Course Code	Level	Course Title	Course Type	Total Hours	L	T	P	Total Credit	EoSE Marks	CCA /Practical Marks	Total Marks
HWR -88T-404	8	Advanced Business Statistics	DCC (Major)	90	4	0	2	6	100	50	150
HWR -88T-405	8	Fundamentals of Management Research	DCC (Major)	90	4	2	0	6	120	30	150
HWR -88T-406	8	Quantitative Techniques	DCC (Major/Minor)	90	4	2	0	6	120	30	150
RAEC-88T-407	8	Research Ethics and Methodology	RAEC	180	4	0		2			300
								Total Credit	20		
RAEC-88T-408	8	Research Ability Enhancement Courses and Thesis	Dissertation/Thesis preparation/ Writing	12 Hours/Week				12			

Credits offered for 4-year UG degree "honours with research":

Year I Year II Year III Year IV internship total credits

52 52 42 50 4 = 200

For 4 year UG degree "honours with research" the minimum credit requirement is 196 from the course and 4 from the internship, hence 4 year UG degree "honours with research" @200 credits.

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11
Name of the Programme: Four Year Bachelor of commerce Programme

Title of the Course: Business Economics

Paper Code:EFM-51T-103

Semester: I

Level	Course Credits	No. Of Hours per Week	Total No. of Teaching Hours	End Semester Exam	Continuous Comprehensive Assessment (30 Marks)
5	6 Credits	6 Hours	90 Hours	120 Marks	Internal Assignments -10 marks
					Seminar & Group Discussions- 10 marks
					Attendance and Discipline- 10 marks

OBJECTIVES:

1. The objective of this course is to acquaint the students with concepts and techniques used in Micro & Macro Economic theory and to enable them to apply this knowledge in Business decision-making.
2. Business economics also aims to help students understand the broader economic environment in which businesses operate, including the macroeconomic factors that affect the overall performance of the economy.

LEARNING OUTCOME OF THE COURSE:

1. Business economics courses would encourage students to develop critical thinking skills, including the ability to evaluate economic arguments and theories, identify biases, and make well-reasoned judgments.
2. Overall, the outcome of a course in business economics would equip students with the knowledge and skills necessary to make informed decisions in the complex and dynamic business environment. Graduates of business economics programs would be able to apply economic principles and analytical skills to solve business problems and make strategic decisions that contribute to the success of their organizations.

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12
SYLLABUS

UNIT -I

Business Economics- Meaning, Nature and Scope, Role of Business Economist in Business.

Central problems of the economy. Micro Economics & Macro Economics: Concept & Scope. Role of Micro and Macro Economic Analysis in Formulation of Business Decisions, Difference and Interdependence of Micro and Macro Economic Analysis.

Utility Analysis: Cardinal and Ordinal Approaches, Law of Diminishing Marginal Utility and Law of Equi-Marginal Utility, Consumer's Surplus.

UNIT-II

Indifference Curve-Meaning, Characteristics, Consumer's Equilibrium, Income Effect, Price Effect and Substitution Effect.

Demand Analysis, Law of Demand, Elasticity of demand and its measurement and significance.

Supply and Law of Supply, Elasticity of supply.

Demand Forecasting.

Revenue and Cost Analysis: Revenue Analysis, Relationship between Total Revenue, Marginal Revenue and Average Revenue, Various concepts of cost, short and long run cost curves.

UNIT-III

Production Function – Types of Production functions, Laws of Returns, Law of Variable Proportions, Returns to scale, Isoquant curves, Expansion path.

General Theory of Price Determination. Role of Time Element in Price Determination.

Market Analysis: Price and Output determination under Perfect Competition, Monopoly, Discriminating Monopoly, Imperfect Competition and Oligopoly: Price Leadership and Kinked Demand Curve.

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Business Cycles-Theories and Phases.

Factor Pricing: Determination of Rent, Wages, Interest and Profit.

Marginal Productivity theory of Distribution.

National Income and its measurement, National Income and Its relationship with Economic welfare.

Suggested Readings:

1. D.M. Mithani: Fundamentals of business and managerial economics, Himalaya Publishing House.
2. Mote and Paul and Gupta: Managerial Economics, TATA McGraw Hill, New Delhi.
3. Ahuja, H.L.: Managerial Economics, S. Chand & Company Ltd., New Delhi.
4. B.P. Gupta: VyavsayikArthashastra (Hindi), Malik and Company, Jaipur.
5. Agarwal and Agarwal: VyavsayikArthshastra, (Hindi) Ramesh Book Depot., Jaipur.
6. M. D. Agarwal and Som Deo: Business Economics, Ramesh Book Depot, Jaipur.
7. Dwivedi D. N., Managerial Economics, Vikas Publications, Delhi.

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Name of the Programme: Four Year Bachelor of commerce Programme

Title of the Course: Indian Banking and Financial System

Paper Code:EFM-52T-109

Semester: II

Level	Course Credits	No. Of Hours per Week	Total No. of Teaching Hours	End Semester Exam	Continuous Comprehensive Assessment (30 Marks)
5	6 Credits	6 Hours	90 Hours	120 Marks	Internal Assignments -10 marks
					Seminar & Group Discussions- 10 marks
					Attendance and Discipline- 10 marks

OBJECTIVES:

1. To provide the basic knowledge of Indian Banking and financial system and institutions and to familiarize the student with major financial services in India.
2. To provide a comprehensive understanding of the Indian financial system and its various components, so that learners can make informed decisions about financial matters and also pursue careers in the financial sector.

LEARNING OUTCOME OF THE COURSE

1. Students would become aware of the regulatory framework of the Indian financial sector and the role played by regulatory bodies such as RBI, SEBI, etc.
2. Students would gain an understanding of the recent developments in the Indian financial sector such as digital banking, Innovative Banking, and the challenges faced by the sector such as NPAs and cyber threats.

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SYLLABUS

Unit-I

Bank-Meaning, Types and Functions of banks, Role of Banks in Economic Development. Credit Creation of Banks. Banking Products and Services: Types of Deposits and Retail Loans.

Reserve Bank of India: objectives, organizational setup, Functions and Credit Control.

Main Provisions of Banking Regulations Act, 1949 and Reserve Bank of India Act, 1934.

Bankers – Customer relationship: General and Special (Banker’s Rights and Obligations) Garnishee order.

Unit-II

Universal and Innovative Banking: Meaning, Significance and features.

Channels of Banking: ATM, Internet, Mobile, Phone Banking, PoS (Point of Sale), UPI.

E- Payment’s mechanism of banks- plastic cards, NEFT, RTGS, IMPS, SWIFT, ECS, payments wallets.

Negotiable Instruments – Cheques, Bills of Exchange, Promissory Note and Demand Draft- Concept, Features, Types and Parties. Acceptance, Payment and Collection of Negotiable Instruments.

Crossing of Cheques, Concept and types of crossing, Endorsement and presentation of Negotiable Instruments.

Unit-III

Indian Financial System: Meaning, Functions and its Components, Financial System and Development, Major issues in Indian Financial System.

Financial Market: Meaning, Features and Functions. An Overview of Money Market, Capital Market (Primary and Secondary) and their Financial Instruments, Debt Market- Meaning and Functions and their instruments, Role of SEBI and RBI in regulation of Capital and Money Market.

NPA: Meaning, Causes of NPA, Impact of NPA on banking Sector.

Handwritten signature and stamp: Dy. Registrar (Acad.) University of Rajasthan, Principal Dr. Rekha Gupta, R.K. Vigyan (P.G.) Mahavidyalaya, Jaipur. Includes a circular stamp with 'JAIPUR' and 'Page 14 of 15'.

Unit-IV

Financial Institutions: An Overview of Development Financial Institutions- IFCI, SIDBI, ICICI, IRCI, IDBI- Objectives, Functions.

Financial Services: Merchant Banking, Mutual Fund, Leasing, Hire Purchase, Venture Capital- Meaning, Objectives and Functions.

Introduction to BITCOIN, Block chain and Crypto Currency.

Financial sector reforms in India.

Suggested Readings:

1. Vasant Desai: Indian Banking Nature and Problems, Himalaya Publishing House, Delhi.
2. Natarajan S, Parameshwaran R: "Indian Banking", S. Chand & Company Ltd., New Delhi.
3. Averbach, Robert D; Money, Banking and Financial Markets Macmillan, London.
4. Varshney, P.N.: Indian Financial System, Sultan Chand & Sons, New Delhi.
5. Khan, M.Y.: Indian Financial System, Tata McGraw Hill, Delhi.
6. Bhole L.M.: Financial Markets and Institutions, Tata McGraw Hill, Delhi.
7. J.K. Tandon and T.N. Mathur – Banking and Finance, Shivam Book House (P) Ltd., Jaipur (Hindi and English Version)
8. Vashitha, Swami, Gupta: Banking and Finance, Ramesh Book Depot, Jaipur.

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SYLLABUS

B.A. Part-III

Examination - 2024


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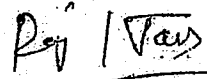
B.A. Part-II Examination
(Under 10+2+3 Pattern)

R.11 (2)

The number of papers and the maximum marks for each paper together with the minimum marks required for a pass are shown in the scheme of Examination on against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/ paper, wherever prescribed, separately classification of successful candidates shall be as follows :

First Division 60%	}	of the aggregate marks obtained at the Part I, II, & III Examination, taken together
Second Division 48%		

All the rest will be declared to have passed the Examination if they obtain the minimum pass marks in each subjects, viz. 36% No division shall be awarded at the Part-I and Part-II examination.


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CONTENTS

Optional Subjects (Any three of the following subjects to the restriction as mentioned in O. 203-I)

1.	English Literature	4-5
2.	Hindi 'Sahitya	6-8
3.	Urdu	9-10
4.	Persian	11-13
5.	Sanskrit	14-19
6.	Philosophy	20-22
7.	History	23-29
8.	Political Science	30-33
9.	Indian Music	34-39
10.	Public Administration	40-45
11.	Drawing & Painting	46-47
12.	Sociology	48-50
13.	Home Science	51-67
14.	Textile Craft	68-69
15.	Garment Production & Export Management	70-73
16.	Investigative Bio-Technology	74-77
17.	Mathematics	78-81
18.	Economics	82-86
19.	Geography	87-90
20.	Statistics	91-94
21.	Applied Statistics	95-96
22.	Psychology	97-99
23.	Rajasthani	100-101
24.	Sheep & Wool	102-103
25.	Live Stock and Dairying	104-106
26.	Anthropology	107-108
27.	Dramatics	109-110
28.	Physical Education	111-115
29.	Indian Heritage in Rural Handicrafts	116-120
30.	Computer Application	121-122

N.B. : 1. Candidates must Pass separately in each of the paper theory and Practical (wherever prescribed)

2. Common papers in the subjects of Statistics, Mathematics, Economics, Geography and Psychology will be set both in the Faculties of Social Science and Science. The allocation of marks will however be different as mentioned in the booklet of syllabus.


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1. ENGLISH LITERATURE

BA Part III

The Syllabus aims at achieving the following objectives :

1. Interpretation and appreciation of selected texts from the genres of poetry, drama, prose and fiction.
2. Strengthening skills of note making, summarizing and dialogue writing.
3. Understanding texts with specific reference to genres, forms and literary terms.

Paper I: Poetry and Drama

Maximum Marks: 100

Duration: 3 hrs

Min. Pass Marks: 36

Question No. 1: References to Context from unit A, B & C.

Candidate will be required to explain four (4) passages of Reference to Context out of Eight (8) of five marks each, with a total of 20 Marks.

Question No. 2 will also be compulsory. The student will be required to attempt 5 questions out of 10, to be answered in about 5 lines each. Each question will carry 4 marks to a total of 20 marks.

The other 3 questions will be essay-type questions of 20 marks each, one from each section with internal choice.

SECTION A

The following poems from *String of Gold* part III edited by Jasbir Jain (Macmillan) :

Tennyson	:	Ulysses
R. Browning	:	My Last Duchess
M. Arnold	:	Dover Beach
G.M. Hopkins	:	The Sea and the Skylark
W.B. Yeats	:	A Prayer for my Daughter
T.S. Eliot	:	Preludes

SECTION B

The following poems from *Texts and Their Worlds* Edited by Anna Kurian, Foundation Books, 2005.

Kalidas, Bhavabhuti, Bhartrahari	:	Is Poetry Always Worthy when its Old?
Syed Amanuddin	:	Don't Call Me Indo-Anglian
R. Parthasarathy	:	From Homecoming
Agyeya	:	Hiroshima

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M. Gopalkrishna Adiga	:	Do Something, Brother
Fr. J. D. Souza	:	Women in Dutch Painting
O.N.V. Kurup	:	Earthen Pots
A. Jayaprabha	:	Stares
Daya Pawar	:	Oh Great Poet
Sitakant Mahapatra	:	The Election

SECTION C

Grish Karnad	:	<i>Tughlaq</i>
Eugene O'Neill	:	<i>The Hairy Ape</i>

Paper II: Prose and Fiction

Maximum Marks: 100

Duration: 3 hrs

Min. Pass Marks: 36

Candidate will be required to answer five (5) Essay type Questions of 20 marks each, choosing at least one question from each section, out of 10 essay type questions.

SECTION A

The following short stories from *Texts and Their Worlds* edited by Anna Kurian.

Foundation Books, 2005 :

Munshi Premchand	:	The Shroud
Intizar Hussain	:	<i>A Chronicle of the Peacocks</i>
Ismat Chughtai	:	Roots
V.M. Basheer	:	Birthday
Shashi Deshpande	:	My Beloved Charioteer
Ambai	:	A Kitchen in the Corner of House

SECTION B

R.K. Narayan	:	<i>The Guide</i>
Charlotte Bronte	:	<i>Jane Eyre</i>

SECTION C

1. A Short Passage of about 10 simple sentences to be translated from Hindi to English.
2. Editing a short text (Grammaticality, Logicality, Cohesion, Coherence)
3. Critical Analysis of a Prose Piece.
4. Writing a News Report.

Recommended Reading :

Vandana R. Singh. *The Written Word* (O.J.P.)
K.M. Shrivastava: *News Reporting and Editing*. Sterling Publication

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Amitav Ghose : *The Hungry Tide*
Aldous Huxley : *Brave New World*

SA

SECTION C

1. A Short Passage of about 10 simple sentences to be translated from Hindi to English.
2. Editing a short text (Grammaticality, Logicity, Cohesion, Coherence)
3. Critical Analysis of a Prose Piece.
4. Writing a News Report.

Recommended Reading:

Short Stories *from texts and their worlds* edited by Anna Kurian Foundation Books, 2005

Indian Literature: An Introduction (Pearson)

Vandana R. Singh. *The Written Word* (O.U.P.)

K.M. Shrivastava: *News Reporting and Editing*, Sterling Publication

Dr. Babasaheb Ambedkar: *Writings and Speeches*, Vol 1, 2014

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[2]

बी.ए. (संस्कृत) तृतीय वर्ष – हिन्दी साहित्य
प्रथम प्रश्न पत्र
आधुनिक काव्य

(6)

पूर्णांक 100

उत्तीर्णांक 36

खण्ड – 'अ'

1. मैथिलीशरण गुप्त
साकेत – नवम सर्ग

यशोधरा

1. वेदने तू भी भली बनी पाऊं प्राण धनी
 2. निरखी सखी ये खंजन आये अश्रु सूखा कर लाये
 3. विरह संग अभिसार भी और एक संसार भी
 4. दोनों और प्रेम पलता है मुझे यही खलता है।
 5. आ आ मेरी निंदिया गूंगी..... मैं न्यौछावर हूँ जी
 6. कहती मैं, चातकि फिर बोल उर के कल-कल्लोल।
 7. सखि निरखि नदी की धार आगे नखीं सहागै
1. सखि, वे मुझसे कहकर जाते
 2. अब कठोर हो वज्रादपि ओ कुसुमादपि सुकुमारी
 3. हे मन आज परीक्षा तेरी

2. जयशंकर प्रसाद
कामायनी – चिन्ता सर्ग

3. सूर्यकांत त्रिपाठी निराला
1. तुलसीदास – प्रथम पांच छंद
2. दिवसावसान का समय

4. अज्ञेय
1. नदी के द्वीप
2. आज थमा हिय हारिलमेरा
3. जो पुल बनाएंगे

5. धूमिल
1. अकाल दर्शन
2. रोटी और संसद

6. नागार्जुन
1. बादल को घिरते देखा है।
2. अकाल और उसके बाद

7. माखनलाल चतुर्वेदी
1. पुष्प की अभिलाषा
2. कैदी और कोकिला

8. मुक्तिबोध – ब्रह्मराक्षस

खण्ड – 'ब' खण्डकाव्य

संशय की एक रात – नरेश मेहता


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खण्ड - 'स'

(7)

आधुनिक हिन्दी कविता की प्रमुख प्रवृत्तियाँ - राष्ट्रीय काव्यधारा, छायावाद, प्रगतिवाद, प्रयोगवाद और नई कविता

अंक विभाजन

खण्ड - 'अ' व 'ब' से चार व्याख्याएं (एक कवि से केवल एक व्याख्या) (खण्ड ब से एक व्याख्या अनिवार्य)
(विकल्प देय) $4 \times 10 = 40$ अंक

खण्ड अ व ब से तीन आलोचनात्मक प्रश्न (खण्ड ब से एक प्रश्न अनिवार्य) (विकल्प देय) $3 \times 15 = 45$ अंक

खण्ड - 'स' निर्धारित पाठ्यवस्तु से संबंधित एक प्रश्न (विकल्प देय) 15 अंक

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खण्ड – 'अ' भाषा

1. हिन्दी भाषा का उद्भव और विकास
2. देवनागरी लिपि – महत्व, वैज्ञानिकता तथा सुधार
3. राजभाषा के रूप में हिन्दी की स्थिति, समस्याएं तथा समाधान

खण्ड – 'ब' काव्य शास्त्र

1. अलंकार – परिभाषा और महत्व
अनुप्रास, यमक, श्लेष, उपमा, रूपक, उत्प्रेक्षा, विभावना, अपन्हुति
2. छंद – परिभाषा और महत्व
दोहा, चौपाई, छप्पय, रोला, मालिनी, शिखरणी, द्रुतविलम्बित, हरिगीतिका
3. रस – परिभाषा, रस के अवयव, रस सिद्धान्त और रस के प्रकार
4. गुण – माधुर्य, ओज, प्रसाद
5. शब्द शक्ति – अभिधा, लक्षणा, व्यंजना

खण्ड – 'स' निबंध

1. सरदार पूर्ण सिंह – आचरण की सभ्यता
2. रामचन्द्र शुक्ल – लोभ और प्रीति
3. हजारी प्रसाद द्विवेदी – भारतीय साहित्य की प्राणशक्ति
4. नंद दुलारे वाजपेयी – साहित्य और सामाजिक जीवन
5. रामविलास शर्मा – तुलसी के सामंत विरोधी मूल्य
6. विद्यानिवास मिश्र – तुम चंदन हम पानी
7. कुबेरनाथ राय – उत्तरा फाल्गुनी के आस-पास

अंक विभाजन

खण्ड – अ

निर्धारित पाठ्यवस्तु पर दो प्रश्न (विकल्प देय)

10 x 2 = 20 अंक

खण्ड – ब

एक प्रश्न रस और अलंकार से संबंधित (विकल्प देय)

10 x 1 = 10 अंक

एक प्रश्न – छंद, गुण, शब्द शक्ति से संबंधित (विकल्प देय)

10 x 1 = 10 अंक

खण्ड – स

कुल चार व्याख्याएं – एक निबंध से केवल एक – (विकल्प देय)

$7\frac{1}{2} \times 4 = 30$ अंक

दो आलोचनात्मक प्रश्न – एक निबंध से एक प्रश्न (विकल्प देय)

15 x 2 = 30 अंक

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3. URDU

B.A. Part-III

Paper-I (Jadeed Asnafa Adab)

M.M. : 100

3 Hrs.

Min. Pass Marks 36

- | | |
|-------------------|-----------------------|
| 1. Jadeed Nazam | 2. Azad Nazam |
| 3. Moarra Nazam | 4. Nasri Nazam |
| 5. Perody | 6. Report Taaz Nigari |
| 7. Khaka | 8. Inshaiya |
| 9. Khutoot Nigari | 10. Savaneh Nigari |

Division of Marks :

Unit I	Ten short answer type question.	20
Unit II	Question on Nazam Nigari.	20
Unit III	Question on Perody & Report Taaz Nigari.	20
Unit IV	Question on Khaka & Inshaiya	20
Unit V	Question on Khutoot Nigari & Savaneh Nigari	20
Total		100

Note: Attempt at least one question from each unit. All the short answer type question of unit I are compulsory.

Books Recommended :

1. Jadeed Urdu Nazm Aur Europi Asrat-By Hamidi Kashmiri
2. Urdu Khake Nigari-By Dr. Sabira Sayeed
3. Urdu Inshaiya- By Dr. Mohd. Hasnain
4. Nai Nazm Ka Safar-By Dr. K. Azmi
5. Urdu Inshayye-By Anwar Sadeed
6. Adab Ka Mutaliya-By Dr. Athar Parveez

Paper-II

(History, Essay and Translation)

M.M. : 100

3 Hrs. Duration

Min. Pass Marks 36

1. Urdu Adab Ka Aaghaz -o-Irtiqa up to 1957.
2. Fort William College Ki Adabi Khidmat.
3. Sir Syed Tehreek
4. Dabistan-e-Delhi
5. Dabistan-e-Lucknow

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Books Prescribed for translation from Persian to Urdu :

- I. Gulha-e-Farsi Published- By Kitabistan, 30 Chak Road, Allahabad.

Division of Marks :

Unit I	Ten Short Answer type question.	20
Unit II	Essay on a literary topic.	20
Unit III	Translation from English, Hindi & Persian into Urdu	20
Unit IV	Urdu Adab Ka Aghaz-o-Irtiqā Dabistan-e-Delhi & Dabistan-e-Lucknow.	20
Unit V	Question on Sir syed Tehreek, Fort William College.	20
		Total 100

Note: Attempt at least one question from each unit. All the short answer type questions of unit I are compulsory.

Books Recommended:

1. Dacani Adab Ki Taeekh by Dr. Zor
2. Urdu Adab Ki Ek Sadi-by Dr. Syed Abdullah
3. Delhi Ka Dabistane Shairi-by Noorul Hasn Hashmi
4. Luknow Ka Dabistane Shairi-by Abdulla Siddiqi
5. Sir Sayed Aur Aligarh Tehreek-by Khaleeq Nizami
6. Fort William College Ki Adabi Khidmat-by Ubada Begum

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4. PERSIAN

BA Part III

Paper-I : Prose & Poetry

Books prescribed :

1. Nisab-e-Jadeed Farsi Published by Jayyed Press Delhi.

The following prose section is prescribed :

Intekab Marzaban Namah - Marzaban Rustam Bin Sharveen

- (i) Dastan Barzeegar Bamar
- (ii) Dastan Ahoo-wa-Moosh-wa-Uqab
- (iii) Dastan Mard Tamaba-Nokhra Nokhara
- (iv) Dastan Ahangar-b-Mard Musafir
- (v) Dastan Bazargan-Ba-Dost Dana
- (vi) Dastan Dehqan-Ba-Pisr-e-Khud

2. Nisab-e-Farsi (Brae-B-A-Sal-e-Suwum) published by Aligarh Muslim University, Aligarh.

- (i) Tareek-e-Tabri-Derzikh Khaber Padshahi Behrum Gour
- (ii) Chahar Maqala-Nisami Uruzi
- (iii) Chahar Maqla- Firdausi

The following poetry sections are prescribed :

1. Nisab-e-Farsi (Brae-B.A.Sal Suwum)

- (i) Shahnama Firdausi Bazgasht in-Ba-Jang-e-Asfandyar
- (ii) Gazliyat
Farrukhi Yazdi
Fidae-Sauz-e-Dil
Pazman
Maham-Shakista-Khatir

- (iii) Manzumat-

Parveen Etasami

- (a) Sapad-o-Siyah (b) Asaish-e-Buzargan

2. Nisabe-Jadeed-Farsi published by Jayyed Press, Delhi.

- (i) Rubaiyat-e-Umarkhayyam (21 to 30)
- (ii) Intekabe Masnavi-e-Manavi Jalaluddin Rumi

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Unit-1	(A) Ten short answer type questions based on full paper.	10
	(B) Translation of two prose passages out of three into Urdu	20
Unit-2	Translation of two Poetry Passages out of three into Urdu	20
Unit-3	General Question on Prose Writer	15
Unit-4	General Question on Poetry Writer.	15
Unit-5	Summary of prescribed lessons.	20
	Total	100

Note: Unit-I Both A and B questions are compulsory.

Paper-II : History of Persian Literature & Translation

M.M. : 100

3 hrs.

Min. Pass Marks. 36

Books Prescribed :

1. Tarikh-e-Adabiyate-Iran By Raza Zada Shafaq (Urdu Edition/Translated)
2. Tarikh-e-Adabiyate-Iran By Raza Zada Shafaq (Persian Edition)
3. Bar Rasi Adabiyate Imruz-e-Iran By Dr. Mohd. Istallami Published By Mussar-e-Intesharat-e- Amir Kabir, Tehran 2536
4. Shair-ul-Ajnm Part I, II, III, IV, V By Shibli Nomani
5. Modern Persian Prose Literature By H. Khan Shad Published By Cambridge University, Press, 1966

Division of Marks :

Questions Based Upon the following Topics :

Unit-1	(A) Ten short answer type questions based on full paper.	10
	(B) Khan Period	20
	(i) Tarikh-e-Jahankusha	
	(ii) Jama-ul-Tarikh	
	(iii) Tarikh-e-Wassaf	
	(iv) Tarikh-e-Gazidah	
Unit-2	Critical Study of the following Writers & Poets of the 14th Century	20
	(i) Rumi	
	(ii) Sadi	
	(iii) Iraqui	
	(iv) Khawaja Nasiruddin Tusi	

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Unit-3	The Timurid Period	20
	(i) Hafiz & his contemporaries	
	(ii) Critical Study of Obez Zakaniasa Satarist	
	(iii) Development of Persian Prose Literature During the 15th Century	
	(iv) Jami and His Works	
	The Safawi Period	
	(i) Historical & Political Importance of the Safawi Dynasty	
	(ii) Study of the Poetry of Mohatsham Kashani The Qajar Period	
	(iii) A Detailed Critical Study of Mirza Habeeb Qaani	
Unit-4	Short Notes on the following Important Histories, Memories & Bigraphics of Qachar Periods	20
	(i) Nasikh-u-Tawarikh	
	(ii) Tarikh Muntazim Nasri	
	(iii) Riyazul Arfeen Manmaussafa	
	(iv) Nama-e-Danishwaran	
Unit-5	Translation of Five Urdu Sentences into Persian	10
		Total 100

Note: Unit-I Both A and B questions are compulsory.

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5. SANSKRIT

BA Part III 2020

सामान्य निर्देश -

1. प्रत्येक परीक्षा में दो-दो प्रश्नपत्र होंगे।
2. प्रत्येक प्रश्नपत्र में न्यूनतम उत्तीर्णांक 36 तथा पूर्णांक 100 होंगे और समय 3 घण्टे का होगा।
3. परीक्षा का माध्यम हिन्दी/अंग्रेजी होगा, परन्तु प्रश्नपत्र केवल हिन्दी में बनाया जायेगा। परीक्षार्थी को छूट होगी कि वह हिन्दी, संस्कृत अथवा अंग्रेजी में किसी एक भाषा में उत्तर दे सके। यदि परीक्षक ने किसी प्रश्न विशेष के लिए भाषा का निर्देश कर दिया है तो उस प्रश्न का उत्तर उसी भाषा में देना अनिवार्य होगा।
4. संस्कृत केवल देवनागरी लिपि में ही लिखा जाना अपेक्षित है।
5. निर्धारित ग्रन्थ में से अनुवाद, व्याख्या, सरलार्थ एवं समालोचनात्मक प्रश्न पूछे जावेंगे।
6. प्रत्येक प्रश्नपत्र में 10 प्रतिशत अंक संस्कृत भाषा में उत्तर के लिये निर्धारित हैं।
7. प्रत्येक प्रश्नपत्र में दो भाग होंगे, जिसमें प्रथम 'अ' भाग लघूत्तरात्मक प्रश्नों का होगा। 'ब' भाग में निबन्धात्मक प्रश्न होंगे। 'अ' भाग में कुल 15 प्रश्न होंगे, जिनका पूर्णांक 30 होगा।

प्रथम प्रश्न-पत्र : भारतीय दर्शन एवं व्याकरण

- | | |
|--|---------|
| 1. श्रीमद्भगवद्गीता - (2,3,4 अध्याय) | 30 अंक |
| 2. तर्कसंग्रह | 30 अंक |
| 3. तिङन्त-लघुसिद्धान्तकौमुदी के आधार पर 'भू', एवं एध् धातु की लट् लोट्, लृट्, लङ् एवं विधिलिङ् इन पांच लकारों में एवं समस्त गणों की प्रथम धातुओं की लट् लकार में रूपसिद्धि एवं सूत्रों की सोदाहरण व्याख्या | 40 अंक |
| कुल योग | 100 अंक |

अंक- विभाजन

क्र.सं.	पाठ्यवस्तु	'अ' भाग प्रश्न संख्या	अंक	'ब' भाग प्रश्न संख्या	अंक	अंको का योग
1.	श्रीमद्भगवद्गीता	लघूत्तरात्मक 02	04	02	26	04+26=30
2.	तर्कसंग्रह	लघूत्तरात्मक 03	06	02	24	06+24=30
3.	व्याकरण तिङन्त	लघूत्तरात्मक 10	20	02	20	20+20=40
कुल योग		15	30	06	70	100

प्रश्नपत्र निर्माता के लिए निर्देश

1.	श्रीमद्भगवद् गीता	'अ' भाग	2 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	04 अंक
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		'ब' भाग	4 श्लोकों में से 2 की सप्रसंग व्याख्या (एक व्याख्या संस्कृत में) अपेक्षित है।	20 अंक
			2 प्रश्नों में से एक प्रश्न प्रष्टव्य है।	06 अंक
2	तर्कसंग्रह	'अ' भाग	3 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	06 अंक
		'ब' भाग	4 में से 2 की व्याख्या (एक व्याख्या संस्कृत में) अपेक्षित है।	18 अंक
			2 प्रश्नों में से एक प्रश्न प्रष्टव्य है।	06 अंक
3	व्याकरण तिङन्त	'अ' भाग	10 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	20 अंक
		'ब' भाग	10 सूत्र पूछकर किन्हीं 5 की सोदाहरण व्याख्या अपेक्षित है। प्रति व्याख्या 2 अंक निर्धारित।	10 अंक
			10 शब्द सिद्धि पूछकर किन्हीं 5 शब्दों की सूत्र निर्देशपूर्वक सिद्धि। प्रत्येक सिद्धि हेतु 2 अंक	10 अंक
	कुल अंक योग			100 अंक

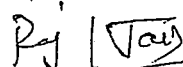
सहायक पुस्तकें

- (क) तर्कसंग्रह – अथल्यं एवं कोडास, पूना
 तर्कसंग्रह – चौखम्बा प्रकाशन, वाराणसी
 तर्कसंग्रह– डॉ. रामसिंह चौहान, अलंकार प्रकाशन, जयपुर

- (ख) गीता
 भगवद्गीता– गीताप्रेस, गोरखपुर
 भगवद्गीता, विनोद पुस्तक मंदिर, आगरा
 गीता रहस्य–तिलक
 भगवद्गीता 2,3,4 अध्याय, डॉ. शिवसागर त्रिपाठी
 श्रीमद्भगवद्गीता (2,3,4 अध्याय)– व्या. डॉ. राजेन्द्रप्रसाद शर्मा, जगदीश संस्कृत पुस्तकालय, जयपुर

(ग) व्याकरण

1. लघुसिद्धान्त कौमुदी–तिङन्त प्रकरण–डॉ. पुष्कर दत्त शर्मा, अजमेरा बुक कम्पनी, जयपुर
2. लघुसिद्धान्त कौमुदी–पं. श्री हरेकान्त मिश्र, भारतीय विद्या प्रकाशन, दिल्ली
3. पाणिनीय व्याकरण का अनुशीलन आर एस भट्टाचार्य, इंडोलोजिकल बुक हाउस, बनारस
4. लघुसिद्धान्त कौमुदी–हिन्दी व्याख्या, डॉ. अर्कनाथ चौधरी, आयुर्वेद हिन्दी संस्कृत पुस्तक भंडार, जयपुर
5. लघुसिद्धान्त कौमुदी– भीमसेन शास्त्री
6. लघुसिद्धान्त कौमुदी– महेशसिंह कुशवाह, चौखम्बा संस्कृत प्रतिष्ठान दिल्ली।
7. लघुसिद्धान्तकौमुदी–तिङन्त प्रकरण, डॉ.सुभाष वेदालंकार, अलंकार प्रकाशन, जयपुर
8. तर्कसंग्रह– व्याख्याकार डॉ. दयानन्द भार्गव, मोतीलाल बनारसीदास, नई दिल्ली


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द्वितीय प्रश्नपत्र— काव्य, धर्मशास्त्र, एवं निबन्ध

समय : 3 घण्टे

अंक—100

द्वितीय प्रश्न पत्र के दो भाग होंगे, जिसमें 'अ' भाग बहुविकल्पीय (वस्तुनिष्ठ) एवं लघूत्तर प्रश्नों का होगा। 'ब' भाग में निबन्धात्मक प्रश्न होंगे। 'अ' भाग में कुल 15 प्रश्न होंगे, जिनका पूर्णांक 30 अंकों का होगा। इनके समाधान हेतु एक घण्टा की अवधि निर्धारित की गई है। 'ब' भाग का पूर्णांक 70 अंकों का होगा, जिसके लिये शेष दो घण्टे की अवधि निर्धारित है।

पाठ्यक्रम

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|---|--------|
| 1. रघुवंशम् — छठा सर्ग (इन्दुमति स्वयंवर) | 20 अंक |
| 2. महाभारत (व्यास) —उद्योग पर्व, विदुरनीति (34—35 अध्याय) | 20 अंक |
| 3. रामायण (वाल्मीकि) बालकाण्ड, प्रथम सर्ग | 20 अंक |
| 4. इन्द्रविजय, नामधेय प्रकरण, पं. मधुसूदन ओझा | 20 अंक |
| 5. निबन्धरचना —संस्कृत में | 20 अंक |
| कुल योग | 100अंक |

अंक— विभाजन

क्र.सं.	नाम पुस्तक	लघूत्तरात्मक प्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	अंको का योग
1.	रघुवंशम् छठा सर्ग (इन्दुमति स्वयंवर)	लघूत्तरात्मक 04	08	02	12	8+12=20
2.	महाभारत (विदुरनीति)	लघूत्तरात्मक 04	08	02	12	8+12=20
3.	रामायण (बालकाण्ड—प्रथमसर्ग)	लघूत्तरात्मक 04	08	02	12	8+12=20
4.	इन्द्रविजय	लघूत्तरात्मक 03	06	02	14	6+14=20
5.	निबन्ध रचना संस्कृत में			01	20	20
कुल योग		15	30	09	70	100

प्रश्नपत्र निर्माता के लिए निर्देश

1.	रघुवंश छठा सर्ग (इन्दुमति स्वयंवर)	'अ' भाग	4 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	08 अंक
		'ब' भाग	2 श्लोकों में से 1 की सप्रसंग व्याख्या	06 अंक
			2 प्रश्नों में से एक प्रश्न प्रष्टव्य है।	06 अंक
2.	महाभारत विदुर नीति	'अ' भाग	4 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	08 अंक
		'ब' भाग	2 श्लोक पूछकर उनमें से किसी 1 की सप्रसंग व्याख्या	06 अंक
			2 श्लोक पूछकर उनमें से किसी 1 का उत्तर अपेक्षित।	06 अंक

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3	रामायण	'अ' भाग	4 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	08 अंक
		'ब' भाग	2 श्लोक पूछकर उनमें से किसी 1 की सप्रसंग व्याख्या	06 अंक
			2 प्रश्न पूछकर उनमें से किसी 1 का उत्तर अपेक्षित।	06 अंक
4	इन्द्रविजय	'अ' भाग	03 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक	06 अंक
		'ब' भाग	2 श्लोक पूछकर उनमें से किसी 1 की सप्रसंग व्याख्या	06 अंक
			2 प्रश्न पूछकर उनमें से किसी 1 का उत्तर अपेक्षित।	08 अंक
5	निबन्ध	'ब' भाग	4 विषय देकर उनमें से किसी 1 विषय पर संस्कृत में निबन्ध लेखन	20
कुल अंक योग				100 अंक

सहायक पुस्तकें—

रघुवंशम् —

1. रघुवंश —कालिदास, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली।

महाभारत —विदुर नीति

1. विदुरनीति— डॉ. कृष्णकान्त शुक्ल, साहित्य भंडार, मेरठ।
2. विदुरनीति— श्री रेवतीरमण शास्त्री, यूनिवर्सिटी जयपुर।

रामायण

1. रामायण—वाल्मीकिकृत — गीताप्रेस, गोरखपुर।
2. रामायण—वाल्मीकिकृत — के. सी. पख, निर्णयसागर प्रेस, मुम्बई।
3. रामायणकालीन भारत— व्यास एवं पाण्डेय, आत्माराम एंड संस, दिल्ली
4. लेक्चर्स ऑन रामायण— मद्रास साहित्य अकादमी, मद्रास।

इन्द्रविजयम्

1. इन्द्रविजय—व्याख्याकार पं. रामप्रपन्न शर्मा, प्रकाशन जगदीश संस्कृत पुस्तकालय, जयपुर
2. इन्द्रविजय—डॉ. श्रीकृष्ण ओझा, राजप्रकाशन मंदिर, चौड़ा रास्ता, जयपुर

निबन्ध रचना

1. प्रबन्ध रत्नाकर, श्री आर सी शुक्ल
2. प्रस्ताव तरंगिनी—श्रीवासुदेव शास्त्री
3. संस्कृत निबन्धरत्नाकर—शिवप्रसाद भारद्वाज
4. संस्कृत निबन्धकलिका डॉ. रामजी उपाध्याय
5. संस्कृत निबन्धादर्श डॉ. राममूर्ति शर्मा
6. संस्कृत निबन्ध एवं व्याकरण — पं. चण्डीप्रसाद
7. निबन्ध—चन्द्रिका—कृष्णदेव उपाध्याय, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली
8. निबन्ध—निवेश—रामअवध शास्त्री, चौखम्बा विद्याभवन, वाराणसी
9. निबन्ध शतकम्, कपिलदेव द्विवेदी, चौखम्बा विद्याभवन, वाराणसी
10. निबन्धमंजरी, डॉ. राममूर्ति आचार्य आगरा प्रकाशन, दिल्ली
11. निबन्ध आदर्श, म.म. श्री गिरिधर शर्मा चतुर्वेदी, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली

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12. संस्कृत निबन्ध रचना, डॉ. श्रीकृष्ण ओझा, राज प्रकाशन मंदिर, जयपुर

13. संस्कृत निबंध पारिजात, डॉ. सुभाष वेदालंकार, अलंकार प्रकाशन

14. संस्कृत निबन्ध, डॉ. नन्दकिशोर गौतम एवं श्रीकृष्ण बिहारी भारतीय

अथवा

द्वितीय प्रश्नपत्र 'ब' – भारतीय ज्योतिष, तिथि निर्णय एवं पंचांग परिचय

समय : 3घण्टे

अंक-100

इस प्रश्न पत्र के दो भाग होंगे, जिसमें 'अ' भाग बहुविकल्पीय (वस्तुनिष्ठ) एवं लघूत्तर प्रश्नों का होगा। 'ब' भाग में निबन्धात्मक प्रश्न होंगे। 'अ' भाग में कुल 15 प्रश्न होंगे, जिनका पूर्णांक 30 अंकों का होगा। इनके समाधान हेतु एक घण्टा की अवधि निर्धारित की गई है। 'ब' भाग का पूर्णांक 70 अंकों का होगा, जिसके लिये शेष दो घण्टे की अवधि निर्धारित है। 10 अंक संस्कृत भाषा के माध्यम से उत्तर देने के लिए निश्चित है।

पाठ्यक्रम

- 1- भारतीय ज्योतिष के प्रारम्भिक सिद्धान्तों का परिज्ञान 70 अंक
 (क) शीघ्रबोध (काशीनाथ दैवज्ञ) – प्रथम प्रकरण (लतापातादि दस दोष रहित) 30 अंक
 (ख) फलित प्रबोधिनी (विनोद शास्त्री) 40 अंक
 2- तिथि-निर्णय के सामान्य सिद्धान्त, प्रमुख व्रतपर्व तथा पंचांग का सामान्य परिचय – 30 अंक
 काल के छः भेद, वर्ष के पांच भेद, अयन, ऋतु, मास, पक्ष, तिथि, क्षय, वृद्धि संक्रान्ति निर्णय, दानादि, अधिकमास-क्षयमास में वर्ज्यावर्ज्य, मलमास, कर्म के भेद एवं निर्णय, प्रदोषव्रत, जन्माष्टमी, गणेशचतुर्थी, रामनवमी, नवरात्र स्थापना, महालय (श्राद्ध), दीपावली, होलिका आदि का सामान्य ज्ञान अपेक्षित है। पंचांग परिचय में तिथि, वार, नक्षत्र, वार, योग, करण का ज्ञान तथा पंचांग की सहायता से गुण मिलान, विवाह मुहूर्त निर्णय, गृहारम्भ, ग्रहप्रवेश आदि जानने की रीति का ज्ञान अपेक्षित है।

अंक-विभाजन

क्र. सं.	नाम पुस्तक	लघूत्तरात्मक प्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	कुल अंक
1	(क) शीघ्रबोध	05 (लघु.)	10	02	21	10+20=30
	(ख) फलित प्रबोधिनी	04 (लघु.)	08	02	28	08+32=40
2	तिथि-निर्णय व पंचांग परिचय	06 (लघु.)	12	02	21	12+18=30
		15	30	06	70	100

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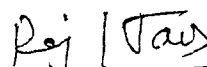
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प्रश्नानु निर्माता के लिए निर्देश-

1.	भारतीय ज्योतिष (क) शीघ्रबोध	5 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक।	10 अंक
		4 निबन्धात्मक प्रश्न पूछकर 2 प्रश्नों के उत्तर अभीष्ट - प्रति प्रश्न 10 अंक निर्धारित	20 अंक
	(ख) फलित ज्योतिष	4 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक।	08 अंक
		4 निबन्धात्मक प्रश्न पूछकर 2 प्रश्नों के उत्तर अभीष्ट - प्रति प्रश्न 16 अंक निर्धारित	32 अंक
2.	तिथि-निर्णय व पंचांग परिचय	6 लघूत्तरात्मक प्रश्न प्रति प्रश्न 2 अंक।	12 अंक
		4 निबन्धात्मक प्रश्न पूछकर 2 प्रश्न का उत्तर अभीष्ट। (पंचांग परिचय संस्कृत में)	18 अंक

सहायक पुस्तकें -

1. शीघ्रबोध - पं. काशीनाथ देवज्ञ, चौखम्भा प्रकाशन, वाराणसी
2. फलित प्रबोधिनी-डॉ. विनोद शास्त्री, राजस्थान ज्योतिष परिषद् एवं शोध संस्थान, जयपुर
3. तिथि-निर्णय के प्रमुख सिद्धान्त एवं विशिष्ट तिथि पर्व निर्णय प्रकाशक-राजस्थान ज्योतिष परिषद् एवं शोध संस्थान, त्रिपोलिया, जयपुर
4. पंचांग का सामान्य परिचय, पं. शिवचरण शास्त्री एवं विकास शर्मा, प्रकाशक- राजस्थान ज्योतिष परिषद् एवं शोध संस्थान, त्रिपोलिया, जयपुर
5. विभिन्न प्रकाशित पंचांगों की सहायता भी ग्राह्य है, जिसमें जयपुर पंचांग पं. दामोदर शर्मा कृत ग्राह्य है।


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6. PHILOSOPHY

B.A. Part III –

Scheme :

Two Papers	Min. Pass Marks 72	Max. Marks 200
Paper I	3 hrs. duration	Max. Marks 100
Paper II	3 hrs. duration	Max. Marks 100

General Instructions :

- (1) The candidates shall opt for any two of the five electives. There shall be two question papers: Paper I and Paper II, corresponding to the electives opted by the candidate.
- (2) Both the question papers will be in two parts: Part I & Part II
- (3) Part I of the question paper will be of 40 marks in total. This part will consist of twenty compulsory short questions, with 2 marks each. The word limit for these questions shall be upto 50 words. These questions will cover the entire units and there will be no unit wise division of the questions asked in this part.
- (4) Part II of the question paper will be of 60 marks and students will be required to write detailed answer in the answer sheet only. If syllabus (course contents) of a paper is divided into two units i.e. Unit A and Unit B, then in this part of the question paper six questions will be asked in total: three questions from each unit. Student will be asked to attempt three questions in total and at least one question from each unit. Each question will be of 20 marks. If syllabus (course contents) of a paper is divided into three Units i.e. Unit A, B & C then in the Part II of the question paper, which consist of Essay type questions, six questions will be asked in total: two questions from each Unit. Students will be required to attempt three questions in total and one question from each Unit. The ideal word limit for these questions is 500-600 words.

Paper I: Philosophy of Religion

Unit A:

1. Philosophy of religion: nature and concern, the concept of Dharma.
2. Religion without God, atheism, theism, deism, pantheism.
3. Reason, faith and revelation.
4. Religion and morality.

Unit B:

1. Attributes of God: omniscience, omnipotence, omnipresence, eternity, goodness.
2. Problem of evil.
3. Proofs for the existence of God: Indian and Western.

Unit C:

1. Prayer and bhakti.
2. Immortality of the soul, transmigration and the doctrine of karma.
3. Religious experience: Mysticism.
4. Religious pluralism and the problem of absolute truth.

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6. PHILOSOPHY

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General Instructions :

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Paper I: Philosophy of Religion

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1. Philosophy of religion: nature and concern, the concept of Dharma.
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Suggested Readings :

- John Hick : *Philosophy of Religion* (Hindi Translation available).
 John Hick (Ed) : *Classical and Contemporary Readings in Philosophy of Religion*
 Harendra Prasad Sinha : *धर्मदर्शन की रूपरेखा*, मोतीलाल बनारसीदास, नई दिल्ली
 Yaqub Masih : *Religious Philosophy* (Hindi edition available)
 H.N. Mishra : *धर्मदर्शन का परिचय*
 V.P. Verma : *धर्मदर्शन की मूल समस्याएँ*
 L.N. Sharma : *धर्मदर्शन*

Paper II: Samkhya Yoga**Unit A:**

1. Isvarkrsna's *Samkhya Karika* with Vaschaspati Mishra's commentary *Samkhya Tattva Kaumudi*.

Unit B:

1. Patanjali Yoga Sutra, Pada. 1
2. Pada 2
3. Pada 3 (sutras 1 to 3 only)

Books Prescribed:

Isvarkrsna, Samkhya Karika with Vaschaspati Mishra's Commentary Samkhya Tattva Kaumudi (Hindi translation available). Translation into English by Ganga Nath Jha, revised edition by M.M. Patkar, Oriental Series, Pune
Patanjali Yoga Sutra Pradeep, Geeta press, Gorakhpur, U.P. (Hindi translation available) English Trans. by Prasad Ram Chaukhambha, Varan

Paper III: Plato

Prescribed Reading : **The Republic, Plato**

Suggested Readings :

- Jowett B. : *The Republic*, Oxford.
 Nettleship R.L. : *Lectures on the Republic of Plato*, McMillan.
 Dr. Zakir Hussain : *रियासत*
 R.S. Bhatnagar : *नागरिकी (रिपब्लिक का हिन्दी अनुवाद)*

Paper IV: Logic (Indian)**Unit: A**

1. Theories of inference in Nyaya: definition- constituents- process and types of anumana, Parramarsa, Vyapti, Types of Vyapti & Vyaptigrahopaya, Major Hetvabhasa.

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Unit: B

1. Theories of inference in Buddhism: definition- constituents and types of anumana, Vyapti & types of Vyapti
2. Theories of inference in Jainism: definition- constituents and types of anumana, Vyapti.

Suggested Readings :

Annambhatta	:	<i>Tarkasangraha</i>
Dharmakirti	:	<i>Nyayabindu.</i>
Yasovijaya	:	<i>Jaina Tarka Bhasa.</i>
S.S. Barlingay	:	<i>A Modern Introduction to Indian Logic.</i>
B.K. Matilal	:	<i>Logic, Language and Reality.</i>
S.K. Maitra	:	<i>Fundamental Questions of Indian Metaphysics & Logic.</i>
F.Th. Stcehatsky	:	<i>Buddhist Logic, Vols. I & II.</i>
C. Bhattacharyya	:	<i>Elements of Indian Logic & Epistemology.</i>
S. Chatterjee	:	<i>Nyaya Theory of Knowledge.</i>
R. Prasad	:	<i>Buddhist Logic.</i>
K.N. Tiwari	:	<i>Bhartiya Tarkshastra, MLBD, New Delhi</i>

Paper V: Socio- Political Philosophy**Section-A**

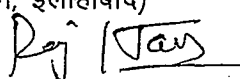
1. Nature of Socio- political Philosophy
2. Social and Political Ideals : Equality, Justice, Liberty.
3. Democracy : Conceptual forms, Major theories and challenges
4. Political Ideologies : Fascism, Capitalism, Marxism and Socialism

Section-B

5. Humanism ; Secularism ; Multiculturalism.
6. Scientific Temper and Development.
7. Feminism : Major streams, Woman Empowerment
8. Caste Discrimination: Gandhi and Ambedkar

Suggested Readings :

R.N. Kaul	:	A Hand book of Social Philosophy
O.P. Gauba	:	Social and Political Philosophy (Pub. Mayur Paperbacks)
O.P. Gauba	:	An Introduction Social Political Philosophy
हृदय नारायण मिश्र	:	समाज दर्शन सैद्धांतिक एवं समस्यात्मक विवेचन
शिवभानु सिंह	:	समाज दर्शन का सर्वेक्षण
के.के. पाठक	:	समाज एवं राजनीतिक दर्शन (राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर)
डॉ. बी एन. सिंह	:	समाज दर्शन एवं राजनीतिक दर्शन (आशा प्रकाशन, इलाहाबाद)
तथा प्रो. उदय शंकर	:	


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5 ~~7~~ HISTORY

The scheme of examination will be as follows:

Scheme:

Maximum Marks 200

Minimum Pass Marks 72

Paper I

3 hrs. Duration

Marks 100

Paper II

3 hrs. Duration

Marks 100

Note: There shall be two papers in all in the subject of History, and each paper shall be of three hours duration and of 100 marks.

Each paper shall consist of two parts. Part I shall carry 40 marks and shall consist of two compulsory questions. The first compulsory question will be of 20 marks, comprising of 10 very short answer type questions of two marks each. The answer to each question should not exceed 20 words.

The second compulsory question will be of 20 marks. It will comprise of 10 short answer type questions of 04 marks each, the candidate will be required to answer any 05 questions. The answer to each question should not exceed 50 words.

The second part of the question paper shall be divided into three sections comprising of 06 essay type questions, containing 02 questions from each section, of 20 marks each. Candidate will be required to answer 03 questions, selecting one question from each section. This part of the question paper shall be of 60 marks.

परीक्षा योजना

अधिकतम अंक 200

न्यूनतम उत्तीर्णांक 72

प्रथम प्रश्नपत्र

समय 3 घंटे

अंक 100

द्वितीय प्रश्नपत्र

समय 3 घंटे

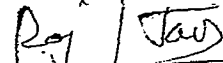
अंक 100

नोट : इतिहास विषय के कुल दो प्रश्नपत्र होंगे, प्रत्येक प्रश्नपत्र तीन घंटे की अवधि का एवं 100 अंकों का होगा।

प्रत्येक प्रश्नपत्र के दो भाग होंगे। प्रथम भाग 40 अंकों का होगा एवं इस भाग में दो अनिवार्य प्रश्न होंगे। 20 अंकों के प्रथम अनिवार्य प्रश्न में, दो-दो अंकों के 10 अनिवार्य अतिलघुउत्तरात्मक प्रश्न होंगे। प्रत्येक उत्तर की शब्द सीमा 20 शब्द।

20 अंकों के द्वितीय अनिवार्य प्रश्न में, चार-चार अंकों के 10 लघुउत्तरात्मक प्रश्न होंगे जिनमें से 05 प्रश्न करने होंगे। प्रत्येक उत्तर की शब्द सीमा 50 शब्द।

प्रश्नपत्र के द्वितीय भाग में, पाठ्यक्रम के तीन खण्डों में से, प्रत्येक खण्ड से दो-दो प्रश्नों का चयन करते हुए, कुल 06 निबन्धात्मक प्रश्न होंगे। प्रत्येक प्रश्न 20 अंकों का होगा। परीक्षार्थियों को प्रत्येक खण्ड में से कम से कम एक प्रश्न का चयन करते हुए कुल 03 प्रश्न हल करने होंगे। प्रश्नपत्र का यह भाग 60 अंकों का होगा।


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PAPER I: HISTORY OF MODERN INDIA (1761 - 1971 A. D.)

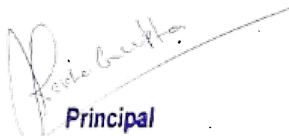
Section - A

India in the mid-eighteenth century. Maratha confederacy, its strength and weakness - clash with the British and decline of the Marathas. Expansion and consolidation of the British rule - Bengal, Mysore, Awadh, Sind and Punjab - Subsidiary Alliance and Doctrine of Lapse. Establishment of Parliamentary control over East India Company - Regulating Act and Pitt's India Act. Land revenue settlements : permanent, ryotwari and mahalwari. Popular resistance to British rule : outbreak of 1857.- causes, nature and results.

Section - B

British policy after 1858 - development of British Paramountcy. Nature of colonial economy - commercialization of agriculture, decline of cottage industries, drain of wealth and India's poverty. Indian Renaissance, its nature and scope - Socio-religious reform movements - Brahma Samaj, Arya Samaj, Ramkrishna Mission. Indian Freedom Struggle - the first phase : Emergence of Indian Nationalism, Formation of the Indian National Congress - Moderates and Extremists - Gokhale and Tilak. Economic nationalism, Swadeshi Movement. Home Rule Movement. Beginning of Muslim communalism and the Muslim League.


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Section - C

Nationalism under Gandhi's leadership : Gandhi's ideology and methods - Non-cooperation, Civil Disobedience and Quit India Movements. Other strands in the National Movement : Revolutionaries, the Left (Socialists and Communists), Subhash Chandra Bose and the Indian National Army. Peasants', Workers' and Depressed Classes' Movements. Women in the National Movement. The Government of India Acts of 1909, 1919 and 1935. Communal politics and the Partition of India. Progress and profile of Independent India (1947-1971) : Integration of States. Agrarian reforms, the concept of planned economy and industrialization. Foreign policy of independent India (1947-1971) - non-alignment and Panchsheel.

प्रथम प्रश्नपत्र : आधुनिक भारत का इतिहास (1761-1971 ईस्वी)खण्ड - क

अठारहवीं शताब्दी के मध्य में भारत। मराठा परिसंघ, इसकी शक्ति एवं दुर्बलता - अंग्रेजों से संघर्ष एवं मराठों का पतन। ब्रिटिश शासन का विस्तार एवं सुदृढीकरण - बंगाल, मैसूर, अवध, सिन्ध एवं पंजाब - सहायक संधियाँ एवं विलय का सिद्धांत। ईस्ट इंडिया कम्पनी पर संसदीय नियंत्रण की स्थापना - रग्गुलेंटिंग एक्ट एवं पिट्स इंडिया एक्ट। भू-राजस्व बन्देस्त : स्थायी, रय्यतवादी एवं महलवादी। ब्रिटिश शासन के प्रति जन प्रतिरोध : 1857 का विद्रोह - कारण, प्रकृति एवं परिणाम।

खण्ड - ख

1858 के बाद ब्रिटिश नीति - ब्रिटिश सर्वोपरिता का विकास। औपनिवेशिक अर्थव्यवस्था का स्वरूप - कृषि का व्यावसायीकरण, कुटीर उद्योगों का पतन, धन का निष्कासन एवं भारत की निर्धनता। भारतीय पुनर्जागरण : इसकी प्रकृति एवं क्षेत्र - सामाजिक-धार्मिक सुधार आंदोलन - ब्रह्म समाज, आर्य समाज, रामकृष्ण मिशन। भारत का स्वाधीनता संग्राम - प्रथम चरण : भारतीय राष्ट्रवाद का उदय, भारतीय राष्ट्रीय कांग्रेस की स्थापना - नरमपंथी एवं उग्रपंथी - गोखले एवं तिलक। आर्थिक राष्ट्रवाद, स्वदेशी आंदोलन। होम रूल आंदोलन। मुस्लिम सांप्रदायिकता का उदय एवं मुस्लिम लीग।

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गांधी के नेतृत्व में राष्ट्रवाद : गांधी की विचारधारा एवं पद्धतियाँ - असहयोग, सविनय अवज्ञा एवं भारत छोड़ो आंदोलन। राष्ट्रीय आंदोलन की अन्य धाराएँ : क्रांतिकारी, वामपंथी (समाजवादी एवं साम्यवादी), सुभाष चंद्र बोस एवं इंडियन नेशनल आर्मी। कृषकों, मजदूरों एवं दलित वर्गों के आंदोलन। राष्ट्रीय आंदोलन में महिलाएं। वर्ष 1909, 1919 एवं 1935 के भारत सरकार अधिनियम। साम्प्रदायिक राजनीति एवं भारत का विभाजन। स्वतंत्र भारत (1947-1971) की प्रगति एवं परिदृश्य : राज्यों का एकीकरण, कृषिपरक सुधार, नियोजित अर्थव्यवस्था की अवधारणा एवं औद्योगिकीकरण। स्वतंत्र भारत की विदेश नीति (1947-1971) - गुट निरपेक्षता एवं पंचशील।

Books Recommended (अनुशंसित पुस्तकें) :

- Bisheshwar Prasad : *Bondage and Freedom, Vol. I and Vol. II*
- C. A. Bayly : *Indian Society and the Making of the British Empire, Cambridge University Press, 1987.*
- Sumit Sarkar : *Modern India, 1885-1947, Delhi, 1995 (also in Hindi)*
- Bipan Chandra : *Nationalism and Colonialism in Modern India, Delhi, 1981*
- A. R. Desai : *Peasant Struggles in India, Delhi, 1979*
- Kenneth Jones : *Social and Religious Reform Movement in Modern India, New Cambridge History, 1989*
- Ravindra Kumar (ed.) : *Social History of Modern India, Delhi, 1983*
- Anil Seal : *Emergence of Indian Nationalism, Cambridge University Press, 1971.*
- Ranjit Guha & Gayatri C. Spivak (ed.) : *Selected Subaltern Studies, Delhi, 1988*
- J. Krishnamurti (ed.) : *Women in Colonial India, Oxford University Press, 1989*
- ए.एस. जैन : *आधुनिक भारत का इतिहास*
- सुमित सरकार : *आधुनिक भारत : 1885-1947 (अनुवाद)*
- जगन्नाथ प्रसाद मिश्र : *आधुनिक भारत का इतिहास, उत्तरप्रदेश हिन्दी संस्थान, लखनऊ*
- बिपिन चन्द्र एवं अन्य : *भारत का स्वतंत्रता संग्राम, दिल्ली, 1998*
- आर.एल. शुक्ल (सं.) : *आजादी के बाद का भारत (1947-2000), दिल्ली, 2004*
- आधुनिक भारत का इतिहास, हिन्दी माध्यम कार्यान्वयन निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली

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PAPER II: HISTORY OF MODERN WORLD (1500-2000 A.D)

Section - A

Renaissance and the beginning of the modern era. Reformation and Counter-Reformation. Economic changes - Feudalism to Capitalism. The American Revolution - causes, nature and consequences. The French Revolution - causes, main events, and impact. Evaluation of Napoleon Bonaparte. Industrial Revolution - causes, processes and impact.

Section - B

Rise of Nationalism in the 19th century. National unification of Germany and Italy. Age of conservatism and Revolutions of 1830 and 1848 in Europe. Growth of Imperialism and Colonialism - exploitation of New World with special reference to countries of Asia and Africa. Eastern question and its complexities for Europe. Nature of European Imperialism in China. Revolution of 1911 in China - principles of Sun-yat-sen. Modernisation of Japan in the 19th century. First World War - causes and consequences. League of Nations.

Section - C

The Russian Revolution of 1917. The Great Economic Depression and Recovery. Fascism in Italy and Nazism in Germany. Second World War. United Nations Organisation - objectives, achievements, limitations. The Chinese Revolution of 1949. Cold War. Emergence of Third World and Non-Alignment. Arab World (Egypt), South-East Asia (Vietnam), Africa - Apartheid to Democracy. Soviet Disintegration and the Unipolar World. Globalisation and its impact.

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द्वितीय प्रश्नपत्र : आधुनिक विश्व का इतिहास (1500-2000 ईसवी)

खण्ड - क

पुनर्जागरण एवं आधुनिक युग का प्रारंभ। धर्मसुधार आंदोलन एवं प्रति-धर्मसुधार आंदोलन। आर्थिक परिवर्तन - साग्नतवाद से पूंजीवाद। अमेरिका की क्रांति - कारण, प्रकृति एवं परिणाम। फ्रांस की क्रांति - कारण, मुख्य घटनाएं एवं प्रभाव। नेपोलियन बोनापार्ट का मूल्यांकन। औद्योगिक क्रांति - कारण, प्रक्रियाएं एवं प्रभाव।

खण्ड - ख

19वीं शताब्दी में राष्ट्रवाद का उदय। जर्मनी एवं इटली का राष्ट्रीय एकीकरण। रुढ़िवादिता का युग एवं यूरोप में 1830 एवं 1848 की क्रांतियाँ। साम्राज्यवाद एवं उपनिवेशवाद का विकास - नव विश्व का शोषण, एशिया एवं अफ्रीका के देशों के विशेष संदर्भ में। पूर्वी समस्या एवं यूरोप के लिए उसकी जटिलताएँ। चीन में यूरोपीय साम्राज्यवाद की प्रकृति। चीन में 1911 की क्रांति - सन यात सेन के सिद्धांत। 19वीं शताब्दी में जापान का आधुनिकीकरण। प्रथम विश्व युद्ध - कारण एवं परिणाम। राष्ट्रसंघ।

खण्ड - ग

1917 की रूसी क्रांति। आर्थिक महामंदी एवं समाधान। इटली में फासीवाद एवं जर्मनी में नाजीवाद। द्वितीय विश्व-युद्ध। संयुक्त राष्ट्र संघ - उद्देश्य, उपलब्धियाँ, सीमाएँ। 1949 की चीनी क्रांति। शीत-युद्ध। तृतीय विश्व का अग्रदूत एवं गुट-निरपेक्षता। अरब विश्व (मिस्र), दक्षिण-पूर्व एशिया (मिगतनाग), अफ्रीका - रंगभेद से लोकतंत्र की ओर। सोवियत विघटन एवं एकसूत्रीय विश्व। भूमण्डलीकरण एवं संसर्ग-प्रभाव।

Books Recommended (अनुशंसित पुस्तकें):

A. G. Dickens	:	<i>The Age of Humanism and Reformation, New Jersey, 1972</i>
Christopher Hill	:	<i>From Reformation to Industrial Revolution, Penguin, 1970</i>
H. B. Parks	:	<i>The United States of America - A History, Indian Reprint, Calcutta, 1976</i>
Georges Lefebvre	:	<i>Coming of the French Revolution, Princeton, 1989</i>
C. D. Hazen	:	<i>Modern Europe to 1945, Indian Reprint, Delhi, 1977</i>
David Thompson	:	<i>Europe since Napoleon, Penguin, 1966</i>
George Vernadsky	:	<i>A History of Russia, 1961</i>
Harold M. Vinacke	:	<i>A History of the Far East in Modern Times, Indian Reprint, Ludhiana</i>

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- A. J. P. Taylor : *The Origins of the Second World War*
- H. A. Davies : *Outline History of the World, 1968*
- J. E. Swain : *A History of World Civilisation, Indian Reprint, New Delhi, 1994*
- Louis L. Synder : *The Making of Modern Man, Princeton, 1967*
- बनारसी प्रसाद सक्सेना : *अमेरिका का इतिहास, पटना, 1972*
- सी.डी. हेजल : *आधुनिक यूरोप का इतिहास (अनुवाद), आगरा*
- देवेन्द्र सिंह चौहान : *यूरोप का इतिहास (1815-1919) भोपाल, 1995*
- जॉर्ज बर्नार्दस्की : *रूस का इतिहास (अनुवाद), भोपाल, 1971*
- हेराल्ड एम. विनाके : *पूर्व एशिया का आधुनिक इतिहास (अनुवाद), लखनऊ, 1982*
- एस.पी. पांयरी : *पूर्व एशिया का संक्षिप्त इतिहास, खण्ड I (19वीं शताब्दी) एवं खण्ड II (20 वीं शताब्दी), लखनऊ, 1973 एवं 1974*
- के.के. कौल : *पश्चिमी एशिया का आधुनिक इतिहास: 1800-1973, लखनऊ, 1977*
- पार्थसारथि गुप्ता : *यूरोप का इतिहास, हिन्दी माध्यम कार्यान्वयन निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली*

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8. Political Science

B.A. Part III -

प्रश्न-पत्रों की रूपरेखा

राजनीति विज्ञान के दो प्रश्न-पत्र होंगे। प्रत्येक प्रश्न-पत्र 3 घण्टे की अवधि का होगा तथा प्रश्न-पत्र के अधिकतम 100 अंक होंगे।

प्रत्येक प्रश्न-पत्र के तीन खण्ड होंगे। प्रथम खण्ड 20 अंको का होगा। इस खण्ड में दो अंकों के 10 अनिवार्य प्रश्न होंगे। जिनमें से प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20-25 शब्दों में देना होगा।

द्वितीय खण्ड 20 अंकों का होगा। इस खण्ड में 05 अंकों के 04 अनिवार्य प्रश्न होंगे, जिनमें से प्रत्येक का उत्तर 150 शब्दों में अपेक्षित होगा।

तृतीय खण्ड 60 अंकों का होगा। इस खण्ड में तीन भाग होंगे। जिनमें प्रत्येक में 20 अंको के दो निबंधात्मक प्रश्न होंगे। परीक्षार्थी से प्रत्येक खण्ड में से एक प्रश्न का उत्तर अपेक्षित होगा। प्रत्येक खण्ड से एक प्रश्न का चयन करते हुए कुल 03 प्रश्नों का उत्तर अपेक्षित होगा।

Scheme of Question Papers

There shall be two papers of political Science. Each question paper shall be of three hours duration and of 100 marks.

Each Question Paper shall consist of three Parts. Part I shall carry 20 marks and shall consist of 10 compulsory questions of 2 marks each to be answered in 20-25 words each.

Part II shall carry 20 marks and shall consist of 4 compulsory questions of 5 marks each to be answered in 150 words each.

Part III of the question paper shall carry 60 marks. This part shall be divided into 3 sections each comprising of 2 essay-type questions of 20 marks each. Candidates will be required to attempt one question from each section (3 questions in all, one from each section)

प्रथम प्रश्न-पत्र: प्रतिनिधि पश्चिमी राजनीतिक विचारक

खण्ड 'क'

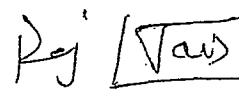
प्लेटो, अरस्तू व एक्वीनास।

खण्ड 'ख'

मेकियावली, हॉब्स, लॉक व रूसो।

खण्ड 'ग'

बेन्थम, जे. एस मिल, मार्क्स एवं हैराल्ड जे. लास्की।


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अनुशसित पुस्तके :-

- जॉर्ज एच. सेबाइन : ए हिस्ट्री ऑफ पोलिटिकल थ्योरी (हिन्दी व अंग्रेजी)
 सी एल वेपर : पोलिटिकल थॉट
 जे.पी.सूद : वेस्टर्न पोलिटिकल थॉट
 फॉस्टर : मास्टर्स ऑफ पोलिटिकल थॉट
 डनिंग : हिस्ट्री ऑफ पोलिटिकल थॉट
 पी.डी शर्मा : राजनीतिक विचारक
 पुखराज जैन : कतिपय प्रमुख राजनीतिक विचारक
 डनिंग : ए हिस्ट्री ऑफ पोलिटिकल थ्योरीज
 एफ. डब्लू. कोकर : रीसेन्ट पोलिटिकल थॉट

Paper I : Representative Western Political Thinkers**Section-A**

Plato, Aristotle and Aquinas.

Section-B

Machiavelli, Hobbes, Locke, and Rousseau.

Section-C

Bentham, J.S. Mill, Karl Marx and Harold J. Laski.

Books recommended :

A. Hacker : Political Theory

G.H. Sabine : History of Political Theory

C.L. Wayper : Political Thought

Foster : Master of Political Thought Vol. I

Jones : Master of Political Thought Vol. II

Lancaster : Master of Political Thought Vol. III

Chaddha : Pramukh Rajnitik Vicharak (Adarsh Prakashan)


P.D. Sharma : Pratinidhi Rajnitik Vicharak

Pukh Raj Jain : Katipay Pramukh Rajnitik Vicharak

द्वितीय प्रश्न— पत्र: द्वितीय विश्वयुद्धोत्तर अन्तर्राष्ट्रीय संबंध एवं भारतीय विदेश नीति

खण्ड 'क'

द्वितीय विश्वयुद्धोत्तर अन्तर्राष्ट्रीय प्रवृत्तियाँ, शीत युद्ध, एवं इसके विभिन्न चरण, संयुक्त राष्ट्र संघ: संगठन, कार्यप्रणाली एवं भूमिका, संयुक्त राज्य अमेरिका व तृतीय विश्व, साम्यवादी खेमे का विघटन, यूरोप का पुनर्गठन।


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खण्ड 'ख'

भारत की विदेश नीति: निर्धारक तत्त्व, भारत एवं संयुक्त राष्ट्र, गुट निरपेक्ष आंदोलन एवं वर्तमान में प्रासंगिकता, पूर्व की और देखो नीति, भारत के पड़ोसी देश एवं प्रमुख शक्तियों (अमेरिका, रूस, चीन) के साथ सम्बन्ध, समसामयिक बहुध्रुवीय विश्व में भारत।

खण्ड 'ग'

अन्तर्राष्ट्रीय राजनीति में सम-सामयिक प्रवृत्तियाँ व मुद्दे, पश्चिमी एशिया की राजनीति, नवीन विश्व अर्थव्यवस्था, क्षेत्रीय सहयोग संगठन: आसियान (दक्षिण-पूर्वी एशियाई राष्ट्र संगठन) एवं सार्क (दक्षिण एशियाई क्षेत्रीय सहयोग संगठन) ब्रिक्स, इबसा, संयुक्त राष्ट्र में सुधार की मांग एवं संयुक्त राष्ट्र में भारत की स्थायी सदस्यता, समसामयिक वैश्विक मुद्दे: मानव अधिकार, पर्यावरणीय मुद्दे, लैंगिक न्याय, आंतकवाद, परमाणु प्रसार।

अनुशासित पुस्तके :

ब्लेक एण्ड थॉमसन : फारेन पॉलिसी

जॉर्डन कॉनेल स्मिथ : पेन्टर्स परसेप्शन ऑव दी डवलपिंग सिंस 1982।

डैनियन एस.पप : सोवियत परसेप्शन ऑव दी डवलपिंग वर्ल्ड इन 1980।

डॉ मथुरालाल शर्मा : अन्तर्राष्ट्रीय सम्बन्ध 1945 से अब तक।

महेन्द्र कुमार : अन्तर्राष्ट्रीय राजनीति के सैद्धांतिक पक्ष (हिन्दी व अंग्रेजी)

पी.के.चड्ढा : अन्तर्राष्ट्रीय सम्बन्ध (आदर्श प्रकाशन, चौडा रास्ता जयपुर)

बाबूलाल फाडिया : अन्तर्राष्ट्रीय सम्बन्ध

पुखराज जैन : अन्तर्राष्ट्रीय सम्बन्ध

दीनानाथ वर्मा : अन्तर्राष्ट्रीय सम्बन्ध

एस.एस. धर : इंटरनेशनल पॉलिटिक्स सिंस 1949

हरिदत्त वेदालंकार : इंटरनेशनल पॉलिटिक्स

Paper II : International Relations since World War –II and Indian Foreign Policy**Section-A**

Post War International Development: Cold War & its different Phases, U.N.O : Organization, Working and role, U.S.A and Third World, Collapse of Communist Block, Reorganisation of Europe.

Section-B

Indian Foreign Policy : Determinants of Foreign Policy, India and UN, NAM and its relevance in Contemporary World, India's Look East Policy, India's relations with neighbourhood & with major powers (U.S.A., Russia and China), India in Contemporary multi-polar world.

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Section-C

Contemporary Trends and Issues in International Politics, Politics of West Asia, New International Economic Order, Associations of Regional Co-operation in Asia: ASEAN, SAARC, BRICS, IBSA, Demand for reform in UN & India for permanent seat of UN, Contemporary Global Issues : Human Rights, Environmental Issues, Gender Justice, Terrorism, Nuclear Proliferation.

Books recommended:

Black & Thomas Foreign Policy

Jorden Connel Smith : Patterns of the post World War 1982

S.M. Dhar: International Problem & World Politics since 1949

Denil S. Papp : Soviet Perception of the Developing world in 1980

Haridutt Vedleanker : International Politics

Dr. Mathuralal Sharma : International Relation (since 1945)

Dinanath Verma : Antar Rashtriya Sambandha

Mahendra Kumar : Theoretical Aspects of International Politics

P.K Chaddha : Antar Rashtriya Sambandh (Adarsh Prakashan Choura Rasta, Jaipur)

Palmer and Perkins : International Relation

Hans Morgenthau : Politics among Nation

Babulal Fadiya : Antar Rashtriya Sambandh

Pukhraj Jain : Antar Rashtriya Sambandh

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B.A. PART -III
INDIAN MUSIC (VOCAL)

B.A. PART -III

Paper - I	3 hrs.duration	Max.Marks 40	Min. Marks 15
Paper - II	3 hrs. duration	Max.Marks 40	Min. Marks 15
Practical	1 hr. per candidate	Max. Marks 120	Min. Marks 43

Teaching Hours

Practical

6 Hours Per Week

Theory

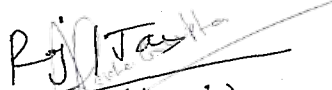
Paper -I 2 Hours Per Week

Paper -II 2 Hours Per Week

Total Teaching Hours for practical – 06, Theory-04 Hours Per Week

Note : The paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all selecting atleast one question from each section.

❖ Candidates have to pass separately in each of the paper Theory and Practical wherever prescribed.


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Important

B.A. Part -III Examination
(under 10+2+3 Pattern)

The number of papers and maximum marks for each paper altogether with the minimum marks required for passing are shown in the Scheme of Examination on against each subject separately. It will be necessary for a candidate to pass in the theory part as well as practical part of this subject/ paper, wherever prescribed, separately. Gradation of successful candidate shall be as follows:

First division	60%	} of the aggregate marks obtained in Pt.I., Pt-II and Pt. III Examinations taken together.
Second division	48%	

Rest of the candidates will be declared as passed. Minimum pass percentage is 36% No division shall be awarded at the Pt. I and Pt. II Examination.

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Theory:-Paper IPrinciples of Indian Music (Vocal)
Common with InstrumentalSection -A

Paper: I

3 hrs. duration

Max. Marks-40 Min. Marks-15

- (1) Brief study of Rag and Ras.
- (2) Comparative study of different Gharanas of Khayal and Sitar
- (3) Music & Religion.

Section -B

- (1) Life sketches and contribution of the following musicians- Ustad Bismillah Khan, Ali Akbar Khan, Pt. Ravi Shankar, Abdul Kareem Khan, Bhimsen Joshi, Kishori Amonkar, Bade Gulam Ali Khan and Amjad Ali Khan.
- (2) Folk instruments of Rajasthan.
- (3) Forms of Hindustani Music.
- (4) Forms of Karnataka Music

Section -C

- (1) Notation writing of different compositions in prescribed Ragas.
- (2) Writing of Alaps and Todas in different Ragas.
- (3) Recognition of Ragas from given notes.
- (4) Writing of Thekason hand palm with different layakaries such as Dugun, Tigun, Chaugun and Chhagun in the following Talas- Tilawada, Dhamar, Trital, Jhaptal, Ektal, Chautal, Punjabi, Sooltal, Jhoomra, Adachautal, Tivra, Deepchandi.

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Theory:-

Paper - II
History of Indian Music (Vocal)
Common with Instrumental

Paper: II

3 hrs. Duration

Max. Marks-40 Min. Marks-15

Note : The paper will contain five questions, having three questions in each section. Candidates are required to attempt five questions in all selecting atleast one question from each section.

Section -A

- (1) Origin of Music.
- (2) Study of the works of Bharat, Matang, Sharangdev, Vishnu Digamber Paluskar and Vishnu Narayan Bhatkhande.
- (3) Types of western Scales Diatonic, Chromatic, Equally tempered.

Section -B

- (1) General ideas of the forms of Vedic music.
- (2) General ideas of Giti and Vani.
- (3) Impact of Folk music on classical music Vice-versa.

Section -C

- (1) General ideas of Rabindra Sangeet.
- (2) General idea of Harmony and melody.
- (3) Essay on General music interest.

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Practical (Vocal)

There shall be one practical paper (conducted by two different Examiners : External and Internal)

(Non-collegiate candidates will have to attend a practical course of forty eight hours at university allotted centres)

Presentation of Ragas & Viva-voce

Duration of Exam.: 1 hour per candidate

Max. Marks-120 Min. Marks-43

Critical and Comparative study of Ragas & Tala according to syllabus.

Detailed Course:

1. To sing given musical piece of notes to recognize the ragas.
2. Knowledge of comparative description of Ragas prescribed in syllabus.
3. To know verbally the "Bol" with Dugun, Tigun and chaugun on hand palm to recognize the following talas when played on tabla-Dhamar, Tilwara, Ektal, Chautal, Rupak, Punjabi, Sooltal, Jhumra, Adachautal, Tivra and Deepchandi.
4. To sing Aroh, Avroh, Pakad and Swar-Vistar of the following ragas- Todi, Puriya-Dhanashree, Jaunpuri, DarbariKanhada, Bihag, Multani, Kafi, Adana, Marwa, Puriya, Kamod and Chhayanat.
5. With the accompaniment of Tabla to sing VilambitKhyaland DrutKhyal with sufficient varieties of Tanas in the following Ragas in the following Four ragas: (i) Todi (ii) Bihag (iii) Jaunpuri (iv) Darbari-Kanhada.
6. To the accompaniment of Tabla to sing DrutKhyalwith Tanas in any six ragas of the following-
(i) Kamod (ii) Multani (iii) Kafi (iv) Adana (v) Marwa
(vi) Puriya (vii) Chhayanat (viii) Puriya dhanashri.

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7. With the accompaniment of Tabla to sing one Dhruvpad and One Dhamar in any two Ragas and to play two compositions composed in other than Trital with Todas in anyragas from clause six but not selected under clause fifth.
8. To sing a Bhajan in any Ragas from syllabus.

→ *Educational Trip*

Books Recommended :

- (1) Krañik Pustak Malika parts 2,3 and 4 Pt. V.N. Bhatkhande.
- (2) Tan Malika parts 2 & 3 by Raja Bhaiya Poochwale,
- (3) Tan Sangrah by S.N. Ratanjankar.
- (4) Sitar Marg by S. Bandopadhyaya.
- (5) Sitar Shiksha by B.N. Bhatt.
- (6) Sitar Parts, 1 to 3 by B.N. Bhimpure.
- (7) Rag Vigyan by N.V. Patwardhan.
- (8) A Short survey of the Music of the Northern India by Pt. V.N. Bhatkhande.
- (9) संगीत के जीवन पृष्ठ by S.Rai.
- (10) Vadya Shastra by Shri Harish Chandra Stivastava.
- (11) Hamare Sangeet Ratnaby Sangeet Karyalaya, Hathras.
- (12) Sangeet Visharad by Basant.
- (13) Sangeet Kaumudi by V.Nigam.
- (14) Hindustani Music-its physics and Aesthetics by G.S. Ranade.
- (15) Origin of Ragas – Bandopadhyaya.
- (16) Bhartiya Sangeet ka Itihas-Umesh Joshi.
- (17) The Music of India by H.A. Popely.
- (18) Hindustani Sangeet Paddhati 1 to 4 by Pt. Bhatkhande
- (19) Pranav Bharti by Omkar Nath Thakur.
- (20) Karanataka Music-Ramchandran.
- (21) South Indian Music by Sambamurti.
- (22) Sangeet Mani Part-I,II- Maharani Sharma
- (23) Sangeet Swarit- Ramakantdivedi

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Public Administration

Scheme :	Max. Marks	Mini. Marks	Time
<u>Two Papers</u>			
Paper-I	100	36	3 Hours
Paper-II	100	36	3 Hours

Note : Each paper shall consist of two parts.

Part-I would consist of 10 compulsory short answer questions of 4 marks each to be answered in 50 words. **Total Marks : 40**

Part-II divided in three sections : each section contains 2 descriptive type questions of 20 marks each. The candidates are required to attempt three questions selecting one question from each section. **Total Marks : 60**

Paper - I : Comparative Administrative Systems
Section - A

Meaning, Nature, Scope and Significance of Comparative Public Administration

Structural Functional, Ecological and Developmental Approaches to the Study of Comparative Administration.

Salient Features and Contribution of ...

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Section - B

Parliamentary System in UK, Presidential System in USA and Presidentialist System in France. Salient Features of Administrative Systems of UK, USA, France and Nepal with particular Reference to Central Administration and Nature and Role of Civil Service

Section - C

British Home Office, Cabinet Secretariat in Great Britain, Independent Regulatory Commission in USA. The Office of Governor in the USA. French Council of State, Swedish Ombudsman, British Treasury

Core Readings :

- 1 Ferrel Heady - Public Administration : A Comparative Perspective.
- 2 Ogg & Zink : Modern Foreign Government.
- 3 V.D Mahajan - Modern Select Governments
- 4 Vishnu Bhagwan and Vidya Bhushan - World Constitutions.
- 5 रवीन्द्र शर्मा : तुलनात्मक प्रशासनिक व्यवस्थाएँ
- 6 सी.बी. गेन : तुलनात्मक राजनीति
- 7 Gavin Drewry and Tony Butcher - The Civil Service Today
- 8 U.S Government Manual.
- 9 S.R. Maheshwari : Higher Civil Service in France
- 10 सी.एल. फडिया : विश्व के प्रमुख संविधान।
- 11 सुरेन्द्र कटारिया : तुलनात्मक प्रशासनिक व्यवस्थाएँ

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प्रश्न-पत्र I : तुलनात्मक प्रशासनिक व्यवस्थाएँ

भाग-अ

तुलनात्मक लोक प्रशासन का अर्थ, प्रकृति, क्षेत्र व महत्त्व, तुलनात्मक लोक प्रशासन, अध्ययन के उपागम : संरचनात्मक-प्रकार्यात्मक, पारिस्थितिकीय, विकासात्मक उपागम। चीन, फ्रांस, संयुक्त राज्य अमेरिका तथा ग्रेट ब्रिटेन के संविधानों के प्रमुख लक्षण ;

भाग-ब

ग्रेट ब्रिटेन में संसदीय व्यवस्था, संयुक्त राज्य अमेरिका में अध्यक्षीय व्यवस्था, फ्रांस में अध्यक्षीय व्यवस्था।

ग्रेट ब्रिटेन, संयुक्त राज्य अमेरिका, फ्रांस व नेपाल की प्रशासनिक व्यवस्थाओं की प्रमुख विशेषताएँ, केन्द्रीय प्रशासन तथा लोक सेवाओं की प्रकृति एवं भूमिका के विशेष संदर्भ में।

भाग-स

ब्रिटिश गृह विभाग, ग्रेट ब्रिटेन में मंत्रिमण्डल सचिवालय, संयुक्त राज्य अमेरिका में स्वतंत्र नियामकीय आयोग, संयुक्त राज्य अमेरिका में गवर्नर का पद, फ्रांस में राज-परिषद, स्वीडन का ओम्बुड्समैन, ब्रिटिश राजकोष।

Core Readings :

1. Ferrel Heady : Public Administration A Comparative Perspective.
2. Ogg & Zink : Modern Foreign Government.
3. V.D. Mahajan : Modern Select Governments.
4. Vishnu Bhagwan and Vidya Bhushan : World Constitutions.
5. रवीन्द्र शर्मा : तुलनात्मक प्रशासनिक व्यवस्थाएँ
6. सी.बी. मेन : तुलनात्मक राजनीति
7. Gavin Drewry and Tony Butcher : The Civil Service Today.
8. U.S. Government Manual.
9. S.R. Maheshwari : Higher Civil Service in France.
10. बी.एल. फडिया : विश्व के प्रमुख संविधान।
11. सुरेन्द्र कठारिया : तुलनात्मक प्रशासनिक व्यवस्थाएँ

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Paper-II : Local Administration

Scheme .	Min. Pass Marks 72	Max. Marks . 200
Paper-I	3 hrs. Duration	100 Marks
Paper-II	3 hrs. Duration	100 Marks

Section - A

Meaning, Nature, and Significance of Local-self Government in Modern State, Evolution of Local-self Government during the Ancient, Medieval and Modern India

The Organisational Structure of Urban, Local-self Government in India, Composition, Functions Powers and Role of various kinds of Local-bodies. Local Administration of the Metropolitan Cities, Municipal Corporations and their Problems of Autonomy and Accountability.

Section - B

Theory and Practice of Democratic Decentralisation in-India with special reference to 73rd Constitution Amendment, Panchayati Raj Institution, Zila Parishad, Panchayat Samiti, Gram Panchayats and Gram Sabha : their Organisation and Functions. Personnel Administration for Rural & Urban Governments. Problem of Recruitment, Classification, Promotion. Training and Service Condition of Local Officials.

Section - C

Financial Administration of Local Bodies in India. Strengthening of Local Resources.

State Control over Local Bodies, Urban and Rural Mechanism of control over Local Bodies at State Level The Role of Directorate

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of Local Bodies and Gramin Vikas & Panchayati Raj Department
Books Recommended :

1. R. Argel : Municipal Government in India.
2. S.R. Maheswari : Local Government in India.
3. M.V. Mathur : Panchayati Raj in Rajasthan.
4. R.L. Khanna : Municipal Government and Administration in India.
5. S.K. Bhogle : Local Government in India.
6. डॉ. एच.सी. शर्मा : भारत में स्थानीय प्रशासन।

Subsidiary Readings :

1. S.C. Jain : Community Development and Panchayati Raj.
2. Govt. of Rajasthan : Sadiq Ali Report, 1964.
3. Govt. of Rajasthan : Rajasthan Municipalities Act, 1964
4. Rajasthan Panchayat Raj Act, 1994.
5. Govt. of India : Diwakar Committee Report, 1963.
6. Balwant Rai Mehta : Committee Report, 1957.

Journals :

1. Nagarlok, Delhi
2. Journal of Local Self Government, Bombay.
3. Kurukshetra.

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प्रश्न-पत्र II : स्थानीय प्रशासन

भाग-अ

आधुनिक राज्य में स्थानीय स्वशासन का अर्थ, प्रकृति तथा महत्व। प्राचीन, मध्यकाल तथा आधुनिक भारत में स्थानीय स्वशासन का विकास, भारत में नगरीय स्थानीय स्वशासन का संगठनात्मक ढांचा, विभिन्न प्रकार के स्थानीय निकायों के कार्य, शक्तियाँ तथा भूमिका। महानगरों का स्थानीय प्रशासन : नगर निगम तथा उनकी स्वायत्तता एवं जवाब देयता की समस्याएँ।

भाग-ब

भारत में लोकतांत्रिक विकेन्द्रीकरण का सिद्धान्त तथा व्यवहार, 73वें संविधान संशोधन के विशेष संदर्भ में पंचायती राज्य संस्थाएँ : जिला परिषद् पंचायत समिति, ग्राम पंचायत तथा ग्राम सभा का संगठन तथा कार्य।

ग्रामीण तथा नगरीय क्षेत्रों में सेवीवर्गीय प्रशासन, स्थानीय निकायों में भर्ती, वर्गीकरण, पदोन्नति, प्रशिक्षण तथा सेवा शर्तों की समस्याएँ।

भाग-स

भारत में स्थानीय निकायों का वित्तीय प्रशासन, स्थानीय प्रसाधनों का सुदृढीकरण। स्थानीय निकायों पर राज्य-नियंत्रण, राज्य स्तर पर स्थानीय निकायों (ग्रामीण व नगरीय) पर नियंत्रण की पणाली, स्थानीय निकाय, निदेशालय तथा ग्रामीण विकास एवं पंचायती राज विभाग की भूमिका।

अनुशंसित पुस्तकें :

1. आर.आर. अंगल : म्युनिसिपल गवर्नमेंट इन इण्डिया
2. एस.आर. माहेश्वरी : भारत में स्थानीय प्रशासन
3. एम.बी. माथुर : पंचायती राज इन राजस्थान
4. आर.एल. खन्ना : म्युनिसिपल गवर्नमेंट एण्ड एडमिनिस्ट्रेशन इन इण्डिया
5. एस.के. भोगले : लोकल गवर्नमेंट इन इण्डिया
6. डॉ. एच.सी. शर्मा : भारत में स्थानीय प्रशासन

सहायक पठन सामग्री :

1. एस.सी. जैन : कम्युनिटी डेवलपमेंट एण्ड पंचायती राज
2. गवर्नमेंट ऑफ राजस्थान : सादिक अली रिपोर्ट, 1964
3. गवर्नमेंट ऑफ राजस्थान : राजस्थान म्युनिसिपलिटिज एक्ट, 1959 संशोधित
4. दिवाकर कमेटी रिपोर्ट, 1963
5. राजस्थान सरकार : राजस्थान पंचायती राज अधिनियम, 1991
6. बलवंत राय मेहता कमेटी रिपोर्ट, 1957
7. सादिक अली कमेटी रिपोर्ट, 1964

Dr. R. K. Gupta

1. नगर निगम दिल्ली, 2. जलियाँ चौक लोका, 3. सेक्टर गवर्नमेंट
मुम्बई 3. कुम शैल

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University of Rajasthan
JAIPUR

Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur

**B.A. Part – III
DRAWING & PAINTING**

SCHEME :

Theory Paper I	Duration	M.M.	Min. Pass Marks
Post Independence Artists of India	3 hrs.	60	21
Paper II-Practical Paper I			
Study from Life	5 hrs.	60	22
Paper III-Practical Paper II			
Pictorial Composition	5 hrs.	60	22
Submission of Practical Works		20	07
	Total	200	72

Paper I : Post Independence Artists of India

Note : The paper consist of three parts :-

Part –I: Carries 10 marks and consist of 10 short type questions of 1 mark each.

Part –II: Carries 20 marks and consist of 4 compulsory questions of 5 marks each to be answered in 100 words each.

Part –III: Carries 30 marks divided into three sections 3 questions of 10 marks each with internal choice. Candidates are required to attempt three questions selecting one question from each section. Each answer should be limited in 700-800 words.

Section – A

M.F. Hussian, S.H. Raza, F.N. Souza, K.H. Ara, N.S. Bendre, K.K. Hebbar, Tayab Mehta, Satish Gujral, K.G. Subramanyam, J. Swaminathan, Ram Kumar, Vikas Bhattacharya, Vivan Sundram

Section – B

Indian Sculptors – D.P. Roy Choudhary, Shankhoo Choudhary, Ram Kinkar Baij, Dhanraj Bhagat, Somnath Hore, Mrinalini Mukherjee, Himmat Shah.

Section – C

Rajasthani Painters and Sculptors - Ram Gopal Vijayvargiya, Kripal Singh Shekhawat, P.N. Choyal, Ram Jaiswal, Usha Rani Hooja, Bhoor Singh Shekhawat.

Books Recommended:

1. Art of India (Feeling and Form) - Ajit Mukarjee
2. आधुनिक चित्रकला की पृष्ठभूमि – जी.के. अग्रवाल
3. भारतीय चित्रकला के आधार स्तम्भ – प्रेमचन्द गोस्वामी
4. भारत की समकालीन कला – प्राणनाथ भागो, नेशनल बुक ट्रस्ट इण्डिया, नई दिल्ली, 2006
5. आधुनिक कला कोश – विनोद भारद्वाज, वाणी प्रकाशन, नई दिल्ली, 2006
6. आधुनिक चित्रकला का इतिहास – आर.वी. सांखलकर, राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।
7. समकालीन कला – अशोक
8. कला विलास – आर.ए. अग्रवाल, डी.एस.ए. बुक्स इंटरनेशनल, मेरठ, 2015

Paper- II (Practical Paper –I) : Study from Life

Medium – Pencil/Charcoal/Soft Pencil

Size ½ Imperial

Duration : 5 hrs.

Max. Marks : 60

Study from life (full figure) showing broad masses of light and shade, clearly bringing out the modelling of the figure and drapery.

Books Recommended :

1. Anatomy and Drawing by Victor Perard, Publisher J.V. Navlakhi, Bombay.
2. Human figure by Vanderpol, Publisher J.V. Navlakhi, Bombay.

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Note : Life Model will sit in front of the candidate for five hours with a rest of 10 minutes when required by the model. Option to arrange a female model should also be given if the Centre Superintendent can arrange one or Life model male could wear a turban or cap. Strictness about the quality of model should be avoided. Emphasis will be given on correct drawing.

Paper- III (Practical Paper -II) : Pictorial Composition

Pictorial Composition based on human figures, should be rendered with emphasis on stylization, colour scheme and textures etc.

Medium – Acrylic, Tempera, Oil, Pastel etc.

Duration : 5 hrs.

Size ½ Imperial

Max. Marks : 60

Composition should be based on any subject related to life. Its important events and the world around us. Styles of composition could be stylised, traditional or modern. Subjects from life (indoor and outdoor) like workers, travellers, farmers and group meetings, festivals etc.

Submission of Practical work :

Max. Marks : 20

Min. Pass Marks : 7

- (a) Five plates from Life.
- (b) Five Plates form Composition.
- (c) A Sketch book of not less than 50 sketches

Instruction for submission :

Note : Submission work will be submitted to the Head of the Department of Drawing und Painting of the College fifteen days before the commencement of examination. The marks in the submission will be awarded by the subject teacher (internal). However, the external examiner shall be empowered to review the work of the submission in case there is a drastic difference between the marks of the examination and submission. Submission work will be retained till the declaration of the result and returned to the Candidate from the Department thereafter. If no claim is made within two months of the declaration of the result, the submission will be destroyed.

Note:

- (a) Candidate should pass in theory as well as in practical paper separately.
- (b) There should be minimum 12 hours for the regular study including two hours for sketching.
- (c) Minimum three demonstrations should be arranged by the subject expert during the session for each practical paper.
- (d) The Department should also arrange for an Educational tour to Ancient Art centres like Ajanta, Ellora, Elephanta, Khujraho, Mahabalipuram etc. once a year.
- (e) Practical examination will be conducted at the centres and the practical work will be examined by external examiner. The examiner will examine the answer books in consultation with and internal examiner who is the subject teacher of the Department of Drawing and Painting. University may centralize the practical examinations at few well equipped Departments to hold examination economically.

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12. SOCIOLOGY

B.A. Part III -

Scheme :

Min. Pass Marks	72	Max. Marks	200
Paper-I	3 hrs. duration	Marks	100
Paper-II	3 hrs. duration	Marks	100

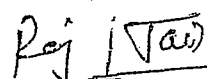
नोट : समाजशास्त्र के दो प्रश्न-पत्र होंगे। प्रत्येक प्रश्न-पत्र 3 घण्टों में विभाजित होगा। प्रत्येक प्रश्न-पत्र के दो भाग होंगे। प्रथम भाग 40 अंको का होगा। इस भाग में दो अनिवार्य प्रश्न होंगे। 20 अंको के एक प्रश्न में, एक-एक अंक के 20 लघु प्रश्न होंगे तथा प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20 शब्दों में देना होगा। दूसरे अनिवार्य प्रश्न के अंतर्गत दो-दो अंको के 10 प्रश्न होंगे। प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 40 शब्दों में देना होगा। निर्धारित शब्द सीमा से अधिक शब्दों में उत्तर देने पर अंक काटे जा सकेंगे। प्रश्न-पत्र के लिए निर्धारित कुल 3 घण्टों की अवधि में से अधिकतम 1 घंटे की अवधि प्रश्न-पत्र के इस भाग के लिए निर्धारित होगी।

प्रश्न-पत्र के इस प्रथम भाग के दोनों प्रश्न, 3 घण्टों में विभाजित पाठ्यक्रम के तीनों खण्डों से संबंधित होंगे। अर्थात् प्रश्न-पत्र के इस भाग में पूरे पाठ्यक्रम से संबंधित प्रश्न होंगे।

प्रश्न-पत्र के द्वितीय भाग में, पाठ्यक्रम के तीनों खण्डों में से प्रत्येक में से दो-दो निबन्धात्मक प्रकृति के प्रश्न होंगे। परीक्षार्थियों को प्रत्येक खण्ड में से कम से कम एक प्रश्न का चयन करते हुए, कुल 3 प्रश्न हल करने होंगे। प्रत्येक प्रश्न 20 अंकों का होगा। प्रश्न-पत्र का यह भाग 60 अंको का होगा।

Note: There shall be two papers in all, and each paper shall be of three hours duration and of 100 marks. Each paper shall consist of two parts. Part I shall carry 40 marks. There shall be 2 questions in Part-I, first question will consist of 20 short questions of 1 mark each, carrying a word limit of 20 words. The second question will consist of 10 questions of 2 marks each, carrying a word limit of 40 words. Marks may be deducted if the word limit is exceeded. This part of the question paper will be given maximum one hour duration and shall relate to all the three sections covering thereby the entire course.

Part-II of the question paper shall be divided into three sections comprising 6 essay type questions of 20 marks each. Candidates will be required to attempt 3 questions selecting one question from each section. This part of the question paper shall be of 60 marks.


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Paper I: Sociological Thought

Max Marks: 100

Unit I: Classical Sociological Tradition

- Karl Marx: Dialectical Materialism, Class struggle
- Emile Durkheim: Mechanical and Organic Solidarity, Social Fact
- Max Weber: Social Action, Types of Authority

Unit II: Contemporary Sociological Tradition

- Jurgen Habermas: Legitimation Crisis, Communicative Action
- Antonio Gramsci: Hegemony, Civil Society
- Anthony Giddens: Modernity, Structuration

Unit III: Indian Sociological Tradition

- M.N. Srinivas: Sanskritization, Dominant Caste
- D.P Mukherji: Diversity, Dialectics of Tradition
- A.R. Desai: Nationalism, Path of Development

Essential Readings: (in English) :

1. Doshi, S.L. 2003: Modernity, Post Modernity and Neo-Sociological Thought, Jaipur: Rawat Publication.
2. Coser, Lewis A., 2008: Masters of Sociological Thought, Jaipur: Rawat Publication.
3. Nagla, B. K. 2013: Indian Sociological Thought, Jaipur: Rawat Publication.
4. Raymond Aron, 1967: Main Currents in Sociological Thought, (Vol. I & II), London: Pengui Books.

Essential Readings: (in Hindi)

1. दोषी, एस. एल., 2003: आधुनिकता अंतर-आधुनिकता एवं नव-समाजशास्त्रीय सिद्धान्त, जयपुर: रावत पब्लिकेशन्स
2. हुसैन, मुजतबा, 2010: समाजशास्त्रीय विचार, नई दिल्ली: ओरियंट ब्लैकस्वॉन
3. दोषी, एस. एल., 2007, आधुनिक समाजशास्त्रीय विचारक, जयपुर: रावत पब्लिकेशन्स
4. मुकर्जी, रवीन्द्रनाथ, 2003, सामाजिक विचारधारा, दिल्ली: विवेक प्रकाशन

Paper II: Introducing Sub Sociologies

Max Marks: 100

Unit I: Sociology of Urban Society

- Concepts: City and its Types, Urbanization, Urbanism, Migration
- Urban Sociology: Nature, Subject Matter, Significance
- Issues: Slums, Health and Sanitation

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Unit II: Sociology of Development

- Concepts: Development & its Forms, Sustainable Development, Modernization
- Sociology of Development: Nature, Subject Matter, Significance
- Issues: Displacement-Rehabilitation, Development Inequalities: Education, Gender

Unit III: Sociology of Globalization

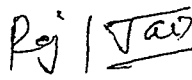
- Concepts: Globalization, Glocalization, Globalism
- Sociology of Globalization: Nature, Subject Matter, Significance
- Issues: Marginalization: Digital Divide, Economic Divide, Identity Crisis

Essential Readings: (in English)

1. Doshi, S.L. 2003: Modernity, Past Modernity and Neo-Sociological Theories, Jaipur: Rawat Publications.
2. Flanagan WG (2011): Urban Sociology, Maryland, Rowman & Littlefield
3. Kofman E. & Youngs G. (edt) (1996), Globalization: Theory & Practice, London, Pinter.
4. Singh, Sheobahal, 2010: Sociology of Development, Jaipur: Rawat Publications.
5. Singh, Yogendra (edited) 2014: Indian Sociology Vol. 2, New Delhi: Oxford University Press.
6. Singh, Yogendra, 2002: Culture Change in India, Jaipur: Rawat Publications.
7. Singh, Yogendra, 2005: Ideology & Theory in Indian Sociology, Jaipur: Rawat Publications.
8. Somayaji S. & Dasguptas, 2013: Sociology of Displacement: Policies and Practice, Jaipur: Rawat Publications.

Essential Readings: (in Hindi)

1. सिंह, शिव बहाल, 2010: विकास का समाजशास्त्र, जयपुर: रावत पब्लिकेशन्स।
2. भार्गव नरेश, 2014 : वैश्वीकरण : समाजशास्त्रीय परिपेक्ष्य, रावत पब्लिकेशन्स।
3. YMSOE-004, 2018, नगरीय समाजशास्त्र, गलीबाबा पब्लिशिंग हाउस प्राइवेट लिमिटेड।


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13. HOME SCIENCE**B.A. Part III –****Examination Scheme :**

- Each Theory paper will contain nine questions having three questions from each unit. Candidates are required to attempt five questions in all selecting at least one question from each unit. Each question will be of 10 marks.

BA Home Science Part III

Paper	Subjects	Duration of exam	Maximum marks	Minimum marks	No. of hrs/wk
Theory Paper V	Mother and Child Care	3hrs	50	18	4
Practical V	Mother and Child Care	3hrs	50	18	2
Theory Paper VI	Extension education and Communication	3hrs	50	18	4
Practical VI	Extension education and Communication*	3hrs	50	18	2
		Total	200	72	12

*In BA Part III, a "Vocational Oriented Practical" under Practical VI- Extension education and communication has been planned in the form of training, internship, demonstration to provide skills to students and enable them to take up a money earning vocation. One practical from each subject has been planned and given as an option to the institution/home science department. The practical which is opted can be based on the available infrastructure and local facilities.

The student has to opt for the practical selected by her institution.

Vocation Oriented Practical*

(in the form of training, internship, demonstration. **One practical** to be selected by the institution based on the available infrastructure and facilities)

One of the following six practicals to be selected by the institution.

- Family Event management
- Nutrition Education activities
- Food Preservation
- Knowledge & Skills based Training for Childhood Educators
- Dyeing & Printing
- Extension Activity Management

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B.A. PART-III

MOTHER AND CHILD CARE (THEORY PAPER V)

Maximum Marks: 50

Minimum marks: 18

Teaching workload: 3 hrs /week

Total teaching workload: 72hours/year

Learning Outcomes:-

The subject will give a basic understanding of menstruation and it's related issues.it will enable the student to understand the physiology of pregnancy and lactation; and the problems and it's management. They will learn about care of newborns and their management of the common ailments.

After studying this subject, they will be able to understand the reproductive cycle and its various related issues. It will facilitate them to understand and utilise the support given to women in reproductive cycle through various health schemes.

Objectives :

1. To understand importance of reproductive cycle
2. To understand the basic care of mother during pregnancy and lactation
3. To understand the problems /complications during pregnancy and their management.
4. To understand the basic care of newborns and infants.
5. To understand the Danger Sign and Common ailments of newborns and their management.

Contents**Hours****Unit – I****Health of the Mother**

1. Menstruation & Fertility :

- Normal Menstrual Cycle
- Process of Reproduction

6

2. Pregnancy:

- Sign & Symptoms
- Use of Pregnancy Kits
- Signs & Symptoms
- Common Ailments
- Abortions –causes & Care of Mother

8

3. Health & nutritional care during Pregnancy & lactation:

- Antenatal Care:
 - i. Registration of Pregnancy
 - ii. Sign & Symptoms of Pregnancy
 - iii. Use of Pregnancy Kits
 - iv. Common ailments during pregnancy & their

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<p>management: morning sickness, heartburn, indigestion, constipation, piles, leg cramps, sleeplessness, frequency of micturition, edema, varicose veins</p> <p>v. Antenatal Checkups & their importance</p> <p>vi. Danger signs during pregnancy & management.</p> <p>• Intra natal care:</p> <ul style="list-style-type: none"> • Birth preparedness for safe delivery • Danger signs during delivery & management & when to refer <p>• Post natal care:</p> <p>i. Complications during post partum period & their management</p> <p>ii. Post natal Checkups</p>	
<p>Unit II Care of New Born</p>	
<p>4. Use of Mother & Child protection card</p> <p>5. Mother and Child Health Nutrition Programme</p> <ul style="list-style-type: none"> • Janani Shishu Suraksha Yojana • Reproductive and Child Health <p>6. Family Planning</p> <ul style="list-style-type: none"> • Advantages & importance • Methods of family planning <p>7. Abortions-causes & care of mother</p> <p>8. New born:</p> <ul style="list-style-type: none"> • Nutritional care of New Born(referring to Integrated Management of Neonatal Childhood illness). • Identification of Danger Sign and when to refer • Common ailments of newborns and their management- diarrhea, constipation, flatulence, vomiting, colic, malnutrition, napkin rash, umbilical infection, acute respiratory infections 	<p>6</p> <p>6</p> <p>20</p>
<p>Unit III</p>	
<p>9. Immunization & growth monitoring of infant and young child</p> <p>10. Nutritional care of infant & young child (referring to Infant and Young child nutrition guidelines)</p> <ul style="list-style-type: none"> • Infancy i. Importance of breastfeeding , early intitaion , colostrums 	<p>4</p> <p>12</p>

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<ul style="list-style-type: none"> ii. Exclusive breastfeeding – techniques of breastfeeding • Complementary feeding: <ul style="list-style-type: none"> i. Importance of complementary feeding ii. Time of introduction iii. Technique of complementary feeding iv. Points to be considered –FODU (Frequency, Adequacy, Density and Utilization. v. Homemade recipes, premixes, from family pot 	16
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References:

1. Sudha Narayanan & Anupama Narayana (2000). Mothercraft Research Publications. 89 Tripolia Bazar, Jaipur. ISBN 8185789-88-6
2. Park JE & Park K (1995). Essentials of Community health Nursing. M/s Banarsidas Bhanot Publishers. 1167 Prem Nagar, Jabalpur. 482001. 2nd Edition. ISBN 81-90011871
3. Dr. Subhash C. Arya (2007). Infant & Child care for the Indian Mother. ISBN 8125914412
4. Shanti Ghosh (2004). Nutrition and Child care: A practical guide. Jaypee Publishers. Second Edition. ISBN: 9788180612077
5. First Aid to the injured. Authorised Manual of St. John Ambulance. 1 cross road, New Delhi 110001
6. Module 1-8 developed for Asha Sahyoginis.

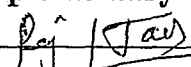
MOTHER AND CHILD CARE(PRACTICAL V)**Maximum marks: 50****Minimum marks: 18****Teaching workload: 1 practical/ week (2 hours/ practical)****Total teaching workload: 24 practical/ batch****Learning Outcomes :-**

The practical will teach students about basic menstruation hygiene and use of pregnancy kits. They will be aware about the care and management of pregnant and lactating mothers; and significance of Mother and Child protection card.

At the end of the course, they will be have basic knowledge about administering first aid in emergency situations. Students will be able to manage home nursing of patients with simple illnesses.

Objectives:-

1. To make the students aware and understand about use of pregnancy kits.
2. To teach them about preparation oh home based, appropriate complementary foods and premixes.


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3. To teach about home based management of common ailments of newborns.

4. To teach students about basic first aid and home nursing.

Content	Hours
1. Use of Pregnancy kits	1
<ul style="list-style-type: none"> • Safe Days • Menstrual Hygiene • Hygienic use & disposal of Sanitary pads 	1
2. Breastfeeding – Techniques & Posture	
3. Preparation of Complementary foods	6
<ul style="list-style-type: none"> • Premixes • Guidelines for consistency for quality, preparing frequency, density & variety premixes. • Homemade recipes • Adaptation from family pot C 	5
4. Use of Mother & Child Protection Card	
<ul style="list-style-type: none"> • Registration & personal details • Antenatal care • Danger signs of pregnancy • Diet during pregnancy • Planning of low cost nutritious recipe for pregnant mother • Internal care • Post antenatal care • Checkups planning of low cost nutrition's recipes for lactating mother • Danger signs of new born • New born care • Immunization • Growth monitoring – Demonstration of weighting & measurement of child • Guidelines for child care 	
5. Management of Diarrhea	2
<ul style="list-style-type: none"> • Skin pinch test for identifying dehydration • Feeding schedule • Preparation of oral rehydration solution 	2
6. Management of fever	
<ul style="list-style-type: none"> • Use of thermometer • When to refer • How to bring down fever (home based care) 	4

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<p>7. First aid & home nursing</p> <ul style="list-style-type: none"> • First Aid during <ol style="list-style-type: none"> i. Burns & Scalds ii. Cuts & wounds (Tetanus Toxoid vaccine) iii. Sprains & fractures iv. Unconsciousness v. Electric shock vi. Animal bite – dog, monkey, snake (importance of vaccine) vii. Poisons viii. Heat stroke • Care in infectious disease <ol style="list-style-type: none"> i. Isolation ii. Prevention of infection through fomites iii. Ventilation & Disinfection iv. Baby weighing scale, ARIT inner & thermometer, first aid box. v. Materials to be provided – from nearest Aanganwadi /Subcentre 	3
<p>Examination scheme</p>	
<p>Major problem – 15 marks</p>	
<p>Planning and preparation of low cost recipe for any one</p>	
<ul style="list-style-type: none"> • Pregnant/ Lactating mother • Supplementary foods/ premixes 	
<p>Minor Problem – 10 marks</p>	
<p>Use of pregnancy kit</p>	
<p>Management of diarrhea ,care of infectious disease, use of Mother & child card,</p>	
<p>Viva voce 5 marks</p>	
<p>Internal -20 marks</p>	
<p>EXTENSION EDUCATION AND COMMUNICATION (THEORY PAPER VI)</p>	
<p>Maximum Marks: 50</p>	
<p>Minimum marks: 18</p>	
<p>Teaching workload: 4 hrs /week</p>	
<p>Total teaching workload: 96</p>	
<p>Learning Outcomes –</p>	


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The students will learn about followings-

- Concept of education and its types, principle and objectives
- Role of development initiatives of government of India in the progress of country
- Concepts of communication , teaching methods and types
- International, National and local support structure contributing to the development of country.

Objectives:

1. To make the students understand the concept of extension and its related aspects.
2. To understand the support of national and international agencies in extension.
3. To sensitize the students and help them to understand the process of communication and its importance in extension teaching.

Contents**Unit-I****Hours****Extension Education**

- | | |
|---|----|
| 1. Concept and Meaning- Non Formal Education, Formal Education, Informal Education, Extension Education | 3 |
| 2. History of Extension Education in India | 3 |
| 3. Objectives and principles of Extension Education | 4 |
| 4. Role and qualities of extension worker | 2 |
| 5. Extension teaching methods- Personal , Group and mass approach | 10 |
| 6. Basic knowledge of flagship development programmes of the Government of India in reference to objectives, target groups, activities, organizational structures and financial support | 10 |

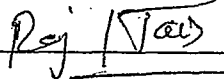
UNIT-II

- | | |
|--|----|
| 7. Communication | |
| • Concept, meaning and process of communication | 4 |
| • Elements and models of communication- Aristotle, Leagens, Roger's and shoemakers | 5 |
| • Functions and barriers of communications | 4 |
| 8. Audio visual aids | |
| • Meaning and use of audio visual aids | 2 |
| • Cone of experience | 1 |
| 9. Classification of audio visual aids- Projected and non projected (visual, audio and audio visual aids) | 10 |
| 10. Media | |
| • Basic concepts of traditional and modern methods of communication | 6 |
| • Relative advantages and limitations of traditional and modern methods of communication | 4 |


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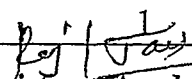
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UNIT III	
11. Support structure and functions –	
<ul style="list-style-type: none"> • Panchayati Raj – Concept, objectives, and structural organisation. Role of Panchayati Raj for Women empowerment 	10
<ul style="list-style-type: none"> • Village organisations – village school, Yuva Mandal, Mahila Mandal, Cooperatives and KVK's 	10
<ul style="list-style-type: none"> • Role of UNDP, UNICEF, NIRD, NIPCCD, CSWB 	8
References:-	
<ol style="list-style-type: none"> 1. Dahama OP (1988). Education and communication for development. Oxford and 1 BH Publishing Co. Pvt. Ltd. New Delhi. 2. Supe SV (1997). An Introduction to Extension Education. Oxford BH publishing Co. Pvt. Ltd. New-Delhi. 3. Jain R (1993). Mass Media and Rural Development, Vol. III. Manak Publication Pvt. Ltd. New Delhi. 4. Pankajam G (2000). Extension – Third Dimension of Education. Gyan Publishing House. New-Delhi. 5. हरपालानी बी.डी. 1998 : गृह विज्ञान में प्रसार शिक्षा , स्टार पब्लिकेशन , आगरा 6. शॉ , सुगीता पुष्प और शॉ जामस शीला 2011 : प्रसार शिक्षा , श्री विनोद पुस्तक मन्दिर , आगरा-2 	
EXTENSION EDUCATION AND COMMUNICATION (PRACTICAL VI) (Based on the institution's choice)	
<p>Vocation Oriented Practical* (in the form of training, internship, demonstration)</p> <p>One practical to be selected by the institution based on the available infrastructure and facilities.</p> <p>*One of the following six practicals to be selected by the institution</p> <ul style="list-style-type: none"> • Family Event management • Nutrition Education activities • Food Preservation • Knowledge & Skills based Training for Childhood Educators • Dyeing & Printing • Extension Activity Management <p>The student has to opt for the practical selected by her institution.</p>	
FAMILY EVENT MANAGEMENT	
<p>Maximum marks: 50</p> <p>Minimum marks: 18</p> <p>Teaching workload: 2 practical/ week (2 hours/ practical)</p> <p>Total teaching workload: 24 practical/ batch</p>	


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Learning Outcomes	
1. Students will be able to plan any event in the family . 2. Students will learn various aspects of event management .	
Objectives	
1. To develop a practical approach for planning on event. 2. To understand various aspects of event management	
Contents :	Hours
Step of Event Management	
1. Making a paper plan	1
<ul style="list-style-type: none"> • Guest List • Making / Drafting / Finalizing/Invitation Card • Infrastructure 	1
i.Tents ii.Furniture and Furnishing for areas : <ul style="list-style-type: none"> ○ Reception, ○ DJs / Music, ○ Games, ○ Food serving (Based on numbers of persons and types of events) 	
i.Decoration (Theme etc.) ii.Planning of games iii.Transportation & communication iv.DJ's / Music v.Planning and Management of food <ul style="list-style-type: none"> ○ Welcome drink ○ Welcome Snacks ○ Main Course ○ Deserts ○ Mouth Fresheners 	3
vi.Return Gifts	
2. Budget under different heads (Market survey can be done)	2
<ul style="list-style-type: none"> • Food • Decoration • Invitation • Gifts • Transportation and communication • Games • Infrastructure tents, furniture, furnishing, etc. • DJ's / Music • Time schedule for major activities • Implementation of various activities 	3 1 1 1 1 2 1 1


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<p>i. Finding out a leader and making groups ii. Work distribution among group members</p> <p>3. Controlling the event activities</p> <p>4. Feedback /evaluation</p> <p>5. Variation in events in a family</p> <ul style="list-style-type: none"> • Religious events • Entertainment and recreational events • Picnics, Other parties and events • College events : Fresher's day, Farewell, Annual function <p>6. Class rooms presentation</p> <p>Note: Students will participate in events of institution.</p>	<p>1</p> <p>1</p> <p>2</p> <p>1</p>
Examination scheme	
<p>1. Major – 20 marks. Making a party plan for any specific party.</p> <p>2. Minor – 10 marks. Planning budget for the party in the specific amount</p> <p>3. Internal – 20 marks</p>	
<p>NUTRITION EDUCATION ACTIVITIES</p> <p>Maximum marks: 50</p> <p>Minimum marks: 18</p> <p>Teaching workload: 2 practical/ week (2 hours/ practical)</p> <p>Total teaching workload: 24 practical/ batch</p>	
<p>Learning Outcomes</p> <p>The students shall learn about the process of nutrition education and its significance for community.</p> <p>They shall be able to make a plan to impart nutrition education with the help of various kinds of teaching aids. The course will provide them basic skills for undertaking a nutrition education program in a community.</p>	
<p>Objectives:-</p> <ol style="list-style-type: none"> 1. To gain insight on the concept and importance of Nutrition Education. 2. To develop skills in organizing a Nutrition Education program. 	
Contents	Hours
<p>Activities:</p> <p>(A) Classroom/Lab activities :</p> <ol style="list-style-type: none"> 1. Introduction to Nutrition Education: Definition, importance related topics, approaches (Individual, group mass), methods, and Teaching aids. 	<p>2</p>

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2. Identification and finalization of nearby village/community/women's group/ Aanganwari center/college premises for Nutrition Education.	1
3. Divide the students in different groups – 5 students in each group. Assign one topic to each group.	2
4. Every group will prepare a Nutrition Education program plan based on the topic given.	3
5. Guidelines for Preparation of teaching aids. – Posters, Charts, Flash Cards, Demonstrations, Street Play, Puppetry. - Every group will prepare a minimum of 3 teaching aids. (Posters / chart/ demonstration/flash cards/role play etc.)	2
6. Prepare an activity calendar: venue, time, place, number of participants and implementation of each education programme.	1
7. Village Health & Nutrition day at the nearest Aanganwari centre- Previsit for Planning, organising –VHND, Evaluation.	
(B) Implementation and evaluation of education program The students will implement every activity as per the activity calendar. (Division of classes will be based on number of groups formulated)	10
(C) File work • Discuss the various programs implemented. Every student should prepare a file which would include: Report of program plan & implementation and a way of teaching aids prepared.	2
<u>Suggested Topics:</u> • Nutritional care during pregnancy. • Nutritional care during lactation. • Advantages of Breast feeding. • Importance and timely introduction of complementary feeding. • Formulation and preparation of fresh home-made and premix for an infant 6 months to 12 months. • Formulation and preparation of fresh home-made and premix for 1 year to 3 years child. • Formulation and preparation of energy – protein rich snack for 3-6 years old child • Growth Monitoring – taking body weight and plotting on growth chart (weight – for – age) • Nutrition counselling based on the results of growth chart. • Preparation of Vitamin 'A'/ Beta- carotene rich food for a young child.	

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<ul style="list-style-type: none"> • Preparation of iron rich food for an adolescent girl. • Promotion of consumption of iodized salt. • Immunization of safe water and house – hold methods of water purification. • Hand – washing promotion. 	
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Examination scheme:

1. Major problem: 20 marks Plan any nutrition education activity for community on any one of the given topics.
2. Minor problem 10 marks Preparation of any one teaching aid.
3. Internal: 20 marks

FOOD PRESERVATION

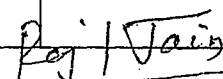
Maximum marks: 50
Minimum marks: 18
Teaching workload: 2 practical/ week (2 hours/ practical)
Total teaching workload: 24 practical/ batch

Learning Outcome
 The students will learn skills for food preservation techniques. It will also teach them how to set up their own unit along with financial aspects. The course will enable the students to undertake food preservation as an enterprise.

Objectives:-

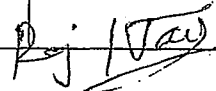
1. To enable the students to develop skills in food preservation.
2. To encourage the students to use these skills at small scale level.

Content	Hours
1. Theory of Preservation : Need, importance, principles of food spoilage, principle of food preservation, various methods of food preservation	2
2. Development of skills in preparation of :	1
• Dried fruits and vegetables	2
i. Sun drying (Curry leaves, mint, methi, coriander, cauliflower, amla , kair-sangri, guar-fali, amchur, onion, peas, kachri, red chillis)	2
• Papad & Magodi	2
• Juices	3
i. Aloe Vera	
ii. Squashes	
iii. Lemon	
iv. Orange	
v. Pineapple	


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<ul style="list-style-type: none"> • Syrups <ol style="list-style-type: none"> i. Rose ii. Khas iii. Chandan iv. Jellies v. Karonda 	3
<ul style="list-style-type: none"> • Jams <ol style="list-style-type: none"> i. Apple ii. Mixed fruit iii. Preserve (Murabba) iv. Carrot v. Amla vi. Ketchup sauce and chutney vii. Tomato Ketchup viii. Garlic Chutney ix. Tomato Chutney x. Imli Chutney 	2 5
<ul style="list-style-type: none"> • Canning and bottling <ol style="list-style-type: none"> i. Green pea ii. Apple iii. Cauliflower iv. Frozen vegetables <ul style="list-style-type: none"> * Peas * Carrots * Cauliflower * Mango Pulp 	
<ul style="list-style-type: none"> • Pastes & Purees <ol style="list-style-type: none"> i. Onion ii. Garlic iii. Ginger iv. Tomato Puree 	
<ul style="list-style-type: none"> • Pickles <ol style="list-style-type: none"> i. Mango ii. Mix Vegetables iii. Kair iv. Lasoda v. Chilli vi. Lemon 	
<ul style="list-style-type: none"> • Requirements to start a small scale unit <ol style="list-style-type: none"> i. Equipments ii. Finance <ul style="list-style-type: none"> * Loan options 	


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- * Budgeting -- calculation of selling price of the product
- * Book keeping

Examination scheme:

1. **Major problem:** 20 marks
Planning and preparation of any one preserved food.
2. **Minor problems:** 10 marks
Calculation of selling price of a given product.
3. **Internal:** 20 marks

KNOWLEDGE AND SKILLS BASED TRAINING FOR CHILDHOOD EDUCATORS

Maximum marks: 50

Minimum marks: 18

Teaching workload: 2 practical/ week (2 hours/ practical)

Total teaching workload : 24 practical/ batch

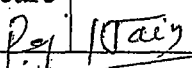
Learning Outcomes

Early childhood years (birth to 8 years) are crucial for the development of children which is greatly influenced by early stimulation (birth to 3 years) and preschool education (3-8 years). This will cater to the needs of working parents/mothers who seek for safe custody of their children in crèches, preschool and day care centres. Early childhood educator plays a major role in shaping the development and laying strong foundation of young children. This practical will be useful for students to learn the skills and knowledge required to be an effective early childhood educator.

Objectives –

1. To develop communication skills in organising various developmental appropriate activities for young children.
2. To gain a clear insight of child's developmental milestone & needs.
3. To develop insight about administration, management and supervision of early childhood Education Centres i.e. Crèches, Preschools and day care centres.

Content	Hours
<p>Pre-Requisites:</p> <p>Identifying nearby crèches, preschool and day care centres.</p> <ul style="list-style-type: none"> • Preparation of activity calendar. • Developing skills and characteristics of an ideal preschool teacher using different teaching strategies – task analysis scaffolding, storytelling, do it signals, dramatization demo field trips songs environmental cues. • Participation with children in crèches, preschool and day care centres 	<p>(12 weeks)</p> <p style="text-align: right;">2</p>


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Course Content :	Hours
• Teaching strategies for early childhood care and education	2
• Characteristics and qualifications of an early childhood educator.	2
• Developing communication skills in dealing with young children.	2
• Working in crèches, preschool and day care centres to develop administrative, managerial and supervisory skills in students.	2
• Administration, management and supervision of crèches, preschool and day care centres.	2
• Planning and implementing developmentally appropriate activities in crèches, preschool and day care centres.	2

Examination scheme:**1. Major Problem : 20 marks**

Planning and preparation of ECE activities in preschools and day care centres.
Evaluation of crèches, preschool and day care centres.

2. Minor Problem : 10 marks

Preparation of teaching aids – story books, songs poems, models, toys, aids etc.

3. Internal : 20 marks**DYEING AND PRINTING**

Maximum marks: 50

Minimum marks: 18

Teaching workload: 2 practical/ week (2 hours/ practical)

Total teaching workload: 24 practical/ batch

After doing the course the students will be able to be self employed as they will master the art of dyeing and printing. Rajasthan is a fertile place where enough infrastructure is available in this area so any related vocation can be started or else they can join as an expert in the area of dyeing and printing.

Contents	Hours
Make a scrap book with following	
1. Different types of motifs	4
• Floral – Natural and stylized	
• Human - Natural and stylized	
• Animal - Natural and stylized	
• Abstract	
• Geometrical	
2. Make samples of different methods of printing and dying	8
• Tie & Dye techniques (10 samples with different techniques)	
i. Marbling	

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<ul style="list-style-type: none"> ii. Pleating & binding iii. Knotting iv. Twisting and coiling v. Bandhej vi. Stitching (Shibori) vii. Pegging, etc <p>Make any one Product – Table cloth with 6 napkins/Chunni / Saree/cushion & bolster set</p> <ul style="list-style-type: none"> • Printing – <ul style="list-style-type: none"> i. Block printing (samples) <ul style="list-style-type: none"> o Butti block to create all over effect o Borders & corners <p>Make any one Product – Table Mats/Table Napkins/Runners</p> <ul style="list-style-type: none"> ii Screen printing (Samples) <p>Make any one Product – Table mat / 'T' shirt /Cushion cover</p>	<p style="text-align: center;">8</p> <p style="text-align: center;">4</p>
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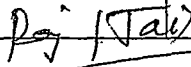
Examination scheme :	
<ol style="list-style-type: none"> 1. Major Problem -20 Marks Make a design for a product by combining any two techniques e.g. tie and dye, block and screen. 2. Minor -10 Marks Make a sample of tie and dye using two colors and two techniques 3. Internal Marks -20 Marks 	

EXTENSION ACTIVITY MANAGEMENT	
Maximum marks: 50	
Minimum marks: 18	
Teaching Workload: 2 practical/ week (2 hours/ practical)	
Total teaching workload: 24 practical/ batch	

Learning Outcome

Objectives:	
1. To impart knowledge regarding process of extension activity management.	
2. To develop the skills in organizing extension activity at the community level.	
Practicals	

1.	Theoretical understanding of process of programme/extension activity	4
2.	management.	


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	<p>Organise following extension activities from the area of home science :</p> <ul style="list-style-type: none"> • Workshop/seminar • Fair • Exhibition • Rally <p>could be taken up in rural/urban/slum community in a group on the basis of following steps-</p> <ul style="list-style-type: none"> • Identification of the activity - nature, duration, number of participants etc. • Plan of the activity – selection of venue, resource management (men, material/infrastructure, and money), and delegation of responsibility. • Scheduling of the activity • Publicity of the activity • Organising the activity • Overall supervision • Report writing 	<p>2</p> <p>4</p> <p>2</p> <p>2</p> <p>3</p> <p>3</p> <p>4</p>
Examination scheme :		
Total Marks: 50 marks		
Major Problem: 15 Marks		
Plan strategy to publicise the chosen extension activity and prepare any one aid out of them.		
Minor Problem: 10 Marks		
Prepare financial budget for the planned activity or prepare scheduling of activities according to allotted time.		
Viva: 5 Marks		
Internal: 20 Marks		

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14. TEXTILE CRAFT**B.A. Part III -****SCHEME: BA/B.Com PART-III**

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	
	Paper -II	3Hrs	30	22
2. Practical:	Paper -I	3Hrs	35	
	Paper-II	3Hrs	35	25
3. Submission:	Paper -I		35	
	Paper-II		35	25

Paper-I : Weaving Theory II**UNIT-I**

1. Types of Spinning: Mechanical and Chemical
Mechanical spinning process: picking, ginning, combing/carding, drawing etc. Types of chemical spinning-melt spinning, dry spinning and wet spinning.
2. Types of Yarns: Simple and Fancy
Simple yarn: single and double/plied/folded yarn
3. Calculation of resultant count for folded yarn

UNIT-II

1. Manmade and Synthetic fibres
Man-made fibres: Basic methods of producing rayon fibre, Different types of man-made fibres
Synthetic fibres: Different types of synthetic/chemical fibre, method of their production, properties of polyester fibre, nylon fibre, glass fibre.
2. Silk and Wool
Production, spinning, properties and uses of silk, different types of silk
Classification of wool, wool spinning process, difference between woollen and worsted fabric
3. Concept of Mixing and Blending, Basic difference between mixing and blending.
Concept of Staple and Filament fibre; difference between staple fibre and filament fibre

UNIT-III

- 1 Derivatives of Twill weave: Broken weave, Herringbone weave and Diamond weave
- 2 Towel weaves: Huckaback and Honeycomb; quality of yarn and weave selected for towels
- 3 Concept of shedding mechanism; Dobby and Jacquard shedding mechanism

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Paper-II: Dyeing Theory II

UNIT-I

1. Dye molecule; Concept and Importance of Chromophores and Auxochrome in a dye
2. Objectives of Fabric finishes; different mechanical and chemical fabric finishes; Determinants of finishes
3. Different types of natural and synthetic dyes.

UNIT-II

4. Method of direct printing: Screen printing; colour preparation and screen preparation
5. Discharge and Resist printing; different styles of discharge and resist printing
6. Factors affecting colour fastness: composition of fibre, chemical structure of dye, techniques of dyeing/printing, addition of other useful additives

UNIT-III

7. Importance of fabric finishes
8. Different types of chemical finishes- crease resistant finish, water proof finish, fire proof finish, moth proofing finish and absorbency finish.
9. Determinants of fabric finishes.

Practical (Paper-I)

1. Concept of yarn twist(S twist and Z twist) and plied yarn(single and double yarn)
2. Calculation of Ends and Picks per inch in given piece of fabric
3. Towel weaves preparation using paper strips

Practical (Paper-II)

1. Screen preparation (simple tracing method)
2. Table cover preparation by screen printing

Submission (paper-I)

1. Assessment of yarn and fabric samples
2. Assessment of weave samples

Submission (paper-II)

1. Assessment of samples
2. Any one article using screen printing

Practical Examination Scheme:

Major Problem: 20 Marks

Minor Problem: 15 Marks

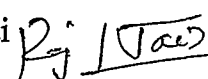
Reference books:

Booth, J.E. (1996) Principles of Textile Testing, 1st edition, CBS publishers & distributors PVT.Ltd. New delhi

Sahnai, V.A. (1980) Technology of Dyeing, Sevak publications. Mumbai

Sahnai, V.A. (1979) Technology of printing, Sevak publications. Mumbai

Sahnai, V.A. (1999) Technology of finishing, Sevak publications. Mumbai


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15. GARMENT PRODUCTION & EXPORT MANAGEMENT**B.A. Part III –****PAPER – 1 : APPAREL TECHNOLOGY**

B.A./B.Com. – M.M 40

B.Sc.- M.M. 50

Hrs. – 3

OBJECTIVES:

1. To create awareness on the basics of Fashion
2. To study the psychological effects of clothing on the individual in social situation.
3. To develop understanding of manufacturing technology of the garment Industry.
4. To understand the fundamental concepts of dyeing and printing.

SECTION-A : INTRODCUTION TO FASHION

1. Fashion terminology, sources of fashion, factors influencing fashion.
2. Fashion forecasting and fashion cycle.
3. India and international fashion designers (five each).
4. Sociological and psychological significance of clothing.

SECTION-B : MANUFACTURING TECHNOLOGY

5. Product development, design development, developing a sample garment.
6. Apparel production
 - I. Costing a garment
 - II. Purchasing pattern making
 - III. Production scheduling
 - IV. Spreading and cutting procedure
 - V. Contracting
 - VI. Garment assembly
7. Introduction to industrial machines-
 - I. cutting : round , straight and band
 - II. fusing: collars, facing
 - III. sewing: chain stitch, lock stitch, button hole, blind stitching
8. Use of components and trims –
 - (i) Performance and properties of components and trims.
 - (ii) labels and motifs
 - (iii) linings and interlinings
 - (iv) face, braids, elastics
 - (v) fasteners; loops
 - (vi) seam binding and tapes
 - (vii) shoulder pads, eyelets

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SECTION –C : DYEING AND PRINTING

Application of design:

7. i. Printing methods – block, screen, stencil, roller.
ii. Styles of printing – direct, discharge and resist.
8. Dyeing – introduction to natural and synthetic dyes
(acid, basic, sulphur, vat, reactive and direct dyes)
9. Stages of dyeing : Fiber, yarn and fabric

References:

1. Rouse Blizabeth, 1999, Understanding Fashion, Blackwell science.
2. Carr Harold and John pomerory, 1996. Fashion design and product development. Blackwell science.
3. Jain Ruby and Rathore Girja, Design, Fashion and Garment Production, CBH publication Jaipur 2019.

PAPER- II : INTERNATIONAL MARKETING

B.A./ B.Com.- M.M. 40

B.Sc. – M.M. 50

Hrs. -3

OBJECTIVES:

1. To study the importance of marketing to the global economy
2. To develop insight into the development of marketing strategies for international markets
3. To Identify business opportunities in an international business environment

SECTION –A

1. International Marketing: nature and scope of international marketing.
2. International marketing v/s domestic marketing.
3. Importance of international marketing.
4. Problems and challenges of international marketing.
5. Selection of agents.

SECTION – B

6. Identification of markets for readymade garments.
7. Market entry conditions.
8. Channels of distribution.
9. Direct and indirect export
10. Trade fair and Exhibitions.

SECTION – C

11. Pricing, role of price and non price factors, factors influencing pricing, price quotation, information needed for export pricing.
12. Role of trading and export houses.

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13. Institutional segments and packaging for exports: packing material, boxing and pressing department, machinery and equipments used in packaging department.
14. Quality control
15. Labeling and consumer protection meaning and its role.

References :

1. R. K. Kothari, B. S. Rathore, P. C. Jain (2009) International Marketing (2009) Ist ed. Ramesh Book Depot, Jaipur, New Delhi
2. R. Kothari and P. C Jain (2009) International Management 1st ed. Ramesh Book Depot, Jaipur, New Delhi
3. M. J. Methew International Marketing (Procedures and practices) 1st ed. RBSA publishers, Jaipur

PRACTICAL – 1 : APPAREL PRODUCTION

B.A./B.Com.-M.M.60

B.Sc.-M.M. 25

Hrs.- 4

OBJECTIVES :

1. To develop basic adult drafts of bodice, sleeve and collar.
2. To develop various patterns of textile techniques
3. Guidance for preparation of portfolio

CONTENT

1. Prepare an adult's bodice and sleeve block.
2. Sketching and designing of men/women garments (5 each)
3. To prepare with specific details of necklines and sari blouses. (20)
4. To identify patterns and its application for women designer dress on fashion figures:
5. Types of patterns include –
 - I. Structural
 - II. Geometrical
 - III. Stripes and plaids
 - IV. Floral
6. Design and prepare an adult dress for fashion shows.

Examination Scheme:

B.A./B.Com. -Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

Internal :-10

B.Sc.-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5

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PRACTICAL – II : DYEING AND PRINTING

B.A/B.Com.-M.M. 60

B.Sc.- M.M. 25

Hrs.- 4

OBJECTIVES:

1. To learn the various types of skills in dyeing
2. To develop various textile printing techniques
3. Guidance of practical knowledge of export houses

Contents

1. Prepare and article of each: Tie and dye, stencil printing, block printing and batik
2. Field trips to Export houses and mass production centers.
3. Exhibition ;

References:

1. Bhargava, Ritu, 2005, fashion illustration and rendering, Jain Publications Pvt. Ltd. New Delhi.
2. Ireland, fashion designing drawing and presentation.
3. Prayag: Technology of textile printing.
4. Shenai: Technology of dyeing

Examination Scheme :

B.A./B.COM:-Max Marks:-60

1.Major Problems :-30

2.Minor Problems:-20

Internal :-10

B.SC:-Max Marks:-25

1.Major Problems :-10

2.Minor Problems:-10

Internal :-5

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16. INVESTIGATIVE BIO-TECHNOLOGY

Scheme :

Paper—I Theory

3 Hrs. Duration

40 Mark

Paper—II Field Work and Practical Experience

Min. Pass Marks 1

8 Hrs. Duration in two days. 120 Marks

Min. Pass Marks 42

Paper—I Parasitology, Systemic Pathology & Laboratory Management

PARASITOLOGY :

Section - A

1. Identification and outline of life cycle relevant to laboratory diagnosis of the following:

(i) Giardia

(ii) E.H. & Other Intestinal amoebae

(5)

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- | | |
|-------------------|---------------------|
| (iii) Trichomonas | (iv) Plasmodia |
| (v) Laisamania | (vi) Tenia |
| (vii) Trichiariis | (viii) Anchylostoma |
| (ix) Ascaris | (x) Oxyris |
| (xi) Guinea Worm | (xii) Filaria. |

Section - B.

ELEMENTARY TOXICOLOGY :

1. Introduction to Toxicology (history).
2. Classification of Poisons.
3. Fatal dose and fatal period of Chemical poisons.
4. Detection of Metallic Poisons.
5. Detection of Toxic anions.
6. Detection of Volatile Poisons.
7. Detection of Insecticides (Organo Phosphorus, Organo Chloro and Carhomates).
8. Detection of Plant Poisons (Alkalosidal and Glycosital).
9. Detection of Habit forming Toxic Drugs.
10. Screening test for common poisons. (Literatrue and books on Toxicology).

Section - C

LABORATORY MANAGEMENT :

1. Design and lay out of the analytical laboratory.
 2. Receipt of material and record-keeping.
 3. Laboratory administration.
 4. Prevention of laboratory accidents and laboratory infection.
 5. Care of laboratory animals.
 6. Collection and preservation of the material.
 - Water
 - Food ingredients
 - Prepared food
 - Milk and cold drinks
 - Fruit, Cane juice and the cream
 - Stool
 - Sewage
 - Blood and other materials connection with problems of health diseases and pollutants.
 7. Transportation of these materials.
 8. Presentation of the data including basic statistical methods.
- Work for 60 days in any laboratory connected with Biochemical Microbiological, Serological, Hematological and Pathological analysis recognised by the University.

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Paper—II : Field Work and Practical Experience

Paper - I Theory	3 Hrs. Duration	40 Marks
		Min. Pass Marks 15
Paper-II Field work and Practical Experience	40 Marks	
	3 Hrs. Duration	Min. Pass Marks 15
Practical	120 Marks	Min. Pass Marks 42
8 Hrs. Duration in two days.		

The students will be required to work for atleast 50 hours in any Laboratory connected with above. A project will be submitted during practical examination to be examined by a board of examiners for practical consisting of at least one external examiners.

PRACTICAL

(75×3 periods) Max. Marks 120 Min. Pass Marks 42
8 Hrs. Duration in two days.

Unit - I : Microbiology

1. Skin scripting and their digestion for demonstration.
2. Fungi and preparation of wet mounts of exulaaes for rungal examination.
3. Preparation and stains used for identification of fungi.
4. Demonstration of bacteriology of water, milk and food.

Unit-II : Protozoology

1. Collection of steel of demonstration of Protozoa parasite.
2. Warm slide technique for trophozoties and wet mounts for Protozoa.
3. Demonstration of cysts of E.G.-M. coli, Giardia etc.
4. Staining and examination of Blood for M.P.
5. Demonstration of trichomonas in vaginal smears.

Unit-III : Helminthology

1. Demonstration of adults worm.
2. Examination of Blood for microfilaria.
3. Collection and preservation of stool for helminthic intestine.
4. Demonstration of various Helminthic ova.
5. Examination of water for cyclops.

Unit-IV : Biochemistry

1. Estimation of total and direct bilirubin for liver function test.
2. Chemical analysis for drinking water.

Unit-V : Serology

1. V.D.R.L Qualitative and quantitative.
2. Wasserman reaction (WR)
3. Rosawallter Test and Rehumatoid Factor (R.F.)
4. Cold Agglutniation and Paul Bunnal Test.

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- 5. C.R.P. (C. reactive Proteins)
- 6. Pregnancy Test.

Unit-VI : Hematology

- 1. Revision of a staining of blood film and bonemarrow smears.
- 2. Bleeding time, clotting time, Platelet count.
- 3. Prothombin Time (P.T.)


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MATHEMATICS

B.A. Part III -

Teaching : 3 Hours per Week per Theory Paper.

Examination Scheme :

	Min.Pass Marks		Max. Marks
	Science - 54		150
	Arts - 72		200
		Duration	Max.Marks
Paper - I	Algebra	3 hrs.	40 (Science) 53 (Arts)
Paper - II	Complex Analysis	3 hrs.	40 (Science) 53 (Arts)
Paper - III	Mechanics	3 hrs.	40 (Science) 54 (Arts)
Practical		2 hrs.	30 (Science) 40 (Arts)

Note:

1. Common paper will be set for both the Faculties of Social Science and Science. However, the marks obtained by the candidate in the case of Faculty of Social Science will be converted according to the ratio of the maximum marks of the papers in the two Faculties.
2. Each candidate is required to appear in the Practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the Principal in consultation with Local Head/Head, Department of Mathematics in the college.
3. An Internal/external examiner can conduct Practical Examination of not more than 100 (Hundred) Candidates (20 Candidates in one batch).
4. Each candidate has to pass in Theory and Practical examinations separately.

Paper - I : Algebra

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks: 40 (Science)
53 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE Question from each Unit. All questions carry equal marks.

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Unit 1: Definition and simple properties of Groups and Subgroups. Permutation group, Cosets, Lagrange's theorem on the order of subgroups of a finite order group.

Unit 2: Morphism of groups, Cayley's theorem. Normal subgroups and Quotient groups. Fundamental theorems of Isomorphism.

Unit 3: Definition and simple properties of Rings and Subrings. Morphism of rings. Embedding of a ring, Integral domain and field. Characteristics of a Ring and Field.

Unit 4: Ideals and Quotient Ring. Maximal ideal and Prime ideal. Principal Ideal domain. Field of quotients of an integral domain. Prime fields. Definition, Examples and Simple properties of Vector spaces and Subspaces.

Unit 5: Linear combination, Linear dependence and Linear independence of vectors. Basis and Dimension. Generation of subspaces. Sum of subspaces. Direct sum and Complement of subspaces. Quotient space and its dimension.

Reference Books:

1. Joseph A. Gallian, *Contemporary Abstract Algebra* (4th Edition), Narosa Publishing House, New Delhi, 1999. (IX Edition 2010).
2. S Lang, *Introduction to Linear Algebra* (2nd edition), Springer, 2005.
3. Gilbert Strang, *Linear Algebra and its Applications*, Thomson, 2007.
4. S. Kumaresan, *Linear Algebra- A Geometric Approach*, Prentice Hall of India, 1999.
5. Kenneth Hoffman, Ray Alden Kunze, *Linear Algebra 2nd Ed.*, Prentice Hall of India Pvt. Limited, 1971.

Paper – II: Complex Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks:

40 (Science)

53 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Complex plane. Connected and Compact sets. Curves and Regions in complex plane. Jordan curve Theorem (statement only). Extended complex plane. Stereographic projection. Complex valued function – Limits, Continuity and Differentiability. Analytic functions, Cauchy-Riemann equations (Cartesian and polar form). Harmonic functions, Construction of an analytic function.

Unit 2: Complex integration, Complex line integrals, Cauchy integral theorem, Indefinite integral, Fundamental theorem of integral calculus for complex functions. Cauchy integral formula, Analyticity of the derivative of an analytic function, Morera's theorem, Poisson integral formula, Liouville's theorem.

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Unit 3: Taylor's theorem. Laurent's theorem. Maximum modulus theorem.

Power series – Absolute convergence, Abel's theorem, Cauchy-Hadamard theorem, Circle and Radius of convergence, Analyticity of the sum function of a power series.

Unit 4: Singularities of an analytic function, Branch point, Meromorphic and Entire functions, Riemann's theorem, Casorati-Weierstrass theorem.

Residue at a singularity, Cauchy's residue theorem. Argument principle. Rouché's theorem. Fundamental theorem of Algebra.

Unit 5: Conformal mapping. Bilinear transformation and its properties. Elementary

mappings: $w(z) = \frac{1}{2} \left(z + \frac{1}{z} \right)$, z^2 , e^z , $\sin z$, $\cos z$, and $\log z$.

Evaluation of a real definite integral by contour integration.

Analytic continuation. Power series method of analytic continuation.

Reference Books:

1. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (Eighth Edition), McGraw – Hill International Edition, 2009.
2. Joseph Bak and Donald J. Newman, Complex analysis (2nd Edition), Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997.

Paper – III: Mechanics

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks: 40 (Science)
54 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Velocity and acceleration – along radial and transverse directions, along tangential and normal directions. S.H.M., Hooke's law, motion along horizontal and vertical elastic strings.

Unit 2: Motion in resisting medium – Resistance varies as velocity and square of velocity. Work and Energy. Motion on a smooth curve in a vertical plane. Motion on the inside and outside of a smooth vertical circle. Projectile.

Unit 3: Central orbits – p-r equations, Apses, Time in an orbit, Kepler's law of planetary motion. Moment of inertia – M.I. of rods, Circular rings, Circular disks, Solid and Hollow spheres, Rectangular lamina, Ellipse and Triangle. Theorem of parallel axis. Product of inertia.

Unit 4: Equilibrium of coplanar force, moments and friction.

Unit-5: Virtual work and Catenary.

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Reference Books :

1. I.H. Shames and G. Krishna Mohan Rao, Engineering Mechanics: Statics and Dynamics (4th Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2009.
2. R.C. Hibbeler and Ashok Gupta, Engineering Mechanics: Statics and Dynamics (11th Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi.
3. S.L. Loney - An Elementary Treatise on the Dynamics of a Particle and of Rigid Bodies, Kalyani Publishers, New Delhi.
4. J.L. Synge & B.A. Griffith - Principles of Mechanics, Tata McGraw-Hill, 1959.

Practical

Teaching: 2 hours per week per batch not more than 20 students.

Examination:**Duration: 2 Hours**

Scheme	Science	Arts
Max.Marks	30	40
Min.Pass Marks	11	15

Distribution of Marks:

Two Practicals one from each group

10 Marks each	=	20 Marks	(13 Marks each)	26
Practical Record	=	05 Marks		07
Viva-voce	=	05 Marks		07
Total Marks	=	30 Marks		40

The paper will contain TWO practicals. The candidates are required to attempt both practicals.

Practicals with Computer Programming in C Language.

Group A:

1. Solution of algebraic and transcendental equations by Bisection method, Regula-falsi method and Newton-Raphson method.
2. Solution of Initial value problems by Euler's method and Runge-Kutta(third and fourth order) method.

Group B:

1. Matrix operations: addition, subtraction, multiplication, Rank of a matrix, inverse of a matrix.
2. Solution of linear algebraic equations by Gauss elimination method, Matrix method, Gauss Jordan method.

Note:

1. Each Candidate (Regular/non-Collegiate) has to prepare his/her practical record.
2. Each Candidate has to pass in Practical and Theory examinations separately.

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18 Economics**B.A. Part III -**

Scheme:	Min. Pass Marks	Max. Marks
Arts	72	200
Science	54	150
Paper-I	3 hours duration	Arts 100 Science 75
Paper- II	3 hours duration	Arts 100 Science 75

Note:

1. There shall be two papers in each class. Each paper shall have 3 questions from every unit. In Addition to these nine questions (3 questions for each unit) there shall be one multiple choice/objective type/ short answer question in each of the two papers
This question shall be compulsory.
2. The student shall be required to attempt five questions in all in each paper selecting atleast one question from each unit and one compulsory multiple choice/objective type/ short answer question
3. The multiple choice/ objective type\short answer questions shall consist of 20 questions in B.A. Examination and 15 questions in B. Sc. Examination of one mark each.

ECONOMICS

Note: There will be two papers of Economics. Each paper shall consist of three parts. Part A shall contain question No.1 consisting of very shot type -X (Ten) question. The candidate is required to answer each question in 20 words. Part -B shall contain question No 2 consisting of V (five) questions. The candidate is required to answer each question in 100 words. Part C shall contain three essay type questions (one from each section) with internal choice.

A candidate will be required to attempt five questions in all. All questions of part A and part B are compulsory while rest 3 questions are to be attempted from parts C selecting one question from each section. All question carry equal marks.

**Paper 1: Introduction To International Trade, Development And
Public Economics**

Section - A

Features of International Trade, Gains from Trade. Trade Theories: Adam Smith, Recardo, Harberler, Mill and H O Theory (Elementary treatment). Free Trade and Protaction, foreign

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Exchange Market and Exchange Rate. Balance of Trade And Finance of payment: Definition And Structure, International Monetary Fund, WTO scope and Impact.

Section –B

Economic Growth and Development: Factors affecting Economic Growth, Measures of Development , Lewis Theory of Unlimited Supply of Labor, Balanced V/S Unbalanced Growth Model, Harrod Domer and Solow Models, Concept of Poverty and Inequality. International Bank for Reconstruction and Development, Asian Development bank.

Section – C

Nature and Scope of Public Finance. Role of Government in the Economy. Public Goods and Private Goods. Theory of Maximum Social Advantage, Optimal Budgeting. Public Revenue: Canons of Taxation, Impact, Incidence and Shifting of Taxation. Direct and Indirect Taxation, GST, Public Expenditure: Canons of Public Expenditure, Classification and Effects on Production and Distribution. Public Debt: Meaning Objectives and Burden Theories. Fiscal Policy: Meaning, Objectives and Anti-Inflationary Policy.

Books Recommended :

1. R.N Musgrave and P.B Musgrave. Public Finance in Theory & Practice, McGraw Hill Publication.
2. S. Ganguly, Public Finance, The World Press Pvt. Ltd.
3. H.L. Bhatia, Public Finance, Vikas Publishing House Pvt. Ltd.
4. John Callas and Philip Jones, Public Finance and Public Choics, Oxford University Press.
5. D. salvatore: International Economics.
6. K.C Rana And K.N Verma: Internatinal Economics. (Hindi/English Edition)
7. B.O. Souderton & G. Reed: International Economics.
8. Michael P. Todaro, Economic decelpment, Macmillan.
9. A.P Thirlwal, Growth and Development, Macmillan.
10. Debraj Ray, Development Econmics, Oxford University Press.
11. S.k. Misra and V.K Puri, Ecomimics of Devloperment and Planning Theory Himalya Publishing House.

Paper –II (a): Application of Mathematics in Economics

Section – A

Differential Calculus and integral Calculus: Application in Economics: Matrix and Determinants: Solution of Simultaneous Equations: Mixima and Minima: Convexity and Concavity.

Theory of Consumer Behaviour Nature of a Utility function: Properties of an Indifference Curve. Maximization of Utility. Demand Functions. Ordinary and Compensated Price and

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Income Elasticity, Elasticity Relation in demand Analysis, Slutsky Equation in two Commodity Case, Elasticity Form and Important Results: Income and Leisure – Derivation of Labour Supply Function and its Properties.

Section –B

Theory of firm: Production Function- Properties of a Well Behaved and Homogenous Production Functions- Cobb- Douglas and CES Production Functions: Product Curves: Output Elasticity of Factor input; Properties of an Isoquant; Elasticity of Substitution of a Homogeneous Production Function –Linearly Homogeneous and Cobb-Douglas Production Functions : Optimization Behaviour of a Firm – Constrained Cost Minimization, Constrained Output Maximization and Profit Maximization; Input Demand Functions Properties and Derivation of Producer's Input Demand functions ; Cost Functions- Properties and Derivation of Short Run and Long Run Cost functions; Consumer's and Producer's Surplus.

Section-C

Linear Programming: Graphical and Simplex Method (Maximization Problem Only): Input Output Analysis: Concepts of Static, Dynamic, Closed and Open Input – Output Models, Hawkins-Simon Conditions of Viability, Determination of Gross Output, and Value Added in Open Input –Output Model; Theory of Games: Two-person Constant Sum Games, Zero-Sum Game, Maximin and Minimax, Dominant Strategies and Saddle Point Solution; First Order Difference Equation- Cobweb Model.

Note: Use of Non-programmable Calculator is permitted

Books Recommended :

1. J.M. Henderson and R.L. Quandt: Micro Economic Theory: A Mathematical Approach, McGraw- Hill London.
2. RGD Allen. Mathematical Economics, McMillan
3. B.C. Mehta: Mathematical Economics; Micro Economic Models, Sultan Chand & Sons, New Delhi.
4. Alpha C Chiang: Fundamental Methods of Mathematical Economics. McGraw-Hill, Kagakusha. Tokyo.

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Paper- II (b): Environmental Economics

Section –A

Environmental Economics: An Introduction; Review of Microeconomics and Welfare Economics; The Theory of Externalities: Pareto Optimality and Market Failure in the Presence of Externalities; Property Rights and the Coase Theorem; Sustainable Development: Concepts and Measurement.

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Section-B

Development and Environment: The Environment Kuznets Curve; Trade and Environment; **Environmental Problems;** Trans-boundary Environmental Problems: Global Warming and **Climate Change;** Methods of Environment Valuation: Hedonic Pricing, Contingent Valuation **Method** and Travel Cost Method.

Section-C

International Environmental Policy: Conventions and Treaties, UN Effort to Protect the Environment, Stockholm, Rio, Johansberg, Agenda 21, OECD Environmental Committee Report, Kyoto, Convention on Biodiversity, Paris Climatic Conventions; Environmental Governance in India; WTO and Environment.

Recommended Books:

1. Charles Kolstad, Intermediate Environmental Economics, Oxford University Press. 2nd Edition, 2010
2. Robert N. Stavins (ed.), Economics of the Environment: selected Readings, W.W.Norton, 5th edition, 2005.
3. Roger Perman, Yue Ma, James McGilvray and Michael Common, Natural Resource and Environmental Economics, Pearson Education/ Addison Wesley, 3rd edition, 2003.
4. Maureen L. Cropper and Wallace E. Oates, 1992, "Environmental Economics: A Survey", Journal of Economic Literature, Volume 30, pp. 675-740.

OR Paper-II (C): Economy of Rajasthan

Section-A

Position of Rajasthan in Indian Economy: Population, Area, Agriculture, Industry and Infrastructure. Population: Size and Growth, District Wise Distribution of Rural and Urban Population, Demographic Features, Occupational Structure and Human Resource Development (Literacy, Health and Nutrition Indicators). Natural Resources **Endowments:** Land, Water, Livestock and Wild Life, Minerals and Mineral Policy of the State. **State Domestic Product:** trends and Composition. Agriculture: land Reforms, Land Utilization, Cropping Pattern, Production and Productivity, Agriculture Finance, Marketing and Insurance, Importance of Livestock and Animal Husbandry, Dairy Development Programmes, Famines and Droughts in Rajasthan.

Section-B

Infrastructure in the State (Irrigation, Power, Road), Industrial Development of the State (Agricultural and Mineral Based Industries, Small Scale and Cottage Industries, Export Based Units, Rajasthan Handicrafts). Growth Centres and Development of Industrial areas.


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Enterprises in Rajasthan. Role of Different Corporations in Industrial Development (RIICO, RFC & RAJSICO), Industrial Finance, Service Sector: Education, Health, Tourism Development in Rajasthan.

Section-C

Economic Planning and Development in Rajasthan. Constraints in The Economic Development of Rajasthan. Special Area Development Programmes in Rajasthan. Woman Empowerment and Child Development. Problems of Poverty and Unemployment in Rajasthan. PanchayatiRaj and Rural Development in Rajasthan. Budgetary Trends in Rajasthan. Centre State Financial Relations.

Books Recommended:

1. Economic Review, Directorate of Economics And Statistics, Department of Planning, Rajasthan Jaipur. (Hindi & English.)
2. Statistical Abstract Directorate Of Economics And Statistics. Department of Planning, Rajasthan Jaipur.
3. लक्ष्मीनारायण नाथूराम का राजस्थान की अर्थव्यवस्था, रमेश बुक डिपो, जयपुर।

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19. Geography

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BA (BSc) Pt III

Scheme of Examination

Faculty	Min. Pass Mars	Max. Marks
Arts/Social Science	72	200
Science	54	150
Paper I	World Regional Geography	Arts 75 Science 50
Paper II	Geography of India	Arts 75 Science 50
Practical	18	Arts 50 Science 50

Notes

1. Students are permitted to use the stencils, simple calculator and log tables wherever needed in both theory and practical examinations.
2. There will be a common paper for Arts and Science.
3. Q.1 will be compulsory and will cover the entire course of the paper.
Q.No. 1 of 20% marks of the maximum marks be set in two parts.
(a) Part (a) will have ten items for locating on a map (to be supplied by examination centre) carrying 10% marks of the maximum marks and candidates shall attempt any five items.
(b) Part (b) will have 10 short answer questions carrying 10% marks of the maximum marks and candidates shall attempt any five items.
4. Remaining 9 questions carrying equal marks will be set with three questions from each section of the syllabus.
5. Candidate will attempt 5 questions in all including question No. 1 selecting at least one question from each section.
6. Practical examination will be conducted by the board of examiners.
7. The candidate will have to pass in theory and practical separately.
8. The non-collegiate candidates will have to attend a practical training camp of 48 hours at a college affiliated to the University of Rajasthan, Jaipur notified by the University from time to time in which Geography subject is taught on payment of fee fixed by the University. The candidates appearing at examination from any examination centre located in Jaipur City will attend the practical camp at the University Post Graduate Department on payment of fee fixed by the University. The candidate will procure Certificate of successful completion of practical training camp from the College/Department of Geography and produce the same at the time of practical examinations.

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Paper I: World Regional Geography

Section A

Asia: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General. Regional Study of South-East and South-West Asia.

Europe: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General ; Regional Study of British Isles, France and Germany.

Section B

North and South America: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of the Continent In General; Regional Study of New England and Brazil.

Section C

Australia and New Zealand: Terrain Pattern, Drainage, Climate, Natural Vegetation, Soils, Population and Economic Base of Australia and New Zealand In General.

Recommended Readings:

Cole, J., 1996. A Geography of the World's Major Regions, Routledge, London.

Deblij, H.J., 1994, Geography : Regions and Concepts, John Wiley, New York.

• Dickenson, J.P. et al, 1996. The Geography of the Third World, Routledge, London.

Gourou, P., 1980. The Tropical World, Longman, London.

Jackson, R.H. and Hudman, L.E., 1991. World Regional Geography : Issues for Today, John Wiley, New York.

Kolb, A., 1977. East Asia - Geography of a Cultural Region, Mathuen, London.

• Mirshull, G.N., 1984 Western Europe, Hoddard & Stoughton, New York.

Patterson, J.H., 1985. Geography of Canada and the United States, Oxford University Press.

Songquiao, Z., 1994. Geography of China, John Wiley, New York.

Ward, P.W. and Miller, A. 1989. World Regional Geography : A Question of Place, John Wiley, New York.

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Paper II: Geography of India

Section A

India in the context of South and Southeast Asia, geological structure, physiographic divisions, climate: seasons, mechanism of Indian monsoon, major climatic regions; vegetation, major soils and regions; drainage system, water resources and irrigation projects; forests, mineral and power resources: their utilization policy and conservation strategies.

Section B

Agriculture: typology, major crops, changing pattern of crops, agricultural growth during plan period and green revolution, livestock resources and their development, industrial growth and development; industrial localization with reference to iron and steel, cotton textile, cement and chemical industries, industrial regions; population growth, distribution, problems, policy implication, trends of urbanization and human resource development.

Section C

Regional disparities in economic development, planning and economic regions of India, multilevel planning, problems and prospects of linking of rivers, environmental issues in India, transport development: rail, road, air and waterways, foreign trade: challenges and prospects.

Recommended Readings:

- Gautam, Alka, 2010: Geography of India, Rastogi Publications, Meerut.
 Gopal Krishnan, R. 2001: Geography of India, Jawahar Publishers & Distributions, New Delhi, 2nd Edition
 Khullar, D.R. 2006. India a comprehensive Geography; Kalyani Publishers, New Delhi
 मानेरिया, सी. 1999: आधुनिक भारत का बृहत् भूगोल। साहित्य भवन प्रब्लिकेशन्स, आगरा।
 Sdasnyuk, G. and Sengupta, 1968: Economic Regionalisation of India, Census of India Publication, New Delhi.
 Singh, G. 1958: A Geography of India, Atma Ram & Sons, Delhi, Sixth Edition.
 Singh, R.L. (ed.) 1971: India: A Regional Geography. NCSI, Varanasi.
 Spate, O.H.K. and Learmonth, A.T.A. 1967: India and Pakistan, Land, People and Economy, Methuen and Co., London.
 Tirtha, R 2000: Geography of India, Rawat Publications, Jaipur 2nd Edition (India)
 शिवर, आर.सी. 2012 भारत का भूगोल। प्रयाग पुस्तक भवन, इलाहाबाद।

Practicals

Scheme of Examination

Min. Pass Marks: 18

Written test
 Field survey and viva voce
 Record and viva voce

Bifurcation of Marks
 24
 10+04
 08+04

Max. Marks: 50

Time
 3 hrs
 2 1/2 hrs

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- 90
- N.B. 1. There shall be 6 questions in written paper selecting at least two questions from each section. Candidates are required to attempt 3 questions selecting 1 question from each section. All questions carry equal marks.

SYLLABUS

Section A

Definition, classification, uses and characteristic of map projection: (graphical constructions).

Conical projections:

1. with the one standard parallel
2. with two standard parallels
3. Bonne's
4. Polyconic

Cylindrical projections:

1. Equidistant
2. Equal Area
3. Mercator's, Universal Transverse Mercator (UTM)
4. Gall's Stereographic

Section B

Zenithal Projections: (Only Polar Case)

1. Equidistant
2. Equal Area
3. Gnomonic
4. Stereographic
5. Orthographic

Three dimensional diagrams: sphere, block pile, cube.

Section C

Plane table surveying: Equipments, procedure, traversing – open and closed traverse, methods- radial and intersection, concept of resectioning.

Height calculation using Indian pattern clinometer.

Recommended Readings:

वीरान, पी.आर. 2005: प्रायोगिक भूगोल। वसुन्धरा प्रकाशन, गोरखपुर।

Raisz, E. 1962: General Cartography. John Wiley and Sons, New York. 5th edition.

Rampal, K.K. 1993: Mapping and Conflation: Methods and Techniques Concept Publishing Company, New Delhi (Reprint 2009)

Robinson, A.H. et al. 2004: Elements of Cartography. John Wiley & Sons, Inc., New York (Sixth Edition)

Singh, L.R. 2006: Practical Geography. Prayag Pustak Publisher, Allahabad U.P.

Singh, R.L. and Singh, R.P. 1991: Elements of Practical Geography. Kalyani Publishers, New Delhi (Reprint 2002)

सर्व, जे.पी. 2010-11. प्रयोगात्मक भूगोल की रूपरेखा। रस्तोगी पब्लिकेशन, मेरठ।

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20. Statistics

**SYLLABUS
FOR
B.Sc./B.A. Pt-III**

**Subject: Statistics
Marks Scheme**

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Sample Survey	50 mark	65 marks
Paper II	Design of Experiment and Computational Techniques	50 mark	65 marks
Paper III	Practical based on Paper I,II	50 mark	70 marks
Total		150	200

Note:

In each Theory Question Papers, 10 (ten) questions will be set having 2 having 2(Two) from each unit. Candidates have questions in all, taking not more than one from each unit.

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Subject: Statistics

Paper -I (Sample Surveys)

(Also common with Subject- Applied Statistics)

Unit-I

Concepts of population and sample, need for sampling, census & Sample surveys. Advantages of sample survey over complete enumerations, Principle steps in a sample survey, Principles of sample survey, Sampling and non-sampling errors.

Unit-II

Probability and non-probability sampling: Methods of drawing a random sample from finite population, accuracy and precision of an estimator. Simple random sampling with and without replacement, probability of selecting any specified unit in the sample, simple random sampling of attributes, size of simple random sample for a specified precision.

Unit-III

Stratified random sampling: Meaning and advantages of Stratified Random Sampling, Estimation of the population mean and its variance. Optimum and proportional allocation and their comparison with SRS & SRS WOR.

Unit-IV

Systematic Sampling: Meaning and sample selection procedures, advantage and disadvantages, variance of the estimated mean, Comparison of systematic with (i) SRSWOR and (ii) stratified random sampling. Cluster sampling (of equal size): Meaning, advantages and disadvantages, estimation of population mean.

Unit-V

Ratio Method of estimation (first approximation only): Meaning, bias of ratio estimators, variance, efficiency of ratio estimate with SRSWOR estimate. Regression method of estimation (first approximation): Meaning, Simple Regression Estimate, expected value and variance of simple regression estimate. Comparison with SRSWOR and ratio estimators.

REFERENCES:

- Des Raj(2000) : Sample Survey Theory. Narosa Publishing House.
 Murthy, M.N.(1967): Sampling Theory and Methods. Statistical Publishing Society, Calcutta.
 Singh, Daroga and Chaudhary. F.S.(1989): Theory and Analysis of Sample Surveys Designs. Wiley Eastern Ltd.
 Sukhatme et al .(1984): Sampling Theory of Surveys with Applications. Indian Society of Agricultural Statistics.
 Joon A.M, Gupta M.K. Das Gupta B (1986) , Fundamentals of Statistics, Vol II World Press Kolkata
 Jupta S.C., Kapoor V.K. : Fundamentals of Applied Statistics , Sultan Chand & Sons., New Delhi

ADDITIONAL REFERENCES:

- ampath S. (2000): Sampling Theory and Methods. Narora Publishing House

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Subject: Statistics

Paper II

Design Of Experiments and Computational Techniques (Also common with Subject- Applied Statistics)

Unit-I

Analysis of Variance: Linear model & its different types (only introduction), Analysis of Variance technique, ANOVA for one-way and two-way classified data (with one observation per cell & fixed effects model) ; Least Square Estimates of Sum of squares, Effects of violations of basic assumptions of ANOVA; Transformations, Critical Difference.

Unit-II

Design of Experiments: Need for design of experiments, fundamental principles of design of experiments, Uniformity Trials, Choice of size and shape of plots , Basic designs (with one observation per cell & fixed effects model)-Completely randomized design(CRD), Randomised block design(RBD)- Their advantages and disadvantages & usage. Efficiency of RBD over CRD.

Unit-III

Latin square design (LSD)- Analysis; least square estimates; expectation of sum of squares; efficiency of LSD over CRD & RBD, Missing plot technique- Estimation of single missing value in RBD & LSD . Factorial experiments- 2^2 , 2^3 experiments, illustrations, main effects, interaction effects & their analysis.

Unit-IV

Computer Application and Data-Processing: Basics of Computer: Operations of a computer, Different units of a computer system like central processing unit, memory unit, arithmetic and logical unit, input unit, output unit etc. ,Hardware including different types of input, output and peripheral devices, Software, system and application software, number systems, Operating systems, packages and utilities, Low and High level languages, Compiler, Assembler, Memory- RAM, ROM, unit of computer memory (bits, bytes etc.).

Unit-V

Network - LAN, WAN, internet, intranet, basics of computer security, virus, antivirus, firewall, spyware, malware etc. Basics of Programming: Algorithm, Flowchart, Data, Information, Database, overview of different programming languages, frontend and backend of a project, variables, control structures, arrays and their usages, functions, modules, loops, conditional statements, exceptions, debugging and related concepts.

REFERENCES :

- Das M.N. & Giri N.C. (1986) .Design and Analysis of Experiments. Springer Verlag
- Goon A.M, Gupta M.K. Das Gupta B (1986) ; Fundamentals of Statistics. Vol-II World Press Kolkata
- Gupta S.C., Kapoor V.K. : Fundamentals of Applied Statistics . Sultan Chand & Sons., New Delhi
- Nagpal D.P. :Computer Fundamentals . Wheeler Publishing. New Delhi
- Norton Peter : Peter Norton's Introduction of Computers . Tata McGraw hills
- Stallings: Operating Systems PHI

ADDITIONAL REFERENCES

- Kampthorne O. (1965) The Design and Analysis of Experiments . Wiley. Eastern
- Cochran W.G. and Cox G.M. (1957) : Experimental Design . John Wiley and sons

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Subject: Statistics

Paper III Practical Paper

(Also Common with Subject- Applied Statistics)

1. To draw a SRS with and without replacement to obtain an estimate of the population total along with the estimates of their variances., Comparing the efficiency of SRSWR with SRSWOR .Finding of confidence interval for the population mean.
2. To draw all the possible samples by SRS-technique and that to show that expected value of the sample mean equals the population mean to show expected value, $E(\bar{S}^2) = S^2$ in SRSWOR.
3. Stratified sampling (i) estimate the sample sizes by (a) proportional allocation (b) Neyman optimum allocation (ii) estimate the mean to the population under the above scheme(iii) calculation of the sampling variance (iv) Comparison of efficiencies of the allocation scheme amongst themselves as well as with SRS.
4. Systematic sampling
5. Cluster sampling.
6. Ratio & Regression methods of estimation.
7. Analysis of one way classification (CRD).
8. Analysis o two way classification (RBD).
9. Analysis of LSD.
10. Efficiency of RBD over CRD.
11. Efficiency of LSD over CRD & RBD.
12. Analysis of 2^2 & 2^3 factorial design.
13. Construction of Flowcharts and Algorithms for Statistical Problems

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21 Applied Statistics

SYLLABUS FOR B.Sc./B.A. Pt-III -

Subject: Applied Statistics

Marks Scheme.

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Sample Survey	50 mark	65 marks
Paper II	Design of Experiment and Computational Techniques	50 mark	65 marks
Paper III	Practical based on Paper I,II	50 mark	70 marks
	Total	150	200

Note:

In each Theory Question Papers, 10 (ten) questions will be set having 2 having 2(Two) from each unit. Candidates have questions in all, taking not more than one from each unit

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Subject: Applied Statistics

**Paper -I
(Sample Surveys)**

(Course Contents are same as that of Subject- Statistics)

**Paper II
Design Of Experiments and Computational Techniques**

(Course Contents are same as that of Subject- Statistics)

**Paper III
Practical Paper**

(Course Contents are same as that of Subject- Statistics)

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22. Psychology

B.A. Part III -

SCHEME OF EXAMINATION:

Faculty	Max. Marks	Min. Passing Marks
Arts	200	72 (Th.54 Pr.18)
Science	150	54 (Th.36 Pr.18)

Paper	Nomenclature	Duration	Max. Marks	
			Arts	Science
I	Positive Psychology	3 Hrs.	75	50
II	Psychological Testing and Assessment	3 Hrs.	75	50
	Practical	3 Hrs.	50	50

NOTE:-

1. There will be three papers in Psychology. Each paper will be of 3 hours. There will be a common paper for Arts and Science. In I and II Papers there will be 3 Sections A, B and C and will cover the entire course content of the paper.

Section-A Will contain 10 questions of 20 words each. Each question will be of 1.5 marks for Arts students and 1 mark for Science students. Thus, Part-A will be of 15 marks for Arts students and of 10 marks for Science students.

Section-B Will contain 7 questions of 50 words each, out of which students are required to attempt 5 questions. Each question will be of 3 marks for Arts students and of 2 marks for Science students. Thus, Part-B will be of 15 marks for Arts student and of 10 marks for Science students.

Section-C Will contain 3 long questions each with internal choice. Each question will be of 15 marks for Arts students and 10 marks for Science students. Thus, Part-C will be of 45 marks for Arts students and 30 marks for Science students.

For clarification the distribution of marks is tabulated as below:-

Arts			
Section	No. of Questions	Marks	Total
A	10	1.5	15
B	5 (out of 7)	03	15
C	3 (with Internal Choice)	15	45
		Total marks	75
Science			
Section	No. of Question	Marks	Total
A	10	01	10
B	5 (Out of 7)	02	10
C	3 (with internal choice)	10	30
		Total Marks	50

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Use of simple calculator will be allowed for statistical portions of all papers.

Paper I -Positive Psychology

Section A

1. Introduction : Definition, Goals and Assumptions of Positive Psychology; Relationship with other Branches of Psychology
2. Happiness: Meaning; Hedonic and Eudaemonic Viewpoint; Positive and Negative Affect; Theoretical Viewpoints; Determinants and Sources; Authentic Happiness; Enhancement of Happiness and Wellbeing.
3. Positive Cognitive States and Processes: Self-Efficacy, Optimism, Hope, Mindfulness, Flow and Spirituality.

Section B

4. Virtues and Strengths of Character: Classification and Measures of Human Strengths, Gallup's Clifton Strength Finder; VIA Classification; Identifying Personal Strengths.
5. Resilience: Meaning and Sources; Developmental and Clinical Perspective; Successful Aging and Growth through Trauma.
6. Self-Regulation and Self-Control: Meaning and Theories; Planning for Self-Regulation Success; Self-Regulation Problems – Goal Conflict, Goal Difficulty and Goal Disengagement.

Section C

7. Mental Health and Well-Being: Subjective Well-Being and Life Satisfaction, Social Well-Being and Psychological Well-Being, Complete State Model.
8. Emotional Intelligence: Meaning, Components and Theories; Enhancement of Emotional Intelligence.
9. Pro-Social Behavior: Empathy, Altruism, Gratitude and Forgiveness.

Books Recommended:

- Snyder, C.R. & Lopez, S.J.(2007). *Positive Psychology*. New Delhi: Sage.
- Snyder, C.R. & Lopez, J.(2005). *Handbook of Positive Psychology*. New York: Oxford.
- Baumgardner, S. & Crothers, M. (2019). *Positive Psychology* . Noida: Pearson Education India.

Paper II - Psychological Testing and Assessment

Section-A

1. Psychological Testing and Assessment:- Definition, Difference between Testing and Assessment , Tools of Psychological Assessment Interview, Case History Data, behavioral Observation, Computers as tools.
2. Psychological Test: Nature, Functions and Uses of Psychological Test, Problem of test

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- Administration, History of Psychological Testing, Characteristics of good Psychological test
3. Psychological Test Development:-Conceptualization, Test Construction, Item analysis.

Section-B

4. Reliability: Meaning, Types and Methods of Calculating Reliability.
5. Validity: Meaning, Types and Methods of Calculating Validity.
6. Norms: Meaning and Types of Norms.

Section-C

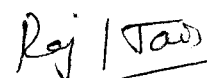
7. Types of Psychological Tests: Group and Individual, Verbal, Non-verbal and Performance Test, Self-Report Inventories, Projective Techniques, Ethical Consideration in Assessment
8. Application of Psychological Testing: Educational, Counseling and Guidance, Clinical and Organizational Setting.
9. Assessment of Personality- Big Five, 16 PF, MMPI, TAT and Rorschach. Test. Assessment of Intelligence- Binet, WAIS, SPM.

Books Recommended:

- Anastasi, A. (1997). *Psychological testing*. New York: MacMillan Co.
- Chadha, N.K. (2009). *Applied Psychometry*. New Delhi: Sage.
- K,aplan, R.M. & Saccuzzo, D.P. (2009). *Psychological Testing and Assessment*. New Delhi: Cengage Learning.
- Cohen, R.J, Swerdlik, M. & Struman, E.D. (2015). *Psychological Testing and Assessment*. New Delhi: McGraw Hill.
- अरुण कुमार सिंह (2002) : मनोविज्ञान में मापन एवं मूल्यांकन, नई दिल्ली मोतीलाल बनारसीदास ।

Practical

1. Measurement of Subjective Wellbeing
2. Measurement of Forgiveness
3. Measurement of Emotional Intelligence
4. Measurement of Hope
5. Measurement of Resilience
6. Measurement of Intelligence (SPM)
7. Personality Assessment through HSPQ
8. Reaction Time
9. Mullar Lyer Illusion
10. Measurement of Level of Aspiration


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23. राजस्थानी

इसमें दो प्रश्न-पत्र होंगे :

प्रथम—प्राचीन राजस्थानी साहित्य एवं निबंध

द्वितीय—राजस्थानी भाषा तथा राजस्थानी साहित्य का इतिहास

परीक्षा योजना	न्यूनतम उत्तीर्णांक 72	पूर्णांक 200
प्रथम प्रश्न-पत्र	समय 3 घंटे	अंक 100
द्वितीय प्रश्न-पत्र	समय 3 घंटे	अंक 100

प्रथम पत्र : प्राचीन राजस्थानी साहित्य एवं निबंध :

- (क) एक प्रश्न 'व्याख्या से संबंधित (कुल दो व्याख्याएँ) $2 \times 16 = 32$
- (ख) दो प्रश्न-प्रत्येक पुस्तक पर एक-एक आलोचनात्मक प्रश्न $2 \times 20 = 40$
- (ग) एक प्रश्न निबंध $1 \times 28 = 28$

निबंध अनिवार्यतः राजस्थानी भाषा में लिखना होगा।

यह राजस्थानी भाषा के किसी भी क्षेत्रीय रूप में लिखा जा सकता है।

पाठ्य पुस्तकें :

1. राजस्थानी साहित्य संग्रह, भाग प्रथम, सम्पादक-नरोत्तम दास स्वामी, राजस्थान प्राच्य विद्या प्रतिष्ठान, जोधपुर।
(इस संग्रह में संकलित खींची गंगेव नीबाबत से दोपहरों को छोड़कर शेष अंक यथावत रहेंगे।)
2. डोला मारू रा दूहा-संपादक-स्वामी, रामसिंह पारीक, नागरी प्रचारिणी सभा, वाराणसी।
(इसमें से आरम्भ के 100 दोहे पाठ्यक्रम में रहेंगे।)

सहायक ग्रंथ :

1. प्राचीन काव्यों की रूप परम्परा, अगरचंद नाहटा, भारतीय विद्या मंदिर शोध प्रतिष्ठान, बीकानेर।
2. डोला मारू रा दूहा—डॉ. शंभूसिंह मनोहर। स्टूडेन्ट्स बुक कम्पनी, चौड़ा रास्ता, जयपुर।

द्वितीय प्रश्न-पत्र : राजस्थानी भाषा तथा राजस्थानी साहित्य का इतिहास

परीक्षा योजना	न्यूनतम उत्तीर्णांक 72	पूर्णांक 200
प्रथम प्रश्न-पत्र	समय 3 घंटे	अंक 100
द्वितीय प्रश्न-पत्र	समय 3 घंटे	अंक 100

इसमें पाँच प्रश्न होंगे। 2 प्रश्न राजस्थानी भाषा में तथा 3 प्रश्न राजस्थानी साहित्य के इतिहास से संबंधित होंगे। प्रत्येक प्रश्न 20 अंक का होगा। $5 \times 20 = 100$

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Syllabus B.A. Part-III

(क) राजस्थानी भाषा से संबंधित राजस्थानी भाषा का उद्भव और विकास राजस्थानी की विशेषताएँ-राजस्थानी की विभिन्न बोलियाँ, उनकी विशेषताएँ, उनके क्षेत्र, डिंगल-पिंगल हिन्दी और राजस्थानी।

(ख) राजस्थानी साहित्य के इतिहास से संबंधित-काल विभाजन-आरम्भिक काल, मध्य काल तथा आधुनिक काल, इन कालों की प्रमुख प्रवृत्तियाँ, काव्य धाराएँ, गद्य विधाएँ, प्रमुख रचनाएँ और रचयिता। राजस्थानी लोक साहित्य का सामान्य परिचय।

सन्दर्भ ग्रंथ :

1. पुरानी राजस्थानी-डॉ. टैसीटरी, अनुवादक-डॉ. नामवरसिंह, नागरी प्रचारिणी सभा, वाराणसी।
2. राजस्थानी भाषा, डॉ. सुनीतिकुमार चटर्जी, साहित्य संस्थान, उदयपुर।
3. राजस्थान का भाषा सर्वेक्षण, जार्ज ग्रेयर्सन अनुवादक डॉ. आत्माराम जाजोदिया राजस्थानी भाषा प्रचार सभा बनीपार्क, जयपुर
4. राजस्थानी भाषा और साहित्य—डॉ. मोतीलाल मेनारिया, हिन्दी साहित्य सम्मेलन, प्रयाग।
5. राजस्थान का पिंगल साहित्य—डॉ. मोतीलाल मेनारिया, हितैषी पुस्तक भण्डार, उदयपुर।
6. आधुनिक राजस्थानी साहित्य प्रेरणा स्रोत और प्रवृत्तियाँ—डॉ. किरण नाहटा, चिन्मय प्रकाशन, चौड़ा रास्ता, जयपुर।
7. राजस्थान का लोक साहित्य, नानुग्राम संस्कर्ता, रूपायन संस्थान. बोरुंदा (जोधपुर)।

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2A SHEEP AND WOOL

(To be offered by the Collegiate student of
Shri B.D. Todi College, Lacchmangarh (Sikar) only)

Scheme :		
Min. Pass Marks : Theory	48	Max. Theory
Min. Pass Mark : Practical	24	Max. Practical
Paper-I	3 Hrs. Duration	132 Mark
Paper-II	3 Hrs. Duration	68 Mark
Practical	3 Hrs. Duration	66 Marks
Syllabus :	4 Hrs. Duration	66 Marks
		68 Marks

Paper—I: Wool Grading and Processing :
Classification of fleece-Bulk classification. Visual appraisal for apparel and carpet wools. Various types of Wool. Wool quality, length, fineness, colour, vegetable content yield.

Grading of Wool : Fine, medium, strong, coarse, white, yellow, heavy yellow, burru, stained, black. Spinning counts for

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Various types of wools. Salient features of International grades. Agmark ISI specification. Wool utilisation, blending, scouring, carding, combing, spinning, weaving, knitting, felting. Woollen and Worsted system. Elementary principles of dyeing and finishing.

Min. Pass Marks	Theory 48	Max. Theory 132	Marks
Min. Pass Mark	Practicals 24	Max. Practical 68	Marks
Paper-I	3 Hrs. Duration		66 Marks
Paper-II	3 Hrs. Duration		66 Marks
Practical	4 Hrs. Duration		68 Marks

Syllabus :

Paper-II: Marketing of Sheep and Sheep Products :

Common practice of sale procurement of sheep and sheep products. Important Sheep products and their uses. Wool, mutton skin, bone, manure, milk etc.

Marketing of wool-regulated markets of wool particularly of Rajasthan, Wool Mandis-Krishi Upaj Mandi, Sheep and Wool Federation, regulations etc.

System of wool purchase of Rajasthan, Marketing systems adopted by Government of Rajasthan.

Wool handling, storage, packing, transportation etc.

Mutton marketing : Mutton Production, potential of Rajasthan and relative position in the country, Existing marketing system of mutton. Establishment of modern abattoirs and their utility, common byproducts of sheep slaughtered and their relative economic value. storage preservation of meat.

Market intelligence and pricing pattern and trends of sheep and sheep products.

Sheep and wool entrepreneurship : Financing agencies and resources mobilisation. Assistance from Banks, State Government, Co-operative etc.

Practicals	4 Hrs. Duration each	68 Marks
(Based on Paper I & II)		Min. Pass Marks 24

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25. LIVESTOCK & DAIRYING

(Pragya Mahavidyalaya, Bijai Nagar and Govt. College, Rajgarh)

Scheme :

Min. Pass Marks : Theory 48

Max. Theory 132 Marks

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Min. Pass Mark : Practical : 24	• Max. Practical 68 Marks
Paper-I	3 Hrs. Duration 66 Marks
Paper-II	3 Hrs. Duration 66 Marks
Practical	4 Hrs. Duration 68 Marks

Paper—I : Livestock Products, By-Products and Their Uses
3 Hrs. Duration 66 Marks


1. Meat Slaughter houses, method of slaughtering meant hygiene, storage, preservation and marketing.
2. Skin—Method of skinning, types of skin, its preservation, tanning, dyeing uses, various products of skin.
3. Horns, hoofs, Bones, intestines—collection, processing and uses.
4. Wool Shearing, grading, processing and uses.
5. Animal wastes—Gobar, blood, urine, their collection, storage, processing and utilization. Composts and manures.
6. Gobar Gas : Construction and types of plant. Production, Utilization of gas.
7. Milk by-Products skim milk, ghee, butter milk and their uses, manufacture of casein.


Paper—II : Dairy Economics

Scheme :

Min. Pass Marks : Theory 48	Max. Theory 132 Marks
Min. Pass Mark : Practical : 24	Max. Practical 68 Marks
Paper-I	3 Hrs. Duration 66 Marks
Paper-II	3 Hrs. Duration 66 Marks
Practical	4 Hrs. Duration 68 Marks
3 Hrs. Duration	66 Marks

1. Dairy Economics—Its definition meaning and scope, importance of the study of dairy economics in relation to India and Rajasthan.
2. Consumption of dairy products—demand and supply of milk and milk products in India and Rajasthan, Determination of price, price and income, elasticities of demand, cross elasticity.
3. Production of dairy products, principles of production and applied to milk and milk products, costs of production, law of diminishing returns, least cost combination, opportunity cost principles enterprize combinations, comparative advantage.


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4. Profit/Efficiency measures, measures on a dairy farm—Gross income, net income, return to factor of production as labour income, return to capital, return to management, etc. Efficiency measures for Labour, capital, Livestock production index. Economics of dairy farm vis-a-vis, mixed farms, Basic ideas of personnel management.
5. Marketing of dairy products—The nature and problems of marketing in dairy products and how they differ from farm products, marketing functions, marketing agencies & institute Live stock markets and cattle fair, marketing costs & margins.
6. Budgeting and planning on dairy farms.
7. Dairy Cooperatives—History, development, Organization and set up dairy cooperatives in India and abroad, role and types, problems and suggestions for improvement.
8. Role of credit and dairy finance—need, types and sources of credit availability on dairy farms. Principles of dairy financing and repayment procedures.
9. Price policy and role of government in regulating pricing of dairy products. Role of Government in the establishment of dairy farm.

Practicals :

4 Hrs. Duration

68 Marks

1. Study of slaughtered carcasses of an animal—determination of proportions of edible and non-edible parts, bones and flesh, dressed percentage.
2. Preservation of skin.
3. Shearing of sheep, grading of wool.
4. Preparation of decorative items from horns and hoofs.
5. Preparation of case in, its storage and disposal.
6. Study of Gobar Gas Plant, making of slurry, changing the plant, removal of decomposed dung.
7. Determination of overall and wet average yields of animals.
8. Working out the requirements for starting a dairy with different number of animals.
9. Working out the cost of milk production under different conditions of management and production.
10. Preparation of credit proposal for starting a dairy farm with different number of animals.
11. Visit to dairy farms, lead banks and their financing institutions.

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26. ANTHROPOLOGY

BA Part III

Paper-I

Max Marks-100

Min Marks-36

Paper-II

Max Marks-100

Min Marks-36

Note- Each Paper will contain nine questions having three questions from each Unit. Candidates are required to attempt five questions in all selecting atleast one question from each Unit.

Paper-I Society and Culture in India**UNIT-I**

Characteristics of Indian Culture: Purushartha, Varna Vyavastha, Ashram Vyavastha, Sanmskara. Marriage and Family in India: Continuity and Change.

UNIT-II

Concepts: Great Tradition and Little Tradition, Universalization and Parochialization, Sanskritization and Westernization. Social Stratification: Caste and Class.

UNIT-III

Special Sections of Indian Society and their Problems: Scheduled Castes, Scheduled Tribes, Women and Minorities. Nature of Indian diversity and problems of National Integration.

List of Books:.

Ahuja Ram, 1993, Indian Social System, Jaipur, Rawat Publications.

Marriott Mckim, 1955, Village India: Studies in Little-Community, Chicago University of Chicago Press.

Sharma K.L. 1997, Social Stratification in India, New-Delhi, Sage Publication.

Singh, Y., 1999, Modernization of Indian Tradition, Jaipur, Rawat Publications.

Srinivas M.N., 1966, Social Change in Modern India, California, Los Angeles,

आहुजा राम, 2000, भारतीय समाज, जयपुर, रावत पब्लिकेशन्स।

योगेन्द्र सिंह, 2006, भारतीय परम्परा का आधुनिकीकरण, रावत पब्लिकेशन्स, जयपुर, अनुवादक: अरविन्द कुमार अग्रवाल।

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Paper-II Peasant Society and Folk Culture

UNIT-I

Meaning of Rural, Characteristics of Indian rural communities. Concept and characteristics of Peasant and Peasant Society. Characteristics of Folk Society.

UNIT-II

Panchayati Raj: Structure and function of Panchayats, Impact of Panchayati Raj on Rural India. Change and development in rural society.

UNIT-III

Folklore: Definition and function. Classification of Folk literature. Folk Literature and its Social Content: Family, Women, Caste and Religion. Concept of Elite tradition.

List of Books:

Beteille Andre, 1974, The Concept of Peasant Society: Six Essays in Comparative Sociology, Oxford, Oxford University Press.

Desai A.R., 1969, Rural Sociology in India, Bombay, Popular Prakashan Private Limited.

Deva Indra, 1989, Folk Culture and Peasant Society in India, Jaipur, Rawat Publications.

Dube S.C., 1955, Indian Village, London Routledge and Kegan Paul.

Islam Mazharul, 1985, Folk lore: the Pulse of the People, New-Delhi, Concept Publishing Company.

Redfield Robert, 1947, Peasant Society and Culture Chicago, University Chicago Press.

श्रीवास्तव, ए.आर.एन., 1999, भारतीय समाज: समाजशास्त्रीय विवेचन, के.के. पब्लिकेशन्स।

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B. A. Part – III (Drama) Examination 2022-23**Paper-I Western and Oriental Acting Theories (Theory)**

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- I. Study of acting styles in:
 - a. Greek Theatre with reference to Sophocles
 - b. Elizabethan Theatre with reference to Shakespeare
 - c. Renaissance Theatre with reference to Moliere
 - d. Realistic Theatre
- II. Selective study of Poetics
- III. Study of Stanislavski and Method Acting
- IV. Study of Acting in Epic Theatre of Brecht
- V. Study of Oriental theatre with reference to Japanese Kabuki, Noh and Bunraku
- VI. Study of following plays:
 - a. Greek Plays
 1. Oedipus - Sophocles
 2. Antigone - Sophocles
 - b. Elizabethan Plays
 1. Othello - Shakespeare
 2. Macbeth - Shakespeare
 - c. Renaissance Plays
 1. Mock Doctor - Moliere
 2. Miser - Moliere
 - d. Realistic Plays
 1. Doll's House - Ibsen
 2. Three sisters - Chekhov
 - e. Epic Plays
 1. Three Penny Opera - Brecht
 2. Mother Courage - Brecht

Books Recommended:

1. History of Theatre – Oscar Brockell
2. Introduction to Theatre – Frank M Whiting
3. Natyakala ke Teen Sahastra Varsh – Sheldon Chenny (Tr. Sitaram Chaturvedi)
4. An Actor Prepare – Stanislavski (Tr. Vishwanath Mishra)
5. Arastoo Ka Kavyashastra – Dr. Nagendra
6. Japanese Theatre – F. Bowers
7. Brecht on Theatre – Tr. John Willett
8. All the plays prescribed in Ch. VI

Paper-II Scene Design (Theory)

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- a. Brief study of the development of Theatre Building.
- b. Definition and study of basic principles of Scene Designing.
- c. Study of conventions of Natyashalas of Natyashastra.
- d. functions and different forms of Scenery.
- e. Study of the process of the Scene Construction.

B. A. Part – III (Drama) Practical Examination 2022-23

Scene Design & Production

PRACTICAL PAPER -II

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- a. Cross section of Theatre building.
- b. Rough sketches and Mechanical Drawing such as plan Elevations, Working Drawings, Cross Sections, Isometric, Orthographic and perspective Drawing
- c. Model Making of a set

PRACTICAL PAPER- II

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- d. Play Production by each students
- e. Submission of workbook and assignments

Books Recommended:

1. Designing and printing for Theatre, Lynn Pecktel.
2. Sceneriography and Stage Technology, W.F. Bellman.
3. Scene Designing and Lighting, Parker and Smith.
4. Building a Character, K. Stanislavsky.
5. Creating a Role, K. Stanislavsky.
6. Hindi Abhinav Bharti, Vishweshar.
7. Brecht on theatre (Selected chapters), Tr. John willet.
8. A primer of Acting, C. Lowell Lees.

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28. PHYSICAL EDUCATION

There shall be two theory papers of 60 marks each, and a practical examination carrying 80 marks. A candidate must pass in theory and practical examination separately.

Paper-I

Health Education

Max. Marks 60

Min. Pass M. 22

Time : 3 Hours

Unit-I

Meaning of Health Education, its need and scope for college students; aims, objectives and principles of Health Education.

Unit-II

Concept of Health and Fitness; the importance of health to individual, family, community and the State; Meaning of Mental Health and its relation ship with Physical health.

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Unit-III

Balanced diet and nutrition, misconceptions about food, function of food in the body, essential body nutrients and other components of food, required diet for sportsman, adverse effects of tobacco, alcohol and intoxicating drugs.

Unit-IV

Need and importance of personal hygiene, environmental hygiene, food hygiene, communicable disease and its posture-common postural defects, their causes and remedies.

Unit-V

Importance and general principles of safety education for preventing accidents in physical Education and sports. Common accidents in games and sports and its first aid treatments.

Books for Reference :

1. Lawrence, Thomas Gordon; Schriver, Allico : Powers; Douglas F. and Verhans Levia
Your Health and Safety Har Court, Brace & World, Inc. New York 1969
2. Bauer, W.U. (Editor)
Today's Health Guide American Medical Association Revised Edition, 1968.
3. Johns, Edward P. Suttan, Wilfred C., and Webster, Lloyd F.
Health for effective living No. Craw Hill Book Company New York, 1970
4. Stack, Harbett, J. Daks Elkow. Education for safe living, Englewood Cliffs, New Jersey, Prentice Hall Inc. 1966.
5. Evans, A. William Everyday Safety, Chicago; Lyons and Carnahan, 1952.
6. Floria, A.A. & Stafford G.T.- Safety Education; New York Mc Craw Hill Book Co. 1969.
7. Park J.E. Text Book of Preventive and Social Medicine Banarsidass Bhanst, 1980.
8. Ajmer Singh etc. : Basis of Physical Education, Health & Sports (B.A. I) : Kalyani Publication Ludhiana.
9. Ajmer Singh etc. Basis of Physical Education, Health & Sports (B.A. II) : Kalyani Publication Ludhiana.
10. Ajmer Singh etc. Basis of Physical Education, Health & Sports (B.A. Pt III) : Kalyani Publication Ludhiana.

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11. Sharma & Granth Singh : Physical & Health Education : Asha Prakashan Greh, New Delhi.
12. Datta A.K. & Mazumdar L : Student teaching in Physical Education : Janvani Prakashan Pvt. Ltd., Delhi.
13. अजमेर सिंह और अन्य शारीरिक शिक्षा स्वास्थ्य एवं खेलों की आधुनिक पाठ्यपुस्तक (बी.ए. I) : कल्याणी पब्लिकेशन लुधियाना।
14. अजमेर सिंह और अन्य : शारीरिक शिक्षा-स्वास्थ्य एवं खेलों की आधुनिक पाठ्यक्रम (बी.ए. पार्ट I व III) : कल्याणी पब्लिकेशन लुधियाना।
15. मोहम्मद बादिर और दीक्षित एन.के. : शारीरिक शिक्षा का इतिहास : दलीपगंज रेलवे क्राफिंग लखनऊ।
16. मोहम्मद बादिर और दीक्षित एन.के. : शारीरिक शिक्षा में शिक्षण विधि दलीपगंज रेलवे क्राफिंग लखनऊ।
17. पाण्डेय लक्ष्मीकान्त : शारीरिक शिक्षा की शिक्षण पद्धति : मेट्रोपोलिटन बुक नं. प्रा. लि., नई दिल्ली।
18. सिद्धान्त अशोक कुमार : शारीरिक शिक्षा सिद्धान्त, मनोविज्ञान एवं इतिहास : श्रीवांस पब्लिकेशन नरगुर।
19. पाटिया ए.एल. और बघेल हेत सिंह : शरीर रचना, किना शक्ति, स्वास्थ्य शिक्षा, मुद्रा शिक्षा, प्राथमिक चिकित्सा और आहार : श्रीवांस पब्लिकेशन नरगुर।
20. कपलेश और संग्राल : शारीरिक शिक्षा के सिद्धान्त व इतिहास : प्रकाश प्रदर्श लुधियाना।
21. देवव्रत चन्द प्रसाद : शारीरिक शिक्षा का संगठन व विधियाँ : श्रीवांस पब्लिकेशन नरगुर।

Paper-II

Test and Measurement

Time : 3 Hours

Max. Marks 60

Min. Pass M. 22

Unit-I : Introduction

1. Meaning of tests, measurements & Evaluation, Need & Importance of Tests & Measurement in Physical Education.
2. Meaning of Statistics, Need & Importance of Statistics.
3. Frequency Tables-Meaning, Construction & Uses.

Unit-II : Fundamental of Statistics

1. Measures of Central Tendency- Meaning, uses and Calculation from Frequency Tables.
2. Graphical representation of Data-Meaning uses and Techniques.
3. Percentiles-Meaning, Uses and Calculations.

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Unit-III : Test Evaluation and Construction

1. Item to be included in Objective and Subjective tests.
2. Criteris of tests selection.
3. Administration of Testing programme.

Unit-IV : Measurement of Physical Fitness and Skill Performance

1. Fitness Tests : Apear, JCR Test, Candian Fitness test.
2. Sports skill Tests : Johnson Basket ball Ability Test, MC Donald Soccer Test, Dribble and Goal Shooting Test in Hockey.

Unit-V

Dimeneiors and Markin of Playfields Football, Volleyball, Basketball, Cricket, Hockey and Badminton.

Books Recommended :

1. Clarke H.H. Application of Measure to Health and Physical Education, Englewood Cliffs, N.J., Precentice Hall Inc.
2. Larson I.A. and Yaom, R.D: Measurement and Evaluation in Physical Health and Recreation Education, St. Louis : C.V. Moslay Company 1957.
3. Mathew, Donald K. Measurement in Physical Education, London; W.B. Saunders Company 1973.
4. Neilson N.P. : An Elementary Course in statistice Test and Measurement in Physical Education. National Test Polo Athletic 1960.
5. Ajmer Singh etc. : Basis of Physical Education, Health & Sports, B.A. I : Kalyani Publication Ludiana.
6. Ajmer Singh etc. Basis of Physical Education, Health & Sports (B.A. II) : Kalyani Publicaiton Ludhiana.
7. Ajmer Singh etc. Basis of Physical Education, Health & Sports (B.A Pt. III) : Kalyani Publication Ludhiana.
8. Sharma & Granth Singh : Physical & Health Education : Asha Prakashan Greh, New Delhi.
9. Datta A.K. & Mazumdar I. : Student teching in Physical Education : Janvani Prakashan Pvt. Ltd., Delhi.
10. अन्वयेर सिंद और अन्व शारीरिक शिक्षा स्वास्थ्य एवं खेलों की आधुनिक पाठ्यपुस्तक (बी.ए. I) कल्याणी पब्लिकेशन लुधियाना।
11. अन्वयेर सिंद और अन्व शारीरिक शिक्षा स्वास्थ्य एवं खेलों की आधुनिक पाठ्यपुस्तक (बी.ए. III) कल्याणी पब्लिकेशन लुधियाना।

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12. मोहम्मद बाहिद और दाफेत एन.के. : शारीरिक शिक्षा का इतिहास : दलीगंज रेलवे क्रॉसिंग लखनऊ।
13. मोहम्मद बाहिद और दीखित एन.के. : शारीरिक शिक्षा में शिक्षण विधि : दलीगंज रेलवे क्रॉसिंग लखनऊ।
14. पाण्डेय लक्ष्मीचन्द्र : शारीरिक शिक्षा की शिक्षण पद्धति : मेट्रोपोलिटन बुक कं. प्रा. लि., नई दिल्ली।
15. सिद्धा अशोक कुमार : शारीरिक शिक्षा सिद्धान्त, मनोविज्ञान एवं इतिहास : श्रीवांस पब्लिकेशन्स बबपुर।
16. पाटिया ए.एल. और बघेता हेत सिद्ध : शरीर रचना, क्रिया शास्त्र, स्वास्थ्य शिक्षा, सुरक्षा शिक्षा, प्राथमिक चिकित्सा और आहार : श्रीवांस पब्लिकेशन्स बबपुर।
17. कमलेश और संगत : शारीरिक शिक्षा के सिद्धान्त व इतिहास : प्रकाश नदरई लुधियाना।
18. वैष्णव एनेन्द्र प्रसाद : शारीरिक शिक्षा का संगठन व विधियाँ : श्रीवांस पब्लिकेशन्स बबपुर।

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29. INDIAN HERITAGE IN RURAL HANDICRAFTS
B.A. Part III

Scheme	Max.Marks	Min. Pass Marks
1. Practical Paper I 5 Hrs. Duration	70	25
2. Practical Paper II 5 Hrs. Duration	70	25
3. Submission	60	22
	220	72

Syllabus

Paper I practical 5 Hrs. Duration	Max. Marks	Min. Pass Marks
	70	25

- a) Clay modelling (sculpture)
b) Ceramics and pottery

Paper II practical 5 Hrs. Duration	Max. Marks	Min. Pass Marks
	70	25

Wood work

- a) Fabrication of toys, sculptures
b) Furniture

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Submission work : Max. Marks 60 Min. Pass Marks 22

Note (1) : Submission work will be submitted to the head of the departments of Rural Handicrafts of the college 15 days before the commencements of examination. The marks in the submission will be Awarded by the subject teacher (Internal). However the external examiner shall be empowered to review the work of submission in case there is drastic difference between the marks of the examination and submission.

B.A. Part-III

Paper-I Scientific Principles of Sports Training & Coaching
Duration : 3 Hrs. Total Periods : 104 Max. Marks: 100

Note: The paper will contain ten questions having atleast two questions from each Unit. Candidates are required to attempt five questions in all taking atleast one question from each unit.

Unit-I

I. Sports Training

- (a) Definition of the terms.
 - (i) Conditioning
 - (ii) Training
 - (iii) Coaching
- (b) Definition, aim and characteristics of Sports Training.
- (c) Principles of Sports Training.

II. Training and Load

- (a) Important features of training load.
 - (i) Intensity
 - (ii) Density
 - (iii) Duration
 - (iv) Frequency.
- (b) Principles of Training load
- (c) Over load
 - (i) Causes
 - (ii) Symptoms

Unit 2

Motor Components

- (i) Strength
 - (a) Types of strength
 - (b) Characteristics of Strength
 - (c) Factors determining Strength

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- (ii) Endurance
 - (a) Form of Endurance
 - (b) Importance of Endurance
 - (c) Characteristics of Endurance
 - (d) Types of Endurance
- (iii) Speed
 - (a) Form of Speed
 - (b) Factors of determining speed
- (iv) Flexibility
 - (a) Importance
 - (b) Meaning
 - (c) Types
 - (d) Factors determining flexibility.
- (v) Co-ordinative abilities
 - (a) Characteristics
 - (b) Importance
 - (c) Types
 - (d) Classification

Unit 3

- (a) Techniques tactic & Planning
 - (i) Meaning
 - (ii) Definition of skill
 - (iii) Techniques and Technical training
 - (iv) Characteristics of Techniques
 - (v) Aims of Techniques
 - (vi) Methods of Techniques Training
 - (vii) Causes and Correction of Faults
- (b) Tactics
 - (i) Meaning
 - (ii) Principles of Tactical Preparation
 - (iii) Training Problems
- (c) Planning Principles of planning, type of planning
- (d) Physical fitness & their effect

Unit 4

Scientific principles: equilibrium, force, motion laws, Law of motion and their applications in different sports games

Unit 5

Psycho-Sociological aspects of Sports Training

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- (a) Competition
 - (i) Functions of Competition
 - (ii) Competition Frequency
 - (iii) Preparation for Competition (Psychological preparation)
- (b) Role of Motivation in Sports.
- (c) Leadership in Sports Book
- (d) Group behaviour in Sports Book
- (e) Audience and Sports Performance

Reference Books (Third year)

1. Cuddy S. Perceptual and Motor Development in Infants and children. Prentice Hall, 1979.
2. Dick F.T. Sports Training Principles-Lopus, London, 1980.
3. Jencks, C.E. Fisher, A.G. Scientific Basis of Athletic conditioning Lea and Febiger, Philadelphia, 1972.
4. Matveyev, L.P. Fundamentals of Sports Training. (Translation from Russian) Mx. Publisher, Moscow, 1981.
5. Pyke, Frank, S. Towards Better Coaching. Australian Government Publishing Service Canberra, 1980.
6. Singh, H. Sports Training, General Theory and Methods, N.L.S. Patna, 1984.
7. Willmore, U.M. Athletic training and Physical Ed. Fitness Allen and Unwin, Inc. Sydney, 1977.
8. D. Hare, Principles of Training.
9. Singh, Hardeep, Science of Sports Training for D.V.S. Publications.
10. Davis R.I. Ball, C.R. Reeson J.V., Reeson D.A. Physical Education and the Study of Sports Wolfe publishing Ltd.

Paper-II Duration 4 Hrs. Max. Marks : 100


Practical: Mandatory Change

1. Specialisation game, one which the student had opted for last two year as major game. Test will be conducted in its skill. Rules and regulation and officiating.

Note: Specialisation skill test consist of the following for the various games.

- A. (i) Hockey - Harbans Singh Hockey Test.
- (ii) Basketball - Johnson Basketball ability test.


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- (iii) Volleyball - Denny Volleyball test.
- (iv) Badminton - Lochint and MC Personal Badminton test.
- (v) Soccer - Mc Donald Soccer test.

B. Specialization Related book

Any one has to be opted.

- (A) Secondary games
 - (a) Secondary games
 - (i) Basketball
 - (ii) Volleyball
 - (iii) Handball
 - (iv) Hockey
 - (v) Cricket
 - (vi) Football
 - (b) Track and field (High/Jump)
 - (i) High Jump
 - (ii) Shotput
 - (iii) 200 m.
 - (iv) Long Jump
 - (v) Javelin
 - (vi) 800 m.
- (B) Races games - Badminton
- (C) Yoga Asana

The scheme of Examination B.A. Part-I, II and III in Physical Education subject laid down as per University order applies to all subjects.

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COMPUTER APPLICATION (VOCATIONAL COURSE) FOR

B.A./B.Com/B.Sc. Part III

Paper-I

Paper Name : Web Authoring tools

Unit I

Data communication, Components of Data Communication System, Transmission Media- Coaxial, UTP, Optical-Fiber, Wireless, Transmission Mode- Simplex, Half Duplex, Full Duplex, Introduction to networking, LAN, MAN, WAN, network topologies.

Unit II

Evolution of Internet, Basic internet terms (Client, Server, MODEM, Web page, Web site, Home page, Browser, URL, ISP, Web server, Download & Upload, Online & Offline etc), Internet applications (Remote login, VoIP, Video Conferencing, Audio-Video streaming, Chatting etc). E-Mail, Advantages, working, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol.

Unit III

Introduction to World Wide Web: History, Working of Web Browsers, Its functions, Search engine category, Concept of Hyper Text Transfer Protocol (HTTP), Web Servers, Internet Explorer, Component of Web Publishing, Site and Domain Name, Overview of Intranet and its applications. Introduction to Advanced Technologies: Big Data, Cloud Computing, Internet of Things, Artificial Intelligence(Introduction only).

Unit IV

HTML, Designed Tools, HTML Editors, Issue in Web Site Creations and Maintenance, FTP S/W for Upload Website, Elements of HTML & Syntax, Building HTML Documents, Use of Font Size and Attributes, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, Use of Frames and Forms in Web Pages.


Unit V

Basic of Cyber Security and Cyber Crime: Computer Ethics and Application Programs, Cyber Law, Introduction to IT laws & Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy, Intellectual property, Legal System of Information Technology, Mail Bombs, Bug Exploits. Software Piracy, Firewall, Threats, Hacking and Cracking (basic concepts only for these topics).

Recommended Books:

1. The Complete Reference: HTML & XHTML.; Thomas A. Powell, 4th Edn.
2. Mastering HTML 4.0 by Deborah S. Ray and Eric J. Ray From BPB
3. Mastering Java Script, BPB publication.
4. Internet and web technology by Raj Kamal, TMH Publication 2. Steven Holzner,
5. The Complete Reference Java Scripts., Tata McGraw – Hill, 3rd Edn.
6. Java Script, Don Gosselin, Vikas publications

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Paper-II

Paper Name : Software Engineering & E-Commerce

Unit I

Introduction to software engineering: What is software engineering, software engineering principles, Software characteristics, applications. Software Development life-cycle, Models: Waterfall model, Incremental model, spiral model, Prototyping Model.

Unit II

Software requirements: Functional- non-functional requirements, User requirement, System requirements, Software requirements documentation, Software Requirement engineering process, Feasibility studies, Requirements elicitation and analysis, software prototyping, Software Reliability, Software Reusability. Software design: Basics of software design, Software Design Techniques, Data design, Data Flow Diagram.

Unit III

A strategic approach to software testing, test strategies for convention software, Black-box and white box testing, validation and system testing, and debugging; System implementation, maintenance and documentation;

Unit IV

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Security Threats of E-Commerce, E-Commerce models.

Unit V

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash. Introduction to e-banking and support services.


Recommended Books:

1. Pressman, Roger (2001) Software Engineering; A Practitioner's Approach, 8th ed. M Graw-Hill, 2014.
2. Girdhari Singh, Shalinipuri; Software Engineering; 2022 Edn. Genius Publications
3. Jalote, Pankaj (7) An integrated Approach to Software Engineering 2nd Ed.
4. Simon Bennett, Steve McRobb and Ray Farmer, " Object-Oriented Systems Analysis and Design Using UML " 4th Edition, McGraw Hill Education, 2010
5. Ravi Kalakota, "Electronic Commerce: A Manager's Guide", Addison-Wesley Professional, Edition 2012.
6. Ian Daniel, "E-Commerce get it Right", Neuro Digital Publication, 2011.
7. Lexis Leon; Enterprise Resource Planning; TMH

Paper-III

Paper Name : Web Authoring Tools Lab
Content : Lab practical's based on paper I.

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Unit 3: Taylor's theorem. Laurent's theorem. Maximum modulus theorem.

Power series – Absolute convergence, Abel's theorem, Cauchy-Hadamard theorem, Circle and Radius of convergence, Analyticity of the sum function of a power series.

Unit 4: Singularities of an analytic function, Branch point, Meromorphic and Entire functions, Riemann's theorem, Casorati-Weierstrass theorem.

Residue at a singularity, Cauchy's residue theorem. Argument principle. Rouché's theorem.

Fundamental theorem of Algebra.

Unit 5: Conformal mapping. Bilinear transformation and its properties. Elementary

mappings: $w(z) = \frac{1}{2} \left(z + \frac{1}{z} \right)$, z^2 , e^z , $\sin z$, $\cos z$, and $\log z$.

Evaluation of a real definite integral by contour integration.

Analytic continuation. Power series method of analytic continuation.

Reference Books:

1. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (Eighth Edition), McGraw – Hill International Edition, 2009.

2. Joseph Bak and Donald J. Newman, Complex analysis (2nd Edition), Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997.

Paper – III: Mechanics

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks:

40 (Science)

54 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit.

Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Velocity and acceleration – along radial and transverse directions, along tangential and normal directions. S.H.M., Hooke's law, motion along horizontal and vertical elastic strings.

Unit 2: Motion in resisting medium – Resistance varies as velocity and square of velocity. Work and Energy. Motion on a smooth curve in a vertical plane. Motion on the inside and outside of a smooth vertical circle. Projectile.

Unit 3: Central orbits – p-r equations, Apses, Time in an orbit, Kepler's law of planetary motion. Moment of inertia – M.I. of rods, Circular rings, Circular disks, Solid and Hollow spheres, Rectangular lamina, Ellipse and Triangle. Theorem of parallel axis. Product of inertia.

Unit 4: Equilibrium of coplanar force, moments and friction.

Unit-5: Virtual work and Catenary.

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SYLLABUS

B.A. Part-II

Examination - 2024

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B.A. Part-II Examination**(Under 10+2+3 Pattern)****R.11 (2)**

The number of papers and the maximum marks for each paper together with the minimum marks required for a pass are shown in the scheme of Examination on against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/ paper, wherever prescribed, separately classification of successful candidates shall be as follows :

First Division 60% } of the aggregate marks obtained at the Part I, II, &
Second Division 48% } III Examination, taken together

All the rest will be declared to have passed the Examination if they obtain the minimum pass marks in each subjects, viz. 36% No division shall be awarded at the Part-I and Part-II examination.

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CONTENTS

Optional Subjects (Any three of the following subjects to the restriction as mentioned in O. 203-I)

1.	English Literature	4-6
2.	Hindi Sahitya	7-10
3.	Urdu	11-12
4.	Persian	13-14
5.	Sanskrit	15-20
6.	Philosophy	21-22
7.	History	23-28
8.	Political Science	29-32
9.	Indian Music	33-39
10.	Public Administration	40-46
11.	Drawing & Painting	47-48
12.	Sociology	49-51
13.	Home Science	52-59
14.	Textile Craft	60-62
15.	Garment Production & Export Management	63-66
16.	Investigative Bio-Technology	67-71
17.	Mathematics	72-73
18.	Economics	74-76
19.	Geography	77-80
20.	Statistics	81-85
21.	Applied Statistics	86-88
22.	Psychology	89-91
23.	Rajsthani	92-93
24.	Anthropology	94-95
25.	Dramatics	96-97
26.	Physical Education	98-102
27.	Indian Heritage in Rural Handicrafts	103-104
28.	Computer Application	105-106

N.B. : 1. Candidates must Pass separately in each of the paper theory and Practical (wherever prescribed)

2. Common papers in the subjects of Statistics, Mathematics, Economics, Geography and Psychology will be set both in the Faculties of Social Science and Science. The allocation of marks will however be different as mentioned in the booklet of syllabus.

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1. ENGLISH LITERATURE

B.A. Part-II

The Syllabus aims at achieving the following objectives :

1. Interpretation and appreciation of selected texts from the genres of poetry, drama, prose and fiction.
2. Strengthening skills of note making, summarizing and dialogue writing.
3. Understanding texts with specific reference to genres, forms and literary terms.

Paper I: Poetry and Drama

Maximum Marks: 100

Duration: 3 hrs

Min. Pass Marks: 36

Question No. 1: References to Context from unit A, B & C.

Candidate will be required to explain four (4) passages of Reference to Context out of Eight (8) of five marks each, with a total of 20 Marks.

Question No. 2: Will also be compulsory. The student will be required to attempt 5 questions out of 10, to be answered in about 5 lines each. Each question will carry 4 marks to a total of 20 marks.

The other 3 questions will be Essay-type questions of 20 marks each, one from each section with internal choice.

SECTION A

Thomas Gray	:	Elegy Written in a Country Churchyard
William Blake	:	London, Tiger
William Wordsworth	:	The World is Too Much with Us The Solitary Reaper
S.T. Coleridge	:	The Ancient Mariner
George Gordon Byron	:	There is a Pleasure in the Pathless Woods.
P.B. Shelley	:	Ode to the West Wind
John Keats	:	To Autumn

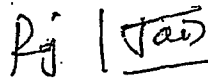
Reference Books :-

Strings of Gold Part I Ed. Jasbir Jain (Macmillan)

The Golden Treasury by Francis Turner Palgrave (OUP)

Poet's Pen: An Anthology of English Verse Paperback – by Dustoor P.E. (Author), Homai P.Dustoor (Author) (Oxford University Press)

The New Oxford Book of English Verse, 1250-1950 (Oxford Books of Verse) by Helen Gardner (Editor)


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SECTION B

Nissim Ezekiel:

- a. Enterprise
- b. Night of The Scorpion

Kamala Das:

- a. My Grandmother's House
- b. The Looking Glass

Arun Kolatkar:

- a. An Old Woman
- b. The Bus
- c. Chaitanya

A.K. Ramanujan:

- a. Of Mothers, Among Other Things
- b. Obituary
- c. A River

Grieve Patel:

- a. On Killing a Tree
- b. Servants

Reference Books :-*Ten Twentieth Century Poets* ed. R. Parthasarathy (O.U.P.):*Indian Writing in English* by K.R.Srinivasa Iyengar .Sterling Publishers Pvt.Ltd*A History of Indian English Literature* by M.K.Naik Sahitya Akademi*The Golden Treasury of Indo-Anglian Poetry, 1828-1965* by Vinayak Krishna Gokak (Editor) Sahitya Akademi**SECTION C**

Ibsen:

A Doll's House

Tagore:

*The Post Office***Reference Books-**

Henrik Ibsen:

A Doll's House. Maple Press (1 August 2011)

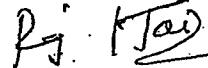
Tagore:

The Post Office. Hesperides Press (August 2014)**Paper II: Prose and Fiction****Maximum Marks: 100****Min. Pass Marks: 36****Duration: 3 hrs****Question No. 1: References to Context from unit A only.**

Candidate will be required to explain four (4) passages of Reference to Context out of Eight (8) of five marks each, with a total of 20 Marks.

Question No. 2 will also be compulsory. The student will be required to attempt 5 questions out of 10, to be answered in about 5 lines each. Each question will carry 4 marks to a total of 20 marks.

The other 3 questions will be Essay-type questions of 20 marks each, one from each section with internal choice.


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SECTION A

S. Radhakrishnan:	The Gandhian Outlook
R.K. Narayan:	A Bookish Topic
J.B. Priestley:	Making Writing Simple
Virginia Woolf:	How Should One Read a Book?
Leo Tolstoy:	Three Questions
Pearl S Buck:	The Refugees
R.K. Narayan:	Under the Banyan Tree
Alice Walker:	Am I Blue?

Reference Books-

An Anthology of English Essays Edited by R.P. Singh (O.U.P.)
The Pointed Vision Edited by Usha Bande and Krishnan Gopal, (O.U.P.)

SECTION B

Chaman Nahal	:	Azadi
William Golding:	:	<i>Lord of the Flies</i>

Reference Books :-

Chaman Nahal : Azadi .Penguin Books Ltd (March 30, 2003).
 William Golding: : *Lord of the Flies*. Penguin Books; 3 edition (October 1, 1999)

SECTION C

Note Making, Summarizing, Theme Writing

Recommended Readings :

Mohan, Krishna., Raman, Meenakshi. *Effective English Communication*. Tata McGraw Hill, New Delhi, 2009.

The Handbook of Creative Writing. Ed. Steven Earnshaw, Edinburgh University Press, London, 2007.

Pal, Rajendra & Korlahalli, J.S. *Essentials of Business Communication*. New Delhi: Sultan Chand & Sons: New Delhi, 2005

Mohan Das, N.K. *Writing Today: Developing Skills in Academic and Workplace Writing* (Orient Blackswan)

Vandana R. Singh: *The Written Word* (O.U.P.)


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खण्ड - अ

1. केशवदास रामचन्द्रिका - सम्पादक - लाला भगवान दीन रावण-अंगद संवाद
2. बिहारी - बिहारी रत्नाकार - जगन्नाथ दास रत्नाकर
 1. मेरी भव बाधा हरौ.....
 2. जम-करि-मुँह-तरहरि पर्यौ.....
 3. कौन भाँति रहि है बिरदु.....
 4. कहत नटत, रीझत, खिझत.....
 5. नहि पराग नहि मधुर मधु.....
 6. दीरघ साँस न लेहि दुख.....
 7. थोरे ही गुन रीझते.....
 8. तंत्री-नाद कवित्त-रस.....
 9. या अनुरागी, चित्त की
 10. जप माला छापा तिलक.....
 11. भूसन भारू सम्भारि है.....
 12. अंग-अंग नग जगमगत दीपशिखा सी देह.....
 13. कहलाने एकत बसत अहि मयूर मृग बाघ.....
 14. कौ कहि सकै बड़ेन सौ लखै बड़ी हू भूल.....
 15. घरू-घरू डोलत दीन है.....
 16. आवत जात न जानियतु.....
 17. बडे न हूजे गुनन बिनु.....
 18. कनक कनक ते सौ गुनी मादकता अधिकाय
 19. तजि तीरथ हरि राधिका.....
 20. जिन दिन देखे वै कुसुम.....
 21. स्वारथु, सुकृतु न श्रम वृथा.....
 22. नर की अरू नल-नीर की
 23. कहत सबै, बेंदी दियें.....
 24. दृग उरझत, टूटत कुटुम.....
 25. रनित भुंग-घंटावली.....
3. देव - जाकै न काम न क्रोध विरोध.....
 - कोरू कहौ कुलटा कुलीन अकुलीन कहौ.....
 - रावरी रूप रहयौ भरि नैनन.....
 - गंग तरंगिन बीच बरंगिनि.....
 - ऐसे जु हौ जानत कि जैहे तु विषय के संग.....
 - डार द्रुम पालना बिछौना नव पल्लव के
 - जब तै कुंवर कान्ह रावरी कला-निधान.....
 - राधिका कान्ह को ध्यान करै तब कान्ह
 - माखन सौ मन दूध सौ जोबन.....
 - को बचिहै यह बैरी बसन्त पै आवत.....

4. भूषण

- 8
- साजि चतुरंग—सैन अंग में उमंग धारि सरजा सिवाजी जंग जीतन चलत है।
 - बाने फहराने घहराने घंटा गजन के नाहीं ठहराने रावराने देसदेस के।
 - बेद राखे बिदित पुरान परसिद्ध राखे राम—नाम राख्यो अति रसना सुघर में।
 - उतरि पलंग तें न दियो हैं धरा पै पग तेऊ सगबग निसिदिन चली जाती हैं।
 - ऊँचे घोर मंदर के अंदर रहनवारी ऊँचे घोर मंदर के अंदर रहाती हैं।
 - अतर गुलाब चोवा चंदन सुगंध सब सहज सरीर की सुबास बिकसाती हैं।
 - सौंधे को अधार किसमिस जिनको अहार चार अंक—लंक मुख चंदके समानी हैं।
 - आपस की फूट ही तें सारे हिंदुवान टूटे टूट्यो कुल रावन अनीति अति करतें।
 - भुज—भुजगेस की बैसंगिनी भुजंगिनी सी खेदि खेदि खाती दीह दारुन दलन के।
 - अति सौंधे भरी सुखमा सु खरी गुख ऊपर आइ रहीं अलकैं।

5. घनानंद —

1. छवि कौ सदन, मोदमंडित बदन—चन्द
2. भोर, ते सांझ लौ कानन ओर निहारति वाबरी नैक न हारति
3. सोएँ न सोयबो, जागे न जाग, अनोखियै लाग सु अँखिन लागी
4. नित द्यौस खरी, उर मांझ अरी, छवि रंग—भरी मुरि चाहनि की
5. अन्तर उदेग—दाह, अँखिन प्रवाह—आँसू
6. नैनन में लागै जाय, जागे सु करेजे बीच
7. दिननि के फेर सों, भयो है हेर—फेर ऐसौ
8. कौन की सरन जैये आप त्यों काहू पैये
9. जासौं प्रीति ताहि निदुराई सों निपट नेह,
10. मीत सुजान अनीत करौ जिन, हा हा न हूजियै मोहि अमोहि

6. आलम

1. रूचिर बरन चीरू चन्दन चरचि रुचि,.....
2. अँखियाँ भली जू ऐसे अँसुवनि धारै, नातो,
3. चाहती सिंगार तिन्हें सिंगी को सगाई कहा,
4. बारैं तें न पलक लगत बिनु साँवरे ते,
5. शीत रिपु भीत भई छाती राती ताती तई,
6. लता प्रसून डोल बोल कोकिला अलाप कैकि,
7. पालन खेलत नन्द ललन छलन बलि,
8. दैहो दधि मधुर धरनि धरयो छोरि खैहैं,
9. नीके न्हाइ धोइ धूरि पैठो नेक बैठो आनि,
10. गोरस सुढौरी लिये संभु ताको मत दिये,

7. पदमाकर

1. कूलन में, केलिन, कछारन में, कुंजन में,
2. औरै भाँति कुंजन में गुंजरत भौरै—भीर,
3. चंचला चमाकैं चहूँ ओरन तें चाह—भरी,.....
4. आयी हौ खेलन फाग इहाँ वृषभानपुरी तें सखी सँग लीने।.....
5. सीज ब्रज चंद पै चली यों मुखचंद जा को,
6. ऐसी न देखी सुनी सजनी धनी बाढ़त जात बियोग की बाधा।.....
7. तीर पर तरनि—तनूजा के तमाल—तरे,
8. फहरे निसान दिसानि जाहिर, धवल दल बक पांत से।.....
9. सिर कटहिं, सिर कटि धर कटहिं, धर कटि सुहय कटि जात हैं.....
10. किल किलकत चंडी, लहि निज खंडी, उमडि, उमंडी, हरषति.....

8. सेनापति

9

1. राखति न दोपै पोपै पिंगल के लच्छन कौं,
2. बानी सौं सहित सुबरन मुँह रहै जहाँ
3. करत कलोल खुति दीरघ, अमोल, तोल,
4. कालिंदी की धार निरधार है अधर, गन.....
5. सोहै सँग आलि, रही रति हुं के उर सालि,
6. मालती की माल तेरे तन कौ परस पाइ,
7. मानहु प्रबाल ऐसे ओठ लाल लाल, भुज,
8. बरन बरन तरु फूले उपवन बन,

खण्ड - ब

रीतिकालीन साहित्य की प्रवृत्तियाँ

अंक विभाजन

1. कुल चार व्याख्याएं (एक कवि से केवल एक व्याख्या) (आन्तरिक विकल्प देय) 4 x 10 = 40 अंक
2. कुल तीन निबन्धात्मक प्रश्न (खण्ड - अ से) एक कवि से संबंधित एक ही प्रश्न (आन्तरिक विकल्प देय)
3 x 15 = 45 अंक
3. एक प्रश्न टिप्पणीपरक— (खण्ड - ब से) 2 x 7 $\frac{1}{2}$ = 15 अंक

दो विषयों पर टिप्पणियाँ (विकल्प देय)

(रीतिकाल की साहित्यिक प्रवृत्तियों से संबंधित)

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पूर्णांक 100

न्यूनतम उत्तीर्णांक — 36

खण्ड — 'अ'

1. नाटक — हानूष — भीष्म साहनी

खण्ड — 'ब'

2. एकांकी

रामकुमार वर्मा — उत्सर्ग
उपेन्द्र नाथ अशक — तौलिये
हमीदुल्ला — हरितगंधा

कथेतर—गद्य

3. रेखाचित्र — प्रोफेसर शशांक — विष्णुकान्त शास्त्री
4. आत्मकथा — बिस्मिल का जीवन — रामप्रसाद बिस्मिल
5. संस्मरण — तीस बरस का साथी — रामविलास शर्मा
6. यात्रावृत्त — चीड़ों पर चांदनी — निर्मल वर्मा
7. रिपोर्टाज — अदम्य जीवन — रांगेय राघव

खण्ड — 'स'

नाटक, एकांकी तथा कथेतर विधाओं का उद्भव एवं विकास

अंक विभाजन

कुल चार व्याख्याएं — दो नाटक से 9 x 4 = 36 अंक
एक एकांकी से
एक कथेतर गद्य से

कुल चार निबन्धात्मक प्रश्न 14 x 4 = 56 अंक
दो प्रश्न नाटक पर (विकल्प देय)
एक प्रश्न एकांकी पर (विकल्प देय)
एक प्रश्न कथेतर गद्य पर (विकल्प देय)

खण्ड 'स' में एक विषय पर टिप्पणी (विकल्प देय) 8 अंक

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3. Urdu

B.A. Part-II

Paper-I Poetry and Critical Appreciation

Max.Marks 100

3 Hrs.

Min. Pass Marks 36

Books Prescribed :

1. Shahpare Published By Idara-e-Nashr-o-Ishayat, Allahabad University, Allahabad (1991 Edition)

The following are prescribed from the text Book :-

- A) Ghazalyat: Dard, Momin, Nasikh
- B) Qasida : Wah Wah Kya Motadil Hai Baghe Alam Ki Hawa of Zauq
- C) Marsiya : Namake Khawane Takallum Hai Fasahat Meri of Meer Anis

Division of Marks :

Unit I	Ten short answer type questions.	20
Unit II	Explanation of Two Out of Three Ghazal/Qasida/Marsiya Passages.	20
Unit III	Critical Appreciation of Poet: Dard, Momin and Nasikh with Internal Choice	20
Unit IV	General Questions on Zauq & Anis..	20
Unit V	General question on Ghazal, Qasida and Marsiya.	20
Total		100

Note: Attempt at least one question from each unit. All the short answer type question of unit I are compulsory.

Paper II (Prose)

Max.Marks 100

3 Hrs.

Min. Pass Marks 36

Books Prescribed :

1. Intikhabe Nasr-Part-II Edited By Dr. Shabihul Hasan & Others (1990 Edition)
The following lessons are Omitted From the Text Book;-
 - A) Adab Ki Gharaz-o-Ghayat
 - B) Natak
2. Afsana : 1. Kafan: Premchand
3. Novel : 1. Ziddi : Ismat Chughtai.

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Division of Marks :

Unit I	Ten short answer type questions.	20
Unit II	Explanation of Two Out of Three Prose Passages.	20
Unit III	Critical Appreciation of A Prose Writer with Internal Choice	20
Unit IV	Summary of A Prose Lesson with Internal Choice	20
Unit V	General Questions on Novel & Afsana.	20
		Total 100

Note: Attempt at least one question from each unit. All the short answer type questions of unit I are compulsory.


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4. Persian

B.A. Part-II

Scheme :

Min. Pass Marks: 72

Max. Marks: 200

Paper-I

3 hrs. Duration

100 Marks

Paper-II

3 hrs. Duration

100 Marks

Paper-I (Prose & Poetry)

M.M. : 100

3 hrs.

Min. Pass Marks. 36

Books Prescribed :

1. Nisab-e-Jadeed Farsi Bara-e-B.A.

(Hissa Nasar Wa Nazm) published by Jayyed Press Delhi.

Prose Section

1. Inlekhhab-e-Zindigi-e-Man Kudki, Mah-e-Man
2. Dastan Hai Kotah
Mohd. Hijazi
(a) Idi (b) Khudkushi

Poetry Section

1. Qasaid Urfi
Dar Wasaf Kashmeer
2. Intekab-e-Masnavi (Page No.: 118-129)
3. Rubaiyate Umar Khyyam 1 to 20 Rubaiyat

Division of Marks :

Unit-1	(A) Ten short answer type questions based on full paper.	10
	(B) Translation of two prose passages out of three into Urdu	20
Unit-2	Translation of two Poetry Passages out of three into Urdu	20
Unit-3	General Question on Prose Writer	15
Unit-4	General Question on Poetry Writer.	15
Unit-5	Summary of prescribed lessons.	20
	Total	100

Note: Unit-I Both A and B questions are compulsory.

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Paper-II**Fiction, History of Persian Literature and Translation**

M.M. : 100

3 hrs.

Min. Pass Marks. 36

Books Prescribed :

1. Nisab-e-Jadeed Farsi Bara-e-B.A. (Hissa-e-Nasr)
Published By Jayyed Press, Delhi
Only Intekhab-e-Haji-BABA
(Upto Guftar Suwwum)

Books Recommended :

1. Sher-ulAjam Part I & II By Shibli Nomani
2. Tarikh-e-Adabiyat-e-Iran By Dr. Raza Zada Shafaq Translated in Urdu By Mubarizudin Rifat.

Division of Marks :

Unit-1	(A) Ten short answer type questions based on full paper.	10
	(B) Translation of two passages out of three prescribed Fiction into Urdu	20
Unit-2	General Question on Fiction/Character	20
Unit-3	History of Persian Literature (From Tahir Period to Safawid Period)	20
Unit-4	Question on Prescribed Lessons	20
Unit-5	Translation of five Urdu sentences into Persian out of ten	10
	Total	100

Note: Unit-I Both A and B questions are compulsory.


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Sanskrit

बी.ए. संस्कृत द्वितीय वर्ष

सामान्य निर्देश -

1. प्रत्येक परीक्षा में दो-दो प्रश्नपत्र होंगे।
2. प्रत्येक प्रश्नपत्र में न्यूनतम उत्तीर्णांक 36 तथा पूर्णांक 100 होंगे और समय 3 घण्टे का होगा।
3. परीक्षा का माध्यम हिन्दी/अंग्रेजी होगा, परन्तु प्रश्नपत्र केवल हिन्दी में बनाया जायेगा। परीक्षार्थी को छूट होगी कि वह हिन्दी, संस्कृत अथवा अंग्रेजी में किसी एक भाषा में उत्तर दे सके। यदि परीक्षक ने किसी प्रश्न विशेष के लिए भाषा का निर्देश कर दिया है तो उस प्रश्न का उत्तर उसी भाषा में देना अनिवार्य होगा।
4. संस्कृत केवल देवनागरी लिपि में ही लिखा जाना अपेक्षित है।
5. निर्धारित ग्रन्थ में से अनुवाद, व्याख्या, सरलार्थ एवं समालोचनात्मक प्रश्न पूछे जायेंगे।
6. प्रत्येक प्रश्नपत्र में 10 प्रतिशत अंक संस्कृत भाषा में उत्तर के लिये निर्धारित हैं।
7. प्रत्येक प्रश्नपत्र में दो भाग होंगे, जिसमें प्रथम 'अ' भाग लघूत्तरात्मक प्रश्नों का होगा। 'ब' भाग में निबन्धात्मक प्रश्न होंगे। 'अ' भाग में कुल 15 प्रश्न होंगे, जिनका पूर्णांक 30 होगा।

परीक्षा योजना-
प्रथम प्रश्न-पत्र
द्वितीय प्रश्न-पत्र

न्यूनतम उत्तीर्णांक-72

पूर्णांक-200
अंक-100
अंक-100

प्रथम प्रश्नपत्र

वैदिक साहित्य, गद्य साहित्य एवं व्याकरण

समय : 3 घण्टे

अंक-100

प्रथम प्रश्न में निर्धारित ग्रन्थ में से लघूत्तरात्मक निबन्धात्मक, अनुवाद, व्याख्या व समालोचनात्मक प्रश्न पूछे जायेंगे। 15 प्रश्न लघूत्तरात्मक होंगे जिनमें से प्रथम 5 प्रश्नों का उत्तर संस्कृत भाषा के माध्यम से देना होगा, प्रत्येक प्रश्न के लिए 2 अंक निर्धारित हैं। जिस प्रश्नपत्र में संस्कृत अनुवाद/ निबन्ध पूछे गए हैं वहाँ संस्कृत में उत्तर अपेक्षित नहीं हैं।

पाठ्यक्रम

1. वैदिक साहित्य

(क) ऋग्वेद के निम्नलिखित सूक्तों का अध्ययन-

20 अंक

अग्निसूक्त (1/1) वरुणसूक्त (1/25) इन्द्रसूक्त (2/12) क्षेत्रपतिसूक्त (4/57)
विश्वेदेवसूक्त (8/58) प्रजापतिसूक्त (10/121) संज्ञानसूक्त (10/191)

इन सूक्तों के मंत्रों का अनुवाद, व्याख्यात्मक टिप्पणी एवं उक्त देवताओं का चरित्र, स्वरूप से सम्बन्धित प्रश्न निर्धारित हैं।

(ख) कठोपनिषद्- प्रथम अध्याय-प्रथम वल्ली

10 अंक

2. गद्य साहित्य- शुकनासोपदेश (कादम्बरी-बाणभट्ट से)

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3. वैदिक साहित्य का इतिहास

15 अंक

(वेद तथा प्रमुख ब्राह्मण ग्रन्थों का सामान्य परिचय)

4. व्याकरण— लघुसिद्धान्तकौमुदी—नामिक (अजन्त एवं हलन्त)

30 अंक

(क) अजन्त प्रकरण —

15 अंक

निम्नलिखित शब्दों की रूपसिद्धि एवं इनमें प्रयुक्त होने वाले सूत्रों का अर्थज्ञान— राम, सर्व, हरि, गुरु, रमा, नदी, ज्ञान, वारि

(ख) हलन्त प्रकरण—

15 अंक

निम्नलिखित शब्दों की रूपसिद्धि एवं इनमें प्रयुक्त होने वाले सूत्रों का अर्थज्ञान— विश्ववाह, राजन्, भगवत्, विद्वस्, शुष्मद्, अस्मद् और चतुर, इदम्।

अंक— विभाजन

क्र.सं.	नाम पुस्तक	लघूत्तरात्मकप्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	अंक योग	
1.	ऋग्वेद	लघूत्तरात्मक 2	04	02	16	4+16=20	
2.	कठोपनिषद्	लघूत्तरात्मक 2	04	01	06	4+06=10	
3.	शुकनासोपदेश	लघूत्तरात्मक 3	06	02	17	6+19=25	
4.	वैदिक साहित्य का इतिहास	लघूत्तरात्मक 2	04	01	11	4+11=15	
5.	लघुसिद्धान्त कौमुदी	लघूत्तरात्मक 03	06	02	09	6+9=15	
	क— हलन्त						
	ख—अजन्त	लघूत्तरात्मक 03	06	02	9	6+9=15	
कुल योग			15	30	10	70	100

प्रश्न-पत्र का निर्माण निम्नानुसार होगा —

1. सभी प्रश्न अनिवार्य हैं।
2. प्रत्येक पुस्तक से लघूत्तरात्मक व निबन्धात्मक, व्याख्यात्मक प्रश्न पूछे जायेंगे। लघूत्तरात्मक प्रश्न के 2 अंक निर्धारित हैं।

निबन्धात्मक / व्याख्यात्मक प्रश्न

1. वैदिक साहित्य

ऋग्वेद

भाग अ में 2-2 अंक के दो लघूत्तरात्मक प्रश्न पूछे जायेंगे।

04 अंक

भाग ब

4 मन्त्र पूछकर उनमें से किसी 2 की सप्रसंग व्याख्या पूछी जायेगी।

10 अंक

देवताओं के स्वरूप सम्बन्धी प्रश्न में से किसी एक का उत्तर अपेक्षित है।

06 अंक

कठोपनिषद्

भाग अ में 2-2 अंक के दो लघूत्तरात्मक प्रश्न पूछे जायेंगे।

04 अंक

भाग ब

2 मन्त्र पूछकर किसी एक की व्याख्या अपेक्षित है।

06 अंक

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2. शुक्रनासोपदेश
भाग अ में 2-2 अंक के तीन लघूत्तरात्मक प्रश्न पूछे जायेंगे । 06 अंक
भाग ब
4 गद्यांश पूछकर उनमें से किन्हीं 2 की सप्रसंग व्याख्या पूछी जायेगी। 12 अंक
दो विवेचनात्मक प्रश्न पूछकर किसी एक प्रश्न का उत्तर देय होगा। 07 अंक
3. वैदिक साहित्य का इतिहास
भाग अ में 2-2 अंक के दो लघूत्तरात्मक प्रश्न पूछे जायेंगे । 04 अंक
भाग ब
2 विवेचनात्मक मन्त्र पूछकर 1 प्रश्न का उत्तर देय होगा। 11 अंक
4. लघुसिद्धान्त कौमुदी.
(क) अजन्त
भाग अ में 2-2 अंक के तीन लघूत्तरात्मक प्रश्न पूछे जायेंगे । 06 अंक
भाग ब
4 सूत्र पूछकर 2 की व्याख्या अपेक्षित है। 05 अंक
4 शब्दों की सिद्धि पूछकर 2 की सिद्धि अपेक्षित है। 04 अंक
- (ख) हलन्त
भाग अ में 2-2 अंक के तीन लघूत्तरात्मक प्रश्न पूछे जायेंगे । 06 अंक
भाग ब
4 सूत्र पूछकर 2 की व्याख्या अपेक्षित है। 05 अंक
4 शब्दों की सिद्धि पूछकर 2 की सिद्धि अपेक्षित है। 04 अंक

सहायक पुस्तकें :

1. वैदिक सूक्त मुक्तावली— डॉ. सुधीर कुमार गुप्त , हंसा प्रकाशन, जयपुर।
2. ऋक्सूक्त मंजरी— डॉ. सुभाष वेदालंकार, —अलंकार प्रकाशन, जयपुर।
3. ऋग्वेदसंहिता—एफ. मैक्समूलर—चौखम्बा प्रतिष्ठान दिल्ली।
4. ऋग्वेदसंहिता—डॉ.शारदा चतुर्वेदी—चौखम्बा प्रतिष्ठान दिल्ली।
5. ऋग्वेदसंहिता—वी.के.शर्मा—चौखम्बा प्रतिष्ठान दिल्ली।
6. कठोपनिषद्—वैजनाथ पाण्डेय—मोतीलाल बनारसीदास ,दिल्ली।
7. कठोपनिषद्—डॉ. राजेन्द्रप्रसाद शर्मा—जगदीश संस्कृत पुस्तकालय, जयपुर।
8. कठोपनिषद्—रचना प्रकाशन, जयपुर।
9. कठोपनिषद्(प्रथम वल्ली)— डॉ. सुभाष वेदालंकार, —अलंकार प्रकाशन, जयपुर।

गद्य-साहित्य :

1. शुक्रनासोपदेश— डॉ. सुभाष वेदालंकार, अजमेरा बुक कम्पनी , जयपुर।
2. शुक्रनासोपदेश—महालक्ष्मी प्रकाशन, आगरा।
3. शुक्रनासोपदेश—डॉ. श्रीकृष्ण ओझा, आदर्श प्रकाशन, जयपुर।
4. कादम्बरी— चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली।

संस्कृत साहित्य का इतिहास :

1. संस्कृत साहित्य की रूपरेखा—चन्द्रशेखर पाण्डेय, चौखम्बा प्रकाशन , वाराणसी।

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2. संस्कृत साहित्य का नवीन इतिहास—डॉ. पुष्करदत्त शर्मा।
3. संस्कृत साहित्य का समालोचनात्मक इतिहास—डॉ. रामजी उपाध्याय, रामनारायण बेनीमाधव, इलाहाबाद।
4. संस्कृत साहित्य का इतिहास— श्री सत्यनारायण शास्त्री, आर्य बुक डिपो, दिल्ली।
5. संस्कृत साहित्य का इतिहास— डॉ. बलदेव उपाध्याय, चौखम्बा प्रकाशन, वाराणसी।
6. संस्कृत साहित्य का इतिहास— मंगलदेव शास्त्री, मोतीलाल बनारसीदास, दिल्ली।
7. संस्कृत साहित्य का इतिहास— प्रो. उमाशंकर शर्मा ऋषि, चौखम्बा प्रतिष्ठान दिल्ली।
8. संस्कृत साहित्य का इतिहास— डॉ. रमाशंकर त्रिपाठी चौखम्बा प्रतिष्ठान दिल्ली।
9. वैदिक साहित्य एवं संस्कृति का स्वरूप— ओम प्रकाश पाण्डेय, विश्व प्रकाशन।

लघुसिद्धान्त कौमुदी :

1. लघुसिद्धान्त कौमुदी—डॉ. अर्कनाथ चौधरी, जगदीश संस्कृत पुस्तकालय, जयपुर।
2. लघुसिद्धान्त कौमुदी— महेशसिंह कुशवाह—प्रथम व द्वितीय भाग, चौखम्बा संस्कृत प्रतिष्ठान दिल्ली।
3. लघुसिद्धान्तकौमुदी, श्रीश्रीधरानन्द शास्त्री, मोतीलाल बनारसीदास, दिल्ली।
4. लघुसिद्धान्तकौमुदी, विश्वनाथ शास्त्री, मोतीलाल बनारसीदास, दिल्ली।

द्वितीय प्रश्नपत्र

नाटक, छन्द, अलंकार एवं संस्कृत साहित्य का इतिहास

समय : 3 घण्टे

अंक—100

प्रथम प्रश्न में निर्धारित ग्रन्थ में से लघूत्तरात्मक निबन्धात्मक, अनुवाद, व्याख्या व समालोचनात्मक प्रश्न पूछे जायेंगे।

पाठ्यक्रम

1. अभिज्ञानशाकुन्तलम्— कालिदास 45 अंक
2. छन्द— अभिज्ञानशाकुन्तलम् के आधार पर निम्नलिखित छन्दों के लक्षण एवं उदाहरण—अनुष्टुप्, आर्या, उपजाति, भुजंगप्रयात, वसन्ततिलका, शिखरिणी, मालिनी, शार्दूलविक्रीडित, इन्द्रवज्रा, उपेन्द्रवज्रा, स्थोद्धता, हरिणी, स्रग्धरा, मन्दाक्रान्ता। 10 अंक
3. अलंकार— काव्यदीपिका(अष्टम शिखा) के आधार पर निम्नलिखित अलंकारों के लक्षण एवं उदाहरण—अनुप्रास, यमक, श्लेष, वक्रोक्ति, उपमा, रूपक, उत्प्रेक्षा, अतिशयोक्ति, अप्रस्तुतप्रशंसा, विभावना, विशेषोक्ति, व्यतिरेक, संमासोक्ति, दृष्टान्त, दीपक, तुल्ययोगिता, संदेह, भ्रान्तिमान। 10 अंक
4. संस्कृत साहित्य का इतिहास 25 अंक
 - (क) वीरकाव्य : रामायण तथा महाभारत
 - (ख) महाकाव्य —कालिदास, अश्वघोष, भारवि, माघ।
 - (ग) गीति काव्य— कालिदास, भर्तृहरि, पण्डितराज जगन्नाथ।
 - (घ) गद्य काव्य— दण्डी, सुबन्धु, बाणभट्ट, अम्बिकादत्त व्यास।

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(ड) नाट्य साहित्य— भास, कालिदास, शूद्रक, विशाखदत्त।

(च) आधुनिक संस्कृत साहित्य (राजस्थान प्रान्त के विशेष संदर्भ में)

पं.गणेशराम शर्मा, पं. मधुसूदन ओझा, भट्ट मथुरानाथ शास्त्री, पद्मशास्त्री,

श्री सूर्य नारायण शास्त्री।

5. अनुवाद (हिन्दी से संस्कृत)

10 अंक

अंक— विभाजन

क्र. सं.	नाम पुस्तक	लघूत्तरात्मक प्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	अंको का योग
1.	अभिज्ञानशाकुन्तलम्	लघूत्तरात्मक 05	10	03	35	10+35=45
2.	छन्द (अभिज्ञानशाकुन्तलम् के आधार पर)	लघूत्तरात्मक 01	02	01	08	2+08=10
3.	अलंकार (काव्यदीपिका अष्टम शिखा के आधार पर)	लघूत्तरात्मक 01	02	01	08	2+08=10
4.	संस्कृत साहित्य का इतिहास	लघूत्तरात्मक 08	16	01	9	16+9=25
5.	अनुवाद			01	10	10
कुल योग		15	30	07	70	100

प्रश्न-पत्र का निर्माण निम्नानुसार होगा —
भाग 'अ'

30 अंक

प्रश्न-पत्र का निर्माण निम्नानुसार होगा —

- सभी प्रश्न अनिवार्य हैं।
- प्रत्येक पुस्तक से लघूत्तरात्मक व निबन्धात्मक, व्याख्यात्मक प्रश्न पूछे जायेंगे।
लघूत्तरात्मक प्रश्न के 2 अंक निर्धारित हैं।

निबन्धात्मक / व्याख्यात्मक प्रश्न

1. अभिज्ञानशाकुन्तलम्

भाग अ में 2-2 अंक के पाँच लघूत्तरात्मक प्रश्न पूछे जायेंगे।

10 अंक

भाग ब

1 से 4 अंकों में से 4 श्लोक पूछकर उनमें से किन्हीं 2 की सप्रसंग व्याख्या पूछी जायेगी।

14 अंक

5 से 7 अंकों में से 4 श्लोक पूछकर उनमें से किन्हीं 2 की सप्रसंग व्याख्या पूछी जायेगी।

14 अंक

2 प्रश्नों में से 1 प्रश्न का उत्तर अपेक्षित है।

07 अंक

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2. छन्द
भाग अ में 2 अंक के एक लघूत्तरात्मक प्रश्न पूछा जायेगा । 02 अंक
भाग ब
4 छन्द पूछकर 2 के लक्षण एवं उदाहरण अपेक्षित है । 08 अंक
3. अलंकार
भाग अ में 2 अंक के एक लघूत्तरात्मक प्रश्न पूछा जायेगा । 02 अंक
भाग ब
4 अलंकार पूछकर उनमें से 2 के लक्षण एवं उदाहरण अपेक्षित है । 08 अंक
4. संस्कृत साहित्य का इतिहास
भाग अ में 2-2 अंक के आठ लघूत्तरात्मक प्रश्न पूछे जायेंगे । 16 अंक
भाग ब
2 विवेचनात्मक प्रश्नों में से 1 प्रश्न का उत्तर अपेक्षित है । 09 अंक
5. अनुवाद (हिन्दी से संस्कृत)
10 वाक्यों में किन्हीं 5 वाक्यों का संस्कृत में अनुवाद । 10 अंक

सहायक पुस्तकें

अभिज्ञानशाकुन्तलम्

1. अभिज्ञानशाकुन्तलम् डॉ. गंगासागर राय, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली
2. अभिज्ञानशाकुन्तलम् जगदीशप्रसाद शर्मा— रचना प्रकाशन, जयपुर
3. अभिज्ञानशाकुन्तलम् सुबोधनचंद्र पंत— मोतीलाल बनारसी, दिल्ली
4. अभिज्ञानशाकुन्तलम् जगदीशलाल शास्त्री— मोतीलाल बनारसी दिल्ली
5. काव्यदीपिका— परमेश्वरानंद शर्मा, मोतीलाल बनारसी दिल्ली

संस्कृत साहित्य का इतिहास :-

1. संस्कृत साहित्य की रूपरेखा— चंद्रशेखर पाण्डेय एवं नानूराम व्यास, चौखम्बा प्रकाशन, वाराणसी
2. संस्कृत साहित्य का नवीन इतिहास— डॉ. पुष्करदत्त शर्मा, अजमेरा बुक कं. जयपुर
3. संस्कृत साहित्य का आलोचनात्मक इतिहास— डॉ. रामजी उपाध्याय, रामनारायणलाल बेलरमाणव, इलाहाबाद
4. संस्कृत साहित्य का इतिहास—श्री सत्यनारायण शास्त्री, आर्य बुक डिपो, दिल्ली
5. संस्कृत साहित्य की प्रवृत्तियाँ— डॉ. जयकिशनप्रसाद खण्डेलवाल, विनोद पुस्तक मंदिर, आगरा
6. संस्कृत साहित्य का इतिहास— ए.बी. कीथ, अनु. मंगलदेव शास्त्री — दिल्ली।
7. संस्कृत साहित्य का इतिहास— प्रो. राजवंश सहाय 'हीरा' चौखम्बा संस्कृत प्रतिष्ठान दिल्ली
8. संस्कृत साहित्य का प्राचीन एवं अर्वाचीन इतिहास— डॉ. रामसिंह चौहान, रितु पब्लिकेशन, जयपुर।

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6. Philosophy

B.A. Part-II

Scheme :

Two Papers	Min. Pass Marks 72	Max. Marks 200
Paper I	3 hrs. duration	Max. Marks 100
Paper II	3 hrs. duration	Max. Marks 100

General Instructions:

- (1) There shall be two question papers: Paper I and Paper II.
- (2) Both the question papers will be in two parts: Part I & Part II
- (3) Part I of the question paper will be of 40 marks in total. This part will consist of twenty compulsory short questions, with 2 marks each. The word limit for these questions shall be upto 50 words. These questions will cover the entire units and there will be no unit wise division of the questions asked in this part.
- (4) Part II of the question paper will be of 60 marks and students will required to write detailed answer in the answer sheet only. If syllabus (course contents) of a paper is divided into two units i.e. Unit A and Unit B, then in this part of the question paper six questions will be asked in total: three questions from each unit. Student will be asked to attempt three questions in total and at least one question from each unit. Each question will be of 20 marks. If syllabus (course contents) of a paper is divided into three Units i.e. Unit A, B & C then in the Part II of the question paper, which consist of Essay type questions, six questions will be asked in total: two questions from each Unit. Students will be required to attempt three questions in total and one question from each Unit. The ideal word limit for these questions is 500-600 words.

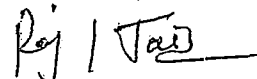
Paper I : Logic (Western)

Unit: A

1. Nature of Logic
2. Deduction and induction
3. Sentence and proposition
4. Truth and validity
5. Uses of language
6. Informal Fallacies
7. Laws of thought

Unit: B

1. Aristotelian classification of categorical propositions, square of opposition and the question of existential import, conversion, observation, contraposition.
2. Categorical syllogism: figures and moods, rules of validity, fallacies.
3. Boolean interpretation of propositions, Venn diagram technique of testing the validity of syllogisms.


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Unit: C

1. Truth-functions: negation, conjunction, disjunction, implications and equivalence.
2. Arguments and argument-forms, truth-table technique for testing the validity of arguments form and classification of statements forms.
3. Mill's methods of experimental enquiry
4. The method of deduction in propositional logic introduction of rules & simple derivation.

Suggested Readings:

- I.M. Copi : *Introduction to logic* (Hindi Translation by Pandey and Mishra and another translation available from Pearson)
- S.K. Seth and Nilima Mishra : *Tarkshastra*, Lokabharti, Allahabad

Paper II: Ethics (Indian and Western)

Unit: A

1. Introduction: Concerns and presuppositions, theory of karma.
2. Dharma: its meaning, definition, classification
3. Niskama Karma Yoga, Sthitprajna, Lokasamgraha
4. Purusarthas and their inter-relation, purusartha: sadhana and sadhaya Mulya.
5. Buddhist ethics: the four noble truths and the eight-fold path. Brahmaviharas
6. Jaina ethics : anuvratas and mahavratas, Tri ratna

Unit: B

1. Nature and scope of ethics.
2. Introduction: concerns and presuppositions; free will.
3. Teleological ethics: egoism; hedonism; utilitarianism.
4. Deontological ethics: Kant.
5. Intuitionism : Butler
6. Virtue ethics: Socrates, Plato and Aristotle.
7. Theories of punishment.

Suggested Readings :

- I.C. Sharma : *Ethical Philosophies of India.*
- S.K. Maitra : *The Ethics of the Hindus.*
- Surama Dasgupta : *Development of Moral Philosophy in India.*
- M. Hiriyanna : *The Indian Conception of Values.*
- P.V. Kane : *The History of Dharmasastras Vol.I* (Hindi translation available)
- W. Lillie : *An Introduction to Ethics.* Philippa Foot (ed.) *Theories of Ethics.*
- J.N. Sinha : *A Manual of Ethics* (Hindi translation available)
- दिवाकर पांडेय : भारतीय नीतिशास्त्र
- संगमलाल पांडेय : नीति दर्शन का सर्वेक्षण
- वेद प्रकाश वर्मा : नीतिशास्त्र के मूल सिद्धान्त

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7. : HISTORY

The scheme of examination will be as follows:

Scheme:

Maximum Marks 200

Minimum Pass Marks 72

Paper I

3 hrs. Duration

Marks 100

Paper II

3 hrs. Duration

Marks 100

Note: There shall be two papers in all in the subject of History, and each paper shall be of three hours duration and of 100 marks.

Each paper shall consist of two parts. Part I shall carry 40 marks and shall consist of two compulsory questions. The first compulsory question will be of 20 marks, comprising of 10 very short answer type questions of two marks each. The answer to each question should not exceed 20 words.

The second compulsory question will be of 20 marks. It will comprise of 10 short answer type questions of 04 marks each, the candidate will be required to answer any 05 questions. The answer to each question should not exceed 50 words.

The second part of the question paper shall be divided into three sections comprising of 06 essay type questions, containing 02 questions from each section, of 20 marks each. Candidate will be required to answer 03 questions, selecting one question from each section. This part of the question paper shall be of 60 marks.

परीक्षा योजना :

अधिकतम अंक 200

न्यूनतम उत्तीर्णांक 72

प्रथम प्रश्नपत्र

समय 3 घंटे

अंक 100

द्वितीय प्रश्नपत्र

समय 3 घंटे

अंक 100

नोट : इतिहास विषय के कुल दो प्रश्नपत्र होंगे, प्रत्येक प्रश्नपत्र तीन घंटे की अवधि का एवं 100 अंकों का होगा।

प्रत्येक प्रश्नपत्र के दो भाग होंगे। प्रथम भाग 40 अंकों का होगा एवं इस भाग में दो अनिवार्य प्रश्न होंगे। 20 अंकों के प्रथम अनिवार्य प्रश्न में, दो-दो अंक के 10 अनिवार्य अतिलघुउत्तरात्मक प्रश्न होंगे। प्रत्येक उत्तर की शब्द सीमा 20 शब्द।

20 अंकों के द्वितीय अनिवार्य प्रश्न में, चार-चार अंकों के 10 लघुउत्तरात्मक प्रश्न होंगे जिनमें से 05 प्रश्न करने होंगे। प्रत्येक उत्तर की शब्द सीमा 50 शब्द।

प्रश्नपत्र के द्वितीय भाग में, पाठ्यक्रम के तीन खण्डों में से, प्रत्येक खण्ड से दो-दो प्रश्नों का चयन करते हुए, कुल 06 निबन्धात्मक प्रश्न होंगे। प्रत्येक प्रश्न 20 अंकों का होगा। परीक्षार्थियों को प्रत्येक खण्ड में से एक-एक प्रश्न का चयन करते हुए कुल 03 प्रश्न हल करने होंगे। प्रश्नपत्र का यह भाग 60 अंकों का होगा।

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PAPER I : HISTORY OF MEDIEVAL INDIA (c. 1200-1761 A. D)

Section - A

A survey of the sources of the period of Delhi Sultanate. Turkish invasions and Rajput resistance. Establishment and consolidation of Delhi Sultanate. Khalji imperialism and Tughlaq innovations. Growth of Provincial kingdoms. Contribution of Bahamani and Vijayanagar kingdoms.

Section - B

A survey of the sources of the Mughal period: Foundations of the Mughal Empire. Rise of Sher Shah Suri and his administration. Expansion and consolidation of the Mughal empire under Akbar. Role of Nur Jahan 'Junta' in Mughal politics. Mughal policy towards Rajputs, Sikhs, Deccan kingdom, Marathas, Persia and Central Asia. Religious policy of the Mughals. Rise of Shivaji and expansion of the Marathas upto 1761. Fall of the Mughal Empire.

Section - C

A critical evaluation of the main features and processes of the polity, society, economy and culture during medieval times (c. 1200-1761 A.D). Nature of State. Growth of administrative and agrarian systems. Economy : agriculture, industry, trade, banking, urban centres. Society : social classes - ulema, nobility, peasantry, slavery. Status of women. Bhakti Movement, Maharashtra Dharma, Sufism, Sikhism. Developments in art, architecture, and literature. Efforts at cultural synthesis and growth of composite culture.

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दिल्ली सल्तनत के काल के स्रोतों का सर्वेक्षण। तुर्की आक्रमण एवं राजपूत प्रतिरोध। दिल्ली सल्तनत की स्थापना एवं सुदृढीकरण। खलजी साम्राज्यवाद एवं तुगलकी नवप्रवर्तन। प्रांतीय राज्यों का उदय। बहमनी एवं विजयनगर राज्यों का योगदान।

खण्ड - 18

मुगल काल के स्रोतों का सर्वेक्षण। मुगल साम्राज्य की स्थापना। शेरशाह सूरी का उत्कर्ष एवं उसका प्रशासन। अकबर के अधीन मुगल साम्राज्य का विस्तार एवं सुदृढीकरण। मुगल राजनीति में नूरजहाँ 'जुन्ता' की भूमिका। राजपूतों, सिक्खों, दक्कनी राज्यों, मराठों, फारस एवं मध्य एशिया के प्रति मुगलों की नीति। मुगलों की धार्मिक नीति। शिवाजी का उत्कर्ष तथा 1761 ईस्वी तक मराठों का विस्तार। मुगल साम्राज्य का पतन।

खण्ड - 19

मध्यकाल (1200 से 1761 ईस्वी) में राजशासन, समाज, अर्थव्यवस्था एवं संस्कृति की मुख्य विशेषताओं का आलोचनात्मक मूल्यांकन। राज्य की प्रकृति। प्रशासनिक एवं कृषिपरक व्यवस्थाओं का विकास। अर्थव्यवस्था : कृषि, उद्योग, व्यापार, बैंकिंग, नगरीय केन्द्र। समाज : सामाजिक वर्ग - उलेमा, कुलीन वर्ग, कृषक वर्ग, दासप्रथा। स्त्रियों की स्थिति। भक्ति आंदोलन, महाराष्ट्र धर्म, सूफीवाद, सिक्ख धर्म। कला, स्थापत्य एवं साहित्य की प्रगति। सांस्कृतिक समन्वय, हेतु प्रयास एवं समिश्र संस्कृति का विकास।

Books Recommended (अनुशासित पुस्तकें) :

- K. S. Lal : *History of the Khaljis*, Allahabad, 1960.
 : *Theory and Practice of Muslim State in India*, Delhi, 1999
 Hermann Kulke (ed.) : *The State in India, 1000-1700 A.D.*, Delhi, 1997
 A. Mahdi Husain : *The Tughlaq Dynasty*.
 : *The Rise and Fall of Muhammad Bin Tughlaq*
 Satish Chandra : *Medieval India - From Sultanate to the Mughals*, Part I, :
Delhi Sultanate (1205-1526), Part II; *Mughal Empire* :
 (1526-1748) Delhi, 1997 (also in Hindi).
 K. M. Ashraf : *Life and Conditions of the People of Hindustan*.
 (1200-1550 A.D.), Delhi, 1970.
 R. P. Tripathi : *Rise and Fall of the Mughal Empire* (also in Hindi),
 Allahabad, 1963
 : *Some Aspects of Muslim Administration*, Allahabad, 1964

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Irfan Raychaudhuri

Irfan Habib (ed.)

John F. Richards

Jadunath Sarkar

Irfan Habib

S. R. Sharma

Burton Stein

H.K. Sherwani

G. S. Sardesai

A. L. Srivastava

राधेशरण

राधेशरण

डारखण्ड चौबे एवं
कन्हैयालाल श्रीवास्तव

सतीश चन्द्र

हरिश्चंद्र वर्मा (सं.)

ए.एल. श्रीवास्तव

धनश्याम दत्त शर्मा

Cambridge Economic History of India, Vol. I,

c. 1200-1750 A.D., Delhi, 1984

*The Mughal Empire, Delhi, 1993**Mughal Administration, Delhi, 1972**Agrarian System of Mughal India, 1526-1707, Mumbai, 1963**Religious Policy of the Mughal Empire (also in Hindi), Agra, 1972**Vijayanagar, 1989**Peasant State and Society in Medieval South India, Delhi, 1980**The Bahamani Kingdom**New History of the Marathas, Vol. I**Medieval Indian Culture (also in Hindi), Agra, 1964*

मध्यकालीन भारत का सामाजिक एवं आर्थिक इतिहास, मध्यप्रदेश, हिन्दी ग्रंथ अकादमी, भोपाल, 2000

मध्यकालीन भारत की सांस्कृतिक संरचना, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1998

मध्ययुगीन भारतीय समाज एवं संस्कृति, उत्तरप्रदेश हिन्दी संस्थान, लखनऊ, चतुर्थ संस्करण, 2005

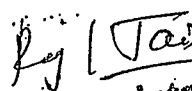
मध्यकालीन भारत : सल्तनत से मुगलों तक, भाग एक - दिल्ली सल्तनत (1206-1526), भाग दो - मुगल सल्तनत (1526-1748)


मध्यकालीन भारत, भाग-1 (750-1540), भाग -2 (1540-1761),

हिन्दी माध्यम कार्यान्वयन निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली

मध्यकालीन भारतीय संस्कृति (अनुवाद)

मध्यकालीन भारतीय सामाजिक, आर्थिक एवं राजनीतिक संस्थाएं, राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर


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PAPER II. MAIN TRENDS IN THE CULTURAL HISTORY OF INDIASection - A

Meaning of Culture. Essence and characteristics of Indian Culture. Religion and Culture : Vedic religion, Buddhism and Jainism, Vaishnavism and Saivism. Bhakti Movement. Islam and Sufism in India. Philosophy and Culture : Upanishadic thought, Bhagvadgita.

Section - B

Literature and Culture : significance of Ramayana, Mahabharata and Puranas. Contribution of Kalidas, Tulsidas, and Ravindranath Tagore. Social Institutions and Culture : Social ideals of ancient India - *varna, ashrama, samskaras, purushartha*. Social Reform Movements of the 19th and 20th centuries.

Section - C

Art and Culture : Characteristics of Indian Art. Styles of temple architecture. A brief study of temples at Abu, Khajuraho, Orissa, Pallava and Chola temples. Painting through the ages - rock paintings, Ajanta paintings, Mughal painting. Science and Culture : Contributions of Aryabhata, Varahamihira, Charaka and Susruta

द्वितीय प्रश्नपत्र : भारत के सांस्कृतिक इतिहास की मुख्य धाराएँखण्ड - क

संस्कृति का अर्थ। भारतीय संस्कृति का प्रधान तत्त्व एवं विशेषताएँ। धर्म एवं संस्कृति : वैदिक धर्म, बौद्ध धर्म एवं जैन धर्म, वैष्णव धर्म एवं शैव धर्म। भक्ति आंदोलन। भारत में इस्लाम एवं सूफी मत। दर्शन एवं संस्कृति उपनिषदों का चिन्तन, भगवद्गीता।

खण्ड - ख

साहित्य एवं संस्कृति : रामायण, महाभारत एवं पुराणों का महत्त्व। कालिदास, तुलसीदास एवं रवीन्द्रनाथ टैगोर का योगदान। सामाजिक संस्थाएँ एवं संस्कृति : प्राचीन भारत के सामाजिक आदर्श - वर्ण, आश्रम, संस्कार, पुरुषार्थ। 19वीं एवं 20वीं शताब्दी के समाज-सुधार आंदोलन।

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कला एवं संस्कृति : भारतीय कला की विशेषताएँ। मंदिर स्थापत्य की शैलियाँ। आवू, खजुराहो, उड़ीसा, चोल एवं चोल मंदिरों का संक्षिप्त अध्ययन। काल के प्रवाह में चित्रकला - शैल चित्रकला, अजंता चित्रकला, मुगल चित्रकला। विज्ञान एवं संस्कृति - आर्यभट्ट, वराहमिहिर, चरक एवं सुश्रुत का योगदान।

Books Recommended (अनुशंसित पुस्तकें) :

G. C. Pande	:	<i>Foundations of Indian Culture, Vol. I and II</i>
	:	<i>Meaning and Process of Culture</i>
R. G. Bhandarkar	:	<i>Vaishnavism, Saivism and other Minor Religious Systems.</i>
Rajbali Pandey	:	<i>Hindu Samskara (The Social and Religious Study of the Hindu Sacraments), (also in Hindi), Varanasi</i>
A. L. Srivastava	:	<i>Medieval Indian Culture (also in Hindi).</i>
V.S. Agrawala	:	<i>Indian Art, Varanasi.</i>
Krishna Dev	:	<i>Temples of North India (also in Hindi), NBT, New Delhi</i>
K. R. Srinivasan	:	<i>Temples of South India (also in Hindi), NBT, New Delhi</i>
A. L. Basham	:	<i>The Wonder that was India (also in Hindi)</i>
	:	<i>The Cultural History of India (ed.)</i>
गोविन्दचन्द्र पाण्डे	:	भारतीय परम्परा के मूल स्वर, नई दिल्ली, 1993
	:	भारतीय समाज - तात्त्विक और ऐतिहासिक विवेचन, नई दिल्ली, 1994
एन.के. देवराज	:	भारतीय दर्शन, लखनऊ, 1963
राजबली पांडे	:	हिन्दू संस्कार, वाराणसी
जयशंकर मिश्र	:	प्राचीन भारत का सामाजिक इतिहास, पटना, 1999
ए.एल. श्रीवास्तव	:	मध्यकालीन भारतीय संस्कृति (अनुवाद)
वासुदेव शरण अग्रवाल	:	भारतीय कला
पृथ्वीकुमार अग्रवाल	:	प्राचीन भारतीय कला एवं वास्तु, विश्वविद्यालय प्रकाशन, वाराणसी, 2002
कृष्णदेव	:	उत्तर भारत के मंदिर, नेशनल बुक ट्रस्ट, नई दिल्ली
के.आर. श्रीनिवासन	:	दक्षिण भारत के मंदिर, नेशनल बुक ट्रस्ट, नई दिल्ली
सत्य प्रकाश	:	प्राचीन भारतीय विज्ञान की परम्परा
ए.एल. बाशम	:	अद्भुत भारत (अनुवाद)

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8. Political Science

B.A. Part-II

प्रश्न-पत्रों की रूपरेखा

राजनीति विज्ञान के दो प्रश्न-पत्र होंगे। प्रत्येक प्रश्न-पत्र 3 घण्टे की अवधि का होगा तथा प्रश्न-पत्र के अधिकतम 100 अंक होंगे।

प्रत्येक प्रश्न-पत्र के तीन खण्ड होंगे। प्रथम खण्ड 20 अंको का होगा। इस खण्ड में दो अंकों के 10 अनिवार्य प्रश्न होंगे। जिनमें से प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20-25 शब्दों में देना होगा।

द्वितीय खण्ड 20 अंकों का होगा। इस खण्ड में 05 अंकों के 04 अनिवार्य प्रश्न होंगे, जिनमें से प्रत्येक का उत्तर 150 शब्दों में अपेक्षित होगा।

तृतीय खण्ड 60 अंकों का होगा। इस खण्ड में तीन भाग होंगे। जिनमें प्रत्येक में 20 अंको के दो निबंधात्मक प्रश्न होंगे। परीक्षार्थी से प्रत्येक खण्ड में से एक प्रश्न का उत्तर अपेक्षित होगा। प्रत्येक खण्ड से एक प्रश्न का चयन करते हुए कुल 03 प्रश्नों का उत्तर अपेक्षित होगा।

Scheme of Question Papers

There shall be two papers of political Science. Each question paper shall be of three hours duration and of 100 marks.

Each Question Paper shall consist of three Parts. Part I shall carry 20 marks and shall consist of 10 compulsory questions of 2 marks each to be answered in 20-25 words each.

Part II shall carry 20 marks and shall consist of 4 compulsory questions of 5 marks each to be answered in 150 words each.

Part III of the question paper shall carry 60 marks. This part shall be divided into 3 sections each comprising of 2 essay-type questions of 20 marks each. Candidates will be required to attempt one question from each section (3 questions in all, one from each section)

प्रथम प्रश्न- पत्र: प्रमुख राजनीतिक व्यवस्थाएँ

विद्यार्थियों से अग्रांकित देशों की राजनीतिक प्रणालियों के महत्वपूर्ण पक्षों-विधायिका, कार्यपालिका, न्यायपालिका, राजनीतिक दल एवं वर्तमान प्रवृत्तियों का विशलेष्णात्मक और तुलनात्मक दृष्टिकोण से अध्ययन करने की अपेक्षा की जायेगी।

खण्ड 'क'

ब्रिटेन।

खण्ड 'ख'

संयुक्त राज्य अमेरिका।

खण्ड 'ग'

चीन, जापान, स्विट्जरलैण्ड।

अनुशासित पुस्तक:-

इकबाल नारायण : विश्व के संविधान।

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- प्रभुदत्त शर्मा : संविधानों की दुनिया।
 बाबूलाल फडिया : विश्व के प्रमुख संविधान।
 पी.के. चड्ढा : विश्व के प्रमुख संविधान।
 पुखराज जैन : विश्व के प्रमुख संविधान।
 ए.सी. कपूर : मेजर कान्स्टीट्यूशन्स।
 के.एल.कमल : चीन का संविधान एवं राजनीति

Paper-I : Selected Political System

Student will be expected to study the salient aspects-Legislature, Executive, Judiciary, Political Parties of the political systems of the following countries with an analytical and comparative perspective.

	Section -A
Britain	
	Section -B
U.S.A.	
	Section -C
Peoples Republic of China, Japan and Switzerland.	

Suggested readings:

- Ogg & Zink : Modern Foreign Governments.
- Babulal Fadia : Vishwa Ke Pramukha Samvidhan.
- Iqbal Narain : Vishwa ke Samvidhan
- Chaddha , P.K : Vishwa Ke Pramukha Samvidhan(Adarsh Prakashan, Chaura Rasta, Jaipur).
- A.C Kapoor : Major Constitutions.
- R.C. Agarwal : World Constitutions.

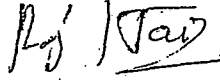
द्वितीय प्रश्न-पत्र: भारतीय राजनीतिक व्यवस्था

खण्ड 'क'

भारत में राष्ट्रीय आंदोलन- भारत में राष्ट्रवाद का उदय, भारतीय राष्ट्रीय कांग्रेस एवं मुस्लिम लीग की स्थापना, उदारवादी और उग्रवादी, गांधी व राष्ट्रीय आंदोलन, भारत में संवैधानिक विकास- भारत में शासन अधिनियम, 1919 (द्वैध शासन के विशिष्ट संदर्भ में), भारत शासन अधिनियम, 1935 (प्रांतीय स्वायत्तता के विशिष्ट संदर्भ में), संविधान निर्मात्री सभा।

खण्ड 'ख'

संविधान की प्रस्तावना, संघीय व्यवस्था, मौलिक अधिकार, राज्य नीति के निदेशक तत्त्व, संघीय कार्यपालिका: राष्ट्रपति, प्रधानमंत्री व मंत्रिपरिषद्, संघीय संसद, उच्चतम न्यायालय व न्यायिक पुनरावलोकन, न्यायिक सक्रियता, जनहित याचिका, संविधान सशोधन की प्रक्रिया, संघ- राज्य सम्बन्ध, संवैधानिक एवं विधिक आयोग-निर्वाचन आयोग, संघ लोक सेवा आयोग, राष्ट्रीय मानवाधिकार आयोग।


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राज्यों का शासन: राज्य व्यवस्थापिका, राज्य कार्यपालिका: राज्यपाल, मुख्यमंत्री एवं मंत्री परिषद, कतिपय राज्यों को विशेष दर्जा और उसके प्रभाव, दलीय व्यवस्था, भारत में पंथनिरपेक्षता की प्रकृति, भारतीय राजनीतिक व्यवस्था के सम्मुख प्रमुख चुनौतियाँ-क्षेत्रवाद, जातिवाद, साम्प्रदायिकता, नक्सलवाद, आंतकवाद, पंचायती राज एवं नगर निकाय, 73 वें व 74 वें संविधान संशोधन की महत्ता।

अनुशंसित पुस्तकें:-

N.D Palmer : The Indian Political System, Houghton Miffling, Boston, 1971

R.L. Hardgrave, Jr. : Indian Government and Politics (Harcourt Brance and World, Inc, New York, 1970)

Basu, D.D : Introduction to Constitution of India

Kashyab, Subash : Our Parliament

Zoya Hasan, E. Sridharan, R.Sudarshan (Editors): India's Living Constitution, Permanent Black, New Delhi, 2006

राजनी कांठारी: भारत में राजनीति, ओरिएन्ट लॉंगमेन्स, नई दिल्ली, 1972

गोविन्द राम: भारतीय राज्य व्यवस्था

बी. एल. फडिया: भारतीय राज्य व्यवस्था

ए. एम. सईद: भारतीय राज्य व्यवस्था

बी. के. शर्मा: भारतीय संविधान

पी. के. चड्ढा: भारतीय राजनीतिक प्रणाली, आदर्श प्रकाशन, चौड़ा रास्ता, जयपुर

बासूकी नाथ चौधरी, युवराजकुमार: भारतीय शासन एवं राजनीति, ओरिएन्ट, ब्लैकस्वान, नई दिल्ली, 2011

Paper (II) – Indian Political System

Section – A

National Movement in India, Rise of Nationalism in India, Foundation of the Indian National congress and Muslim League, Moderates and Extremists, Gandhi and National Movement.

Constitutional Development in India : Government of India Act 1919 (with special reference to Dyarchy) and Government of India Act 1935(with special reference to Provincial Autonomy)Constituent Assembly.

Section-B

Preamble of the Constitution, Federal system, Fundamental Rights, Directive Principles of State Policy, Union Executive: President, Prime Minister and the Council of Ministers, Union Parliament, Supreme Court and Judicial Review, Judicial Activism, PIL, Method of Amendment in the Constitution, Centre – State Relation, Constitutional/Statutory commission- ECI, UPSC, NHRC.

Section –C

Governance of States: State Legislature, State Executive: Governor, Chief Minister, Council of Minister, Special status to certain states and its implications, Party System, Nature of Secularism in India, Major challenges before the Indian Political System : Regionalism, Casteism, Communalism, Naxalism and Terrorism, Panchayati Raj and Municipalities, significance of 73rd and 74th constitutional amendment acts.

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Suggested Readings:-

N.D Palmer : The Indian Political System, Houghton Miffling, Boston, 1971

R.L. Hardgrave, Jr. : Indian Government and Politics (Harcourt Brance and World, Inc, New York, 1970)

Basu, D.D : Introduction to Constitution of India

Kashyap, Subash : Our Parliament

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गोविन्द राम: भारतीय राज्य व्यवस्था

बी. एल. फडिया: भारतीय राज्य व्यवस्था

एस. एम. सईद: भारतीय राज्य व्यवस्था

बी. के. शर्मा: भारतीय संविधान

पी. के. चड्ढा: भारतीय राजनीतिक प्रणाली, आदर्श प्रकाशन, चौडा रास्ता, जयपुर

बासूकी नाथ चौधरी, युवराजकुमार: भारतीय शासन एवं राजनीति, ओरिएन्ट, ब्लेकस्वान, नई दिल्ली, 2011

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9 B.A. PART II
INDIAN MUSIC (VOCAL)

Paper - I	3 hrs.duration	Max.Marks 40	Min. Marks 15
Paper - II	3 hrs.duration	Max.Marks 40	Min. Marks 15
Practical	1 hr. per candidate	Max. Marks 120	Min. Marks 43

Teaching Hours

Practical

6 Hours Per Week

Theory

Paper -I 2 Hours Per Week

Paper -II 2 Hours Per Week

Total Teaching Hours for practical – 06, Theory - 04 Hours Per Week

- Note : (1) Each theory paper will contain nine questions having three question in each section. Candidates are required to attempt five questions in all selecting atleast one question from each section.
- (2) Candidate must pass separately in each of the theory and practical.

❖ Candidates must pass separately in each of the paper Theory and Practical wherever prescribed.

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Important**B.A. Part -II Examination**
(under 10+2+3 Pattern)

The number of papers and maximum marks for each paper altogether with the minimum marks required for passing are shown in the Scheme of Examination on against each subject separately. It will be necessary for a candidate to pass in the theory part as well as practical part of this subject/ paper, wherever prescribed, separately. Gradation of successful candidate shall be as follows:

First division	60%	} of the aggregate marks obtained in Pt.I, Pt-II and Pt. III Examinations taken together.
Second division	48%	

Rest of the candidates will be declared as passed. Minimum pass percentage is 36% No division shall be awarded at the Pt. I and Pt. II Examination.

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Theory:-

Paper – I

Principles of Indian Music (Vocal)
Common with Instrumental

Section –A

Paper: I

3 hrs. duration

Max. Marks-40 Min. Marks-15

- (a) Definitions and explanations of the following terms: Ragalap, Roopakalaap, Alpatva, Bahutva, Alapti, Avirbhav and Tirobhav, Swasthan Niyam & Aadhunik aalap gayan.
- (b) Shruti and Swarsthanas according to Bharat and Pt. Bhatkhande.
- (c) Placement of Shuddha swaras on the wire of veena according to Pt. Ahobal and Pt. Bhatkhande.
- (d) Comparative study of the swaras of North and South Indian Music.

Section –B

- (a) To write the thekas with dugun and chaugun in the following talas : Dhamar, Tilwada, Ektal, Chautal, Rupak, Punjabi, Sooltal, Jhumra, Tivra.
- (b) Critical and comparative study of the ragas prescribed for practical course: Malkauns, Vrindavani-Sarang, MiyanMalhar, Bahar, Bhairav, Ramkali, Shuddha-Kalyan, Jajiwanti, Khamaj and Hameer.

Section –C

- (a) Define the terms of Gat, Jhala, Ghaseet, Jod-alap, Jamjama, Krintan, Meend, Khatka, Murkiand Gamak.
- (b) Notation writing in prescribed ragas.
- (c) Writing Alaps and Tanas / Todas in different Ragas.

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(d) Recognition of Ragas from given notes.

Theory:-

Paper – II

History of Indian Music (Vocal)
Common with Instrumental

Paper: II

3 hrs. duration

Max. Marks-40 Min. Marks-15

Note : The paper will contain five questions, having three questions in each section. Candidates are required to attempt five questions in all selecting atleast one question from each section.

N.B. Candidate must pass separately in each of the theory and practical paper.

Section – A

- (a) Study of Gram Moorchana.
- (b) Modern Shudha Scales of Karnatak and Hindustani Music.
- (c) Major and Minor Scales of Western Music.
- (d) Staff Notation.

Section –B

- (a) Frequencies of the Musical notes.
- (b) Classification of Ragas according to Rag-RaginiPaddhati.
- (c) Life sketches, contribution and style of the following musicians :
Allauddin Khan, Amir Khan, KesarBaiKerker, Pt, OmkarNath Thakur, Vilayat Khan, Nikhil Banerjee.

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Section - C

- (a) Theory of Mela and Janya ragas and 72 Melas of Pt. Vyankatmukhi, 10 Thatas of Bhatkhande, 32 Thatas according to the Swaras of Hindustani Music.
- (b) Use and description of the following instruments pakhawaj, Veena and flute.
- (c) A short essay on any subject of general musical interest.

Practical Vocal

There shall be one practical paper: (conducted by two different Examiners : External and Internal)

(Non-collegiate candidates have to attend compulsory a practical course of forty eight hours at university allotted centres)

Presentation of Ragas & Viva-voce

Duration of Exam. : 1 hour per candidate

Max. Marks 120, Min. Marks. 43

(Critical and Comparative study of Ragas & Tala and to sing or play all the Ragas according to syllabus).

Detailed Course:

1. To sing given musical piece and to recognize the ragas & swaras when sing.
2. To show the difference of ragas through swarvistar in all the ragas.
3. Knowledge of bolas and Thekas on Hand Palm and to recognize on Tabla prescribe Talas in syllabus as - Dhamar, Tilwara, Jhaptal, Punjabi, Sooltal, Jhoomra, Ektal, Chautal, Teevra and Roopak.
4. To sing Aroh, Avroh, Pakad and Swar Vistar of the following ragas- Malkauns, Vrindavani-Sarang, MiyanMalhar, Bahar, Bhairav, Ramkali, Shuddha-Kalyan, Jaijaiwanti, Khamaj, Tilak-Kamod, Hameer.

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5. With the accompaniment of Tabla to sing BadaKhyal and Chhotakhyal with sufficient varieties of Tanas in the following four ragas: Malkauns, Vrindavani-Sarang, Bhairav, Miyan-Malhar.
6. With the accompaniment of Tabla to sing Tarana /Chhotakhyal with tana and in any four ragas of the following.
 - (i) Kharnaj (ii) Bahar (iii) Tilak-Kamod (iv) Ramkali
 - (v) ShuddhaKalyan (vi) Jaijaiwanti.
7. With the accompaniment of Tabla to sing a composition, composed in other than Trital with Tanas, in any two ragas mentioned in clause 4, but not selected under clause 5 & 6.
8. To sing Bhajan in any Ragas to prescribe insyllabus.

Books Recommended :

- (1) Kramik Pustak Malika parts 2,3 and 4 Sangeet Karyalaya, Hathras.
- (2) Tan Malika parts 2 and 3 (Purvardh) by Raja Bhaiya Poochwale, Sangeet Karyalaya, Hathras.
- (3) Tan Sangrah by S.N. Ratanjankar.
- (4) Sitar Marg by S.Bandopadhyaya.
- (5) Sitar Shiksha by B.N. Bhatt.
- (6) Sitar Parts 1 to 3 by B.N. Bhimpure.
- (7) Saral Violin Parichaya by G.N. Goswami, Goswami Printers, Narahi, Lucknow.
- (8) Ragvigyan by N.V. Patwardhan, Part I and part II, Sangeet Karyalaya, Hathras.
- (9) A Short survey of the Music of the Northern India by Pt. V.N. Bhatkhande.
- (10) संगीत के जीवन पृष्ठ by S.Rai.
- (11) Vadya Shastra by Shri Harish Chandra Srivastava.
- (12) Hamare Sangeet Ratna, Sangeet Karyalaya, Hathras.
- (13) Sangeet Visharad by Basant.
- (14) Comparative study of the Music of the 15th, 16th and 17th Centuries by Pt. V.N. Bhatkhande Sangeet Karyalaya, Hathras.
- (15) Sangeet Kaumudi-Vikramaditya. Singh Nigam.
- (16) Tan Malika Pt. III (Uttararddha) by Raja Bhaiya Poochwale.
- (17) Hindustani Music- Its physics and aesthetics by G.S. Ranade, Sangeet Karyalaya, Hathras.

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- (18) Origin of Ragas – Bandopaddhyaya.
- (19) The Music of India by H.A. Popley.
- (20) Hindustani Sangeet Paddhati (Shastra) by Pt. Bhatkhande, Parts 1 to 4.
- (21) Sangeet Mani Part-I,II- Maharani Sharma
- (22) SangeetSwarit- Ramakantdivedi
- (23) Swaranjali- Dr. Sharda Mishra
- (24) RaagRoopanjali- Prof. PushpaVasu

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10.

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Public Admn.

UNIVERSITY OF RAJASTHAN

Subject - Public Administration

Scheme	Max. Marks	Mini Pass. Marks	Time
Two Papers	200	72	
Paper - I	100		3 Hrs.
Paper - II	100		3 Hrs.

Note : Each Paper shall consist of two parts.

Part-I would contain 10 compulsory short answer questions of 4 marks each to be answered in 50 words. Total Marks: 40

Part-II divided into three sections - each section contains 2 descriptive type question of 20 marks each. The candidates are required to attempt three questions selecting one question from each section. Total Marks: 60

Slabus

Paper-I : Administrative Institutions in India

Section - A

Administrative Institutions in a Democratic and Socialist Society. The concepts of *Loissez Faire*, Welfare State and Administrative etc.

Organization of Government : Legislature - its role and reasons decline in modern times; Executive : Types and Relationship with legislature.

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Kalwar, Jaipur

Judiciary : Functions and Role with special reference to the Power of Judicial Review, Judicial Activism.

Section - B

Democracy and Administration, Features of Democratic Administration. Role of Bureaucracy, Political Parties and Pressure Groups and their interaction with each other.

Organization and administrative working of Finance Commission, Planning Commission of India and the National Development Council. Election Commission and the administration of elections in India.

Section - C

Organization and working of following Administrative Institutions

(1) University Grants Commission, (2) U.P.S.C., (3) Railway Board, (4) Reserve Bank of India, (5) Central Social Welfare Board.

Books Recommended :

A. Core Books :

1. Waldo : Administrative State.
2. Field : Government in Modern Society.
3. Paranjape : Planning Commission.
4. I.P.A. : Organisation of the Government of India.
5. जियाउद्दीन खाँ एवं अंतर सिंह : प्रशासनिक संस्थाएँ
6. Dr. H.C. Sharma : Prashasnik Sansthayen.
7. Report of Finance Commission of India.
8. M.G. Gupta : Modern Government.

B. Books for Reference :

1. Garbin : Systematic Politics.
2. Salt : Political Institution A Preface.

C. Journal :

1. Indian Journal of Public Administration, New Delhi.

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प्रथम खण्ड

प्रजातांत्रिक तथा समाजवादी समाज में प्रशासनिक संस्थाएँ, अहस्तक्षेपवादी राज्य, कल्याणकारी राज्य तथा प्रशासकीय राज्य की अवधारणाएँ, सरकार का संगठन : व्यवस्थापिका—इसकी भूमिका तथा आधुनिक समय में इसके हास के कारण; कार्यपालिका प्रकार तथा व्यवस्थापिका से सम्बन्ध; न्यायपालिका : कार्य तथा भूमिका-न्यायिक सुविधाओं की शक्ति के विशेष संदर्भ में, न्यायिक सक्रियता।

द्वितीय खण्ड

लोकतंत्र तथा प्रशासन, लोकतांत्रिक प्रशासन के लक्षण, नौकरशाही की भूमिका। राजनीतिक दल तथा दबाव समूह तथा इनकी पारस्परिक अन्तर्क्रिया, भारत में वित्त आयोग, ~~बजट~~ ^{जीए} आयोग तथा ~~संघीय विकास परिषद~~ ^{की} संगठन व प्रशासनिक कार्य प्रणाली, निर्वाचन आयोग तथा भारत में निर्वाचन का प्रशासन।

तृतीय खण्ड

निम्नांकित प्रशासनिक संस्थाओं का संगठन तथा कार्य प्रणाली : 1. विश्वविद्यालय अनुदान आयोग, 2. संघ लोक सेवा आयोग, 3. रेलवे बोर्ड, 4. भारतीय रिजर्व बैंक, 5. केन्द्रीय समाज कल्याण बोर्ड।

अनुशासित पुस्तकें :

(अ) मुख्य पुस्तकें :

1. काल्डो : एडमिनिस्ट्रेटिव स्टेट

2. फिल्ड : गवर्नमेंट इन मॉडर्न सोसायटी

3. गवर्नमेंट : प्लानिंग कमिशन

4. गड्डे आर्.पी.ए. : ऑर्गेनाइजेशन ऑफ द गवर्नमेंट ऑफ इण्डिया।

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5. जियाउद्दीन खा एव अतर सिंह : प्रशासनिक संस्थाएँ
6. डॉ. एच.टी. शर्मा : प्रशासनिक संस्थाएँ
7. रिपोर्ट ऑफ फाइनेन्स कमिशन ऑफ इंडिया
8. एम.जी. गुप्ता : माइने गवर्नमेंट

(ब) संदर्भ पुस्तकें :

1. गार्बिन : सिस्टेमेटिक पॉलिटिक्स
2. साल्ट : पॉलिटिकल इस्टीमेशन : ए प्रीफेस

(स) पत्रिकाएँ

1. इंडियन जर्नल ऑफ पब्लिक एडमिनिस्ट्रेशन, नई दिल्ली।

Paper-II : State Administration in India

Section - A

Present Status of State Administration in India. General background of State Administration in India. States with special reference to the State of Rajasthan.

The Office of the Governor—Powers, Functions and Role in State Administration, Relationship with Council of Ministers.

The Office of the Chief Minister—Powers, Functions, Role and Importance of the Office, Relationship with Council of Ministers.

Organization of the State Secretariat. Organization and working of the Departments of Home, Finance and Agriculture in Rajasthan. Chief Secretary—its Role and Significance in State Administration.

Section - B

Organization and working of the following Boards Companies and Directorates in the State of Rajasthan :

- (a) Revenue Board
- (b) Rajasthan State Electricity : Companies
- (c) Directorate of Agriculture
- (d) Directorate of Education.

Section - C

Personnel Administration : Role of the State Civil Services in Rajasthan (R.A.S., R.P.S. etc.), Organization and working of the Rajasthan Public Service Commission, Training of State Civil Services, Organisation and Functions of State Training Institutes in Rajasthan, Rajasthan Civil Service, Appellate Tribunal.

District Administration : Organization of District Administration. District Collector : Functions and Position.

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Revenue Administration at the District and below level, the role of S.D.O., Tehsildar and Patwaris.

Books Recommended :

A. Core Books :

1. S.R. Maheshwari : Indian Administration.
2. S.S. Khera : District Administration in India.
3. M.V. Pylee : Indian Constitution (Hindi also).
4. A.R.C. : Report on State Administration.
5. A. Zabier & Gupta : Organization of Government of Uttar Pradesh.
6. Dr. H.C. Sharma : Bharat Mein Rajya Prashasan.
7. सी.एम. सिंह एवं अन्य : राजस्थान में राज्य प्रशासन।

B. Reference Books :

1. D.P. Singh : Readings in Indian Administration.
2. S.L. Verma : Revenue Board in Rajasthan.
3. I.I.P.A. : Revenue Board.
4. Rajasthan Government Secretariat Manual.
5. Rajasthan Government : Report of Administrative Reforms Committee (Mathur Committee Report, 1963).
6. Rajasthan Government : Report of the Committee on Training, 1963.
7. H.C.M. Institute : Management of Higher Personnel of Public Administration.
8. I.I.P.A. : Indian Journal of Public Administration (State Administration Special Number July-September, 1976).
9. J.D. Shukla : State and District Administration in India.
10. B. Mehta : Dynamics of State Administration.
11. Annual Report of the Departments of the Government of Rajasthan, Jaipur.

C. Journals :

1. Indian Journal of Public Administration (New Delhi).
2. Prashashnika : H.C.M.R.I.P.A., Jaipur.
3. Management in Government, Delhi.

पाठ्यक्रम :

द्वितीय प्रश्न पत्र : भारत में राज्य प्रशासन

प्रथम खण्ड

भारत में राज्य प्रशासन की वर्तमान स्थिति, राजस्थान के विशेष संदर्भ में, भारत में.

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राज्य प्रशासन की सामान्य पृष्ठभूमि। राज्यपाल : कार्य, शक्तियाँ तथा राज्य प्रशासन में भूमिका, मंत्रिपरिषद् से संबंध। मुख्यमंत्री : शक्तियाँ, कार्य, भूमिका तथा इस पद का महत्त्व मंत्रिपरिषद् से संबंध।

राज्य सचिवालय का संगठन, राजस्थान में गृह, वित्त तथा कृषि विभाग का संगठन तथा कार्यप्रणाली, मुख्य सचिव : राज्य प्रशासन में इसकी भूमिका तथा महत्त्व।

द्वितीय खण्ड

राजस्थान में निम्नलिखित मण्डलों, कम्पनियों तथा निदेशालयों का संगठन एवं कार्यप्रणाली :

(अ) राजस्व मण्डल

(ब) राजस्थान राज्य विद्युत कम्पनियाँ

(स) कृषि निदेशालय

(द) शिक्षा निदेशालय

तृतीय खण्ड

सेवीवर्गीय प्रशासन : राजस्थान राज्य में लोक सेवाओं (आर.ए.एस., आर.पी.एस. इत्यादि) की भूमिका, राजस्थान लोक सेवा आयोग का संगठन तथा कार्यप्रणाली, राज्य लोक सेवाओं का प्रशिक्षण, राजस्थान में राज्य प्रशिक्षण संस्थानों का संगठन एवं कार्य; राजस्थान सिविल सेवा अपीलीय न्यायाधिकरण जिला प्रशासन, जिला प्रशासन का संगठन, जिलाधीश—कार्य तथा पद स्थिति, जिला एवं अधीनस्थ स्तरीय राजस्व प्रशासन; एस.डी.ओ., तहसीलदार तथा पटवारी की भूमिका।

अनुशासित पुस्तकें :

(अ) मुख्य पुस्तकें—

1. एस.आर. माहेश्वरी : इण्डियन एडमिनिस्ट्रेशन
2. एस.एस. खेरा : डिस्ट्रिक्ट एडमिनिस्ट्रेशन इन इंडिया
3. एम.वी. पायली : इंडियन कॉस्टीट्यूशन (हिन्दी संस्करण भी)
4. ए.आर.सी. : रिपोर्ट ऑन स्टेट एडमिनिस्ट्रेशन
5. ए. जबीर एवं गुप्ता : उत्तर प्रदेश सरकार का संगठन
6. डॉ. एच.सी. शर्मा : भारत में राज्य प्रशासन
7. डॉ. सी.एम. सिंह एवं अन्य : राजस्थान में राज्य प्रशासन
8. रमेश के. अरोड़ा व गीता चतुर्वेदी : राज्य प्रशासन
9. सुरेन्द्र कटारिया : राज्य प्रशासन

(ब) संदर्भ पुस्तकें :

1. डी.पी. सिंह : रीडिंग्स इन इंडियन एडमिनिस्ट्रेशन
2. एस.एल. वर्मा : रेवेन्यू बोर्ड इन राजस्थान

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3. आई.आई.पी.ए. : रेवेन्यू बोर्ड

4. राजस्थान गवर्नमेंट सैक्रेटेरिएट मैनुअल

5. राजस्थान गवर्नमेंट रिपोर्ट ऑफ एडमिनिस्ट्रेटिव रिफार्म्स कमेटी (माथुर कमेटी)

6. राजस्थान गवर्नमेंट : रिपोर्ट ऑफ दी कमेटी ऑन ट्रेनिंग, 1963

7. एच.सी.एम. इंस्टीट्यूट : मैनेजमेंट ऑफ हायर पर्सोनेल ऑफ पब्लिक एडमिनिस्ट्रेशन

8. आई.आई.पी.ए. : इंडियन जर्नल ऑफ पब्लिक एडमिनिस्ट्रेशन स्पेशल नम्बर; जुलाई-सितम्बर, 1976

9. जे.डी. शुक्ला : स्टेट एण्ड डिस्ट्रिक्ट एडमिनिस्ट्रेशन इन इंडिया

10. श्री. मेहता : डायनेमिक्स ऑफ स्टेट एडमिनिस्ट्रेशन

11. एनुअल रिपोर्ट ऑफ द डिपार्टमेंट ऑफ द गवर्नमेंट ऑफ राजस्थान, जयपुर

(स) पत्रिकाएँ :

1. इंडियन जर्नल ऑफ पब्लिक एडमिनिस्ट्रेशन (नई दिल्ली)

2. प्रशासनिका : एच.सी.एम. रीपा, जयपुर

3. मैनेजमेंट इन गवर्नमेंट, दिल्ली

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B.A. Part – II

11 DRAWING & PAINTING

SCHEME :

Theory Paper I	Duration	M.M.	Min. Pass Marks
History of Indian Painting and Sculpture	3 hrs.	90	32 ^{1/2}
Practical Paper II			
Part A- Study from Bust (Portrait)	3 hrs.	45	32 ^{1/2}
Part B-Creative Portrait (Rendering)	3 hrs.	45	
Submission of Practical Works(A & B)		20	07
Total		200	72

Paper I : History of Indian Painting and Sculpture

Note : The paper consist of two parts :-

Part –I: Carries 30 marks and consist of 15 short type questions of 2 marks each.

Part –II: Carries 60 marks divided into three sections 4 questions of 15 marks each with internal choice. Candidates are required to attempt four questions selecting one question from each section. Each answer should be limited in 700-800 words.

Section – A

Prehistoric Rock Paintings, Art of Indus Valley Civilization, Jogimara, Ajanta, Bagh, Sigiriya Cave Paintings.

Pal and Apbhransh Painting.

Rajasthan School – Mewar, Kishangarh, Jaipur and Bundi style of painting.

Pahari School – Basohli and Kangra style of Painting.

Section – B

Company School

Raja Ravi Varma, Bengal School - Abanindranath Tagore, Nandalal Bose

Other Indian Artist – Yamini Roy, Rabindranath Tagore and Amrita Shergil

Section –C

History of Indian Sculpture – Maurya Period – Ashoka Pillars, Yakshni of Didarganj and Yaksh Murtishilp.

Sunga Period – Sanchi

Kushan Period, Gandhara and Mathura Sculpture.

Sculptures of Gupta Period.

Books Recommended:

1. Studies in Indian Art - V.S. Agarwal, Varansi, 1965
2. History of Fine Arts in India & Ceylon - Vincent A. Smith (edited by K. Khomalalwala), Bombay, 1930
3. History of Indian and Indonesian Art - A.K. Coomaraswamy, London, 1927
4. Indian Painting - Percy Brown. Calcutta, 1918
5. Survey of Indian Sculpture - S.K. Saraswati, Calcutta, 1957
6. Kala Vilas - Dr. R.A. Agarwal. D.S.A. Books international, Meerut, 2015
7. Fundamental of Indian Arts - S. Das Gupta.
8. भारतीय चित्रकला का संक्षिप्त इतिहास – शर्मा, लोकाेश चन्द्र, कृष्ण प्रकाशन मीडिया (प्रा.लि.)
9. भारतीय मूर्तिकला – राय कृष्ण दास, नागरी प्रचारिणि सभा, काशी
10. भारतीय चित्रकला का संक्षिप्त इतिहास – अविनाश बहादुर वर्मा, प्रकाश बुक डिपो, बरेली.1968
11. भारतीय चित्रकला – राय कृष्ण दास, भारती भोमदार लीडर प्रेस, इलाहाबाद, 2023 ए.डी.
12. भारतीय चित्रकला – वाचस्पति गौरीला, मित्र प्रकाशन प्राइवेट राय कृष्ण दास, नागरी प्रचारिणि सभा, काशी

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Paper- II Part-A : Study from Bust (Portrait)

Medium –Water/ Oil Colour

Duration : 4 hrs.

Size ½ Imperial

Max. Marks : 45

Study from bust (Portrait Painting) showing broad masses of light and shade, clearly bringing out the modelling of the figure and drapery.

Part – B : Creative Portrait (Rendering)

Two Dimensional Creative Portrait should be rendered with emphasis on stylization, colour scheme and textures etc.

Medium –Any Medium

Duration : 2 hrs.

Size ½ Imperial

Max. Marks : 45

Books Recommended :

1. Anatomy and Drawing by Victor Perard, Publisher J.V. Navlakhi, Bombay.
2. Human figure by Vanderpol, Publisher J.V. Navlakhi, Bombay.

Note : Life Model will sit in front of the candidate for four hours with a rest of 10 minutes when required by the model. First session of four hours should be devoted for the study of portrait. There will be a break of one hour after first session. Second session will be of two hours for practical of Creative Portrait (Rendering). Both the parts should be completed on the same day. The student should be allowed to use any style of composition in the examination.

Submission of Practical work :

Max. Marks : 20

Min. Pass Marks : 7

- (a) Five plates from bust study in colour and three plates from bust study in pencil or charcoal.
- (b) Five Plates from creative portrait in colour and three plates from creative portrait in pencil or charcoal.
- (c) A sketch book of not less than 50 sketches.

Instruction for submission :

Note : Submission work will be submitted to the Head of the Department of Drawing and Painting of the College fifteen days before the commencement of examination. The marks in the submission will be awarded by the subject teacher (internal). However, the external examiner shall be empowered to review the work of the submission in case there is a drastic difference between the marks of the examination and submission. Submission work will be retained till the declaration of the result and returned to the Candidate from the Department thereafter. If no claim is made within two months of the declaration of the result, the submission will be destroyed.

Note:

- (a) Candidate should pass in theory as well as in practical paper separately.
- (b) There should be minimum 10 hours for the regular study including two hours for sketching.
- (c) Minimum three demonstrations should be arranged by the subject expert during the session for each practical paper.
- (d) The Department should also arrange for an Educational tour to Ancient Art centres like Ajanta, Ellora, Elephanta, Khujraho, Mahabalipuram etc. once a year.
- (e) Practical examination will be conducted at the centres and the practical work will be examined by external examiner. The examiner will examine the answer books in consultation with and internal examiner who is the subject teacher of the Department of Drawing and Painting. University may centralize the practical examinations at few well equipped Departments to hold examination economically.

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12. Sociology

B.A. Part-II

Scheme :

Min. Pass Marks	72	Max. Marks	200
Paper-I	3 hrs. duration	Marks	100
Paper-II	3 hrs. duration	Marks	100

नोट : समाजशास्त्र के दो प्रश्न-पत्र होंगे। प्रत्येक प्रश्न-पत्र 3 घण्टों में विभाजित होगा। प्रत्येक प्रश्न-पत्र के दो भाग होंगे। प्रथम भाग 40 अंको का होगा। इस भाग में दो अनिवार्य प्रश्न होंगे। 20 अंको के एक प्रश्न में, एक-एक अंक के 20 लघु प्रश्न होंगे तथा प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 20 शब्दों में देना होगा। दूसरे अनिवार्य प्रश्न के अंतर्गत दो-दो अंको के 10 प्रश्न होंगे। प्रत्येक प्रश्न का उत्तर परीक्षार्थी को अधिकतम 40 शब्दों में देना होगा। निर्धारित शब्द सीमा से अधिक शब्दों में उत्तर देने पर अंक काटे जा सकेंगे। प्रश्न-पत्र के लिए निर्धारित कुल 3 घण्टों की अवधि में से अधिकतम 1 घंटे की अवधि प्रश्न-पत्र के इस भाग के लिए निर्धारित होगी।

प्रश्न-पत्र के इस प्रथम भाग के दोनों प्रश्न, 3 घण्टों में विभाजित पाठ्यक्रम के तीनों खण्डों से संबंधित होंगे। अर्थात् प्रश्न-पत्र के इस भाग में पूरे पाठ्यक्रम से संबंधित प्रश्न होंगे।

प्रश्न-पत्र के द्वितीय भाग में, पाठ्यक्रम के तीनों खण्डों में से प्रत्येक में से दो-दो निबन्धात्मक प्रकृति के प्रश्न होंगे। परीक्षार्थियों को प्रत्येक खण्ड में से कम से कम एक प्रश्न का चयन करते हुए, कुल 3 प्रश्न हल करने होंगे। प्रत्येक प्रश्न 20 अंकों का होगा। प्रश्न-पत्र का यह भाग 60 अंको का होगा।

Note: There shall be two papers in all, and each paper shall be of three hours duration and of 100 marks. Each paper shall consist of two parts. Part I shall carry 40 marks. There shall be 2 questions in Part-I, first question will consist of 20 short questions of 1 mark each, carrying a word limit of 20 words. The second question will consist of 10 questions of 2 marks each, carrying a word limit of 40 words. Marks may be deducted if the word limit is exceeded. This part of the question paper will be given maximum one hour duration and shall relate to all the three sections covering thereby the entire course. Part-II of the question paper shall be divided into three sections comprising 6 essay type questions of 20 marks each. Candidates will be required to attempt 3 questions selecting one question from each section. This part of the question paper shall be of 60 marks.

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Paper I: Social Research Methods

Max Marks: 100

Unit 1: Understanding Social Research

- Philosophy of Science
- Nature of Science
- Scientific Method
- Issues of objectivity & Subjectivity in Social Science
- Ethnography and Sociological Research

Unit 2: Methods of Research in Sociological Enquiry

- Types of Research : Pure & Applied
- Types of Sociological Method : Empirical, Historical, Evolutionary, Comparative
- Types of Research Design : Descriptive, Exploratory, Explanatory, Experimental
- Difference between Survey & Research

Unit 3: Tools and Techniques of Data Collection and Analysis

- Sampling Procedure : Types, Probability Non-Probability
- Tools of Data Collection : Observation, Questionnaire, Schedule, Interview Guide
- Source of Data : Primary and Secondary
- Nature of Central Tendency: Mean, Median, Mode.

Essential Readings: (in English) :

1. Ahuja, Ram. 2002: Research Methods, Jaipur: Rawat Publications
2. Bajaj & Gupta, 1972: Elements of Statistics. New Delhi: S. Chand and Co. Publication
3. Goode, W.G. and Hatt, P.K. 1952: Methods in Social Research, New York.
4. Kothari, C.R. 1989: Research Methodology: Methods and Techniques, Bangalore: Wiley Eastern.
5. Mann, Peter H. 1988: Methods of Social Investigation, Delhi: Disha Publications.
6. Punch, Keith. 1996: Introduction to Social Research, London: Sage.
7. Selltiz, C. & Jahoda, M. & Others, 1965: The Theory and Methods of Social Research, London.
8. Shipman, Martin. 1988: The Limitations of Social Research. London: Sage.
9. Willkinson, T.S. & Bhandarkar, P.L. 1977: Methodology & Techniques of Social Research, Bombay: Himalaya Publishing House.
10. Young, P.V. 1988: Scientific Social Surveys and Research, New York.

Essential Readings: (in Hindi) :

1. रावत, हरिकृष्ण, 2013: सामाजिक शोध की विधियाँ, जयपुर: रावत पब्लिकेशन्स
2. शर्मा, वीरेन्द्र प्रकाश, 2009: समाजशास्त्रीय अनुसंधान के तर्क एवं पद्धतियाँ, जयपुर: पंचशील प्रकाशन
3. नागर, कैलाश नाथ, 2010, सांख्यिकी के मूल तत्व, मेरठ: मीनाक्षी प्रकाशन

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Paper II: Sociology of Village

Max Marks: 100

Unit 1: Introduction to Rural Sociology

- Concept of Rural Sociology & its Development
- Basic Concepts : Village, Peasant Society, Agrarian Structure, Little, Great & Multiple traditions, Rural-Urban Continuum
- Features of Economy & Polity in relation to village

Unit 2: Social Structure of Village

- Family, Caste, Kinship and Gender
- Religion and Village Life
- Formal and Informal Administrative Structures : Village Panchayats, Caste Panchayat

Unit 3: Change in Indian Village Structure

- Agrarian Distress in Villages : Suicide, Indebtedness, Poverty
- Agrarian Movement in India
- Impact of Urbanization & Globalization in Village Systems

Essential Readings: (in English) :

1. Desai A.R., 1959: Rural Sociology India, Popular Prakashan, Bombay.
2. Rao M.S.A., 1874: Urban Sociology in India, Orient Longman, New Delhi.
3. Desai A.R., 1979: Rural Sociology India in Transition, Popular Prakashan, Bombay.
4. D'Souza Alfred, 1978: The Indian City, Poverty, Ecology and Urban Development, Manohar Publication, New Delhi.
5. Ramkrishana Mukarjee, 1957: The Dynamics of Rural Society, Berlin.

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13. Home Science

Examination Scheme :

- Each Theory paper will contain nine questions having three questions from each unit. Candidates are required to attempt five questions in all selecting at least one question from each unit. Each question will be of 10 marks.

BA Home Science Part II

Paper	Subjects	Duration of exam	Maximum marks	Minimum marks	No. of hrs/wk
Theory Paper III	Human Development	3hrs	50	18	4
Practical III	Human Development	3hrs	50	18	2
Theory Paper IV	Textiles and Clothing	3hrs	50	18	4
Practical IV	Textiles and Clothing	3hrs	50	18	2
		Total	200	72	12

B.A. PART-II**HUMAN DEVELOPMENT (THEORY PAPER III)****Maximum Marks: 50****Minimum marks: 18****Teaching workload: 4 hrs /week****Total teaching workload: 96**

Human Development and Family Studies is concerned with the study of the human lifespan from conception and onwards. In this program students would study various stages of life; prenatal, Infancy childhood, adolescence, adulthood and ageing. There is a special reference to ECCE, developmental disorders, family relationships and its dynamics. This program covers the biological and environmental, psychological and social factors that are understood to explain patterns of human behavior over the lifespan.

The program helps in understanding how people develop throughout their lives, and how Heredity and Environment can influence possibilities for individuals. This is important and useful knowledge for everyone.

Basic knowledge of Human Development is an important background for those wishing to go into professions such as social work, nursing and teaching. There is a need for more research in the context of family and lifespan development in our country, and we are looking for students


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with vision and innovative ideas to join us in innovative studies when they reach postgraduate level.

Objectives:-

1. To acquaint the student with the scope and foundation of human development.
2. To understand development through different life span stages.
3. To learn regarding the significant developmental tasks of each stage.

Contents	Hours
UNIT I	
• Definition and scope of Human Development as a field of study.	6
• Principles of development	4
• Role of Heredity and environment and learning and maturation in development.	4
• Factors affecting development.	6
UNIT II	
Development from conception to adolescence:	
• Physical development	6
• Motor development	5
• Socio-emotional development	8
• Language and cognitive development	8
UNIT III	
• Importance and objectives of early childhood education; impact of deprivation and early stimulation	8
• Definitions, functions and types of families; changing roles and challenges faced by Indian Families	8
• Understanding differently abled children; definitions, meaning and classification	10
• Major development tasks, achievements and problems of adulthood and aging. Need for care and support for aging individuals.	10
References :	
1. Santrock JW (2007). Lifespan Development. Tata – McGrawHill. New Delhi. 3 rd Ed.	
2. Bee H (1995). The developing child. Harper Collins College Publisher.	
3. Berk L (2006). Child development. Allyn & Bacon. New York.	
4. Cole M and Cole SR (1996). The Development of Children. W.H. Freeman and Company.	
5. Rice F (1992). Human Development: A Life Span Approach. Prentice Hall.	
6. Rice FP. Marriage and Parenthood. Allyn and Bacon Inc. Toronto.	
7. Vidhya Bhushan and Sachdeva (2000). Introduction to Sociology.	
HUMAN DEVELOPMENT – PRACTICAL III	
Maximum marks: 50	


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Minimum marks: 18

Teaching workload: 1 practical/ week (2 hours/ practical)

Total teaching workload: 24 practicals/ batch

Learning Outcomes

Students will gain insight into the growth patterns, developmental characteristics and activities of children in a practical situation. They will also learn to understand significant issues related to adolescents, adults and ageing people.

Objectives :

1. Students will gain insight into the growth patterns, developmental characteristics and activities of children in a practical situation.
2. They will also learn to understand significant issues related to adolescents, adults and ageing people.

Contents	Hours
1. Anthropometric measurement of children from birth to 6 years. Plotting and interpretation of data as per WHO norms.	4
2. Interviewing mothers of young infants regarding breast feeding schedules, supplementary foods and weaning practices.	3
3. Organizing and conducting play and creative activities of children in a nursery school.	3
4. Preparation and conduction of various activities to enhance overall development of children: physical, motor, language, cognitive, social and emotional.	4
5. Focus group discussion with adolescents to understand their aspirations, educational and career choices.	3
6. Market survey of story books and toys for children. Assessment of the above in terms of quality, cost, durability, safety, attractiveness and developmental appropriateness.	2
7. Preparation of a brief questionnaire to identify the problems faced by adults and aging people in communities. Report the information as individual case profile.	3
8. Preparation of a scrap book on relevant issues of human development.	2

Examination scheme :

1. **Major problem** - 20 Marks
Planning and preparation of various activities to enhance overall development.
Preparation of interview schedule of feeding for interviewing's mothers of infants.
Organizing and conducting play.
2. **Minor Problem** – 10 Marks
FGD
Preparation of a brief questionnaire to identify problems of ageing peoples.
Plotting of graph on the basis of anthropometric measurements of children from 02-06 years and its interpretations
3. **Internal** – 20 Marks

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TEXTILES & CLOTHING (THEORY PAPER IV)**Maximum Marks: 50****Minimum Marks: 18****Teaching workload: 4 hrs /week****Total teaching workload: 96 hours/year****Learning outcome:**

After completing the course the student will possess the basic knowledge of different processes involved from the raw material to the finished textiles, along with the properties and use which will further help them in the selection of clothes. Knowledge of technical textiles helps in broadening their vision as usage of textiles is not only limited to apparel wear. The course helps the students in selection of apparel for themselves and others. With the backing of knowledge of design principles and elements, a base is prepared for the subject and arouses the interest to further pursue in the area. The students also become aware of the rich traditional heritage of Indian textiles.

After finishing the course the students will have the basic knowledge in the area of textiles and clothing and will be able to identify her own specialization in the field

Objectives:

The course will lead to :

1. Acquaint students with basic knowledge of textiles and clothing.
2. Familiarize the students to make purchase decisions in selection of clothing.
3. Update the students with the recent innovations in the field.
4. Impart knowledge regarding traditional textiles and embroideries of India

Contents	Hours
Unit – I	
Textile Study	
1. Fiber <ul style="list-style-type: none"> • Classification • Properties and their importance to the consumer with special reference to the care. • Natural Fibers <ol style="list-style-type: none"> (a) Cotton (b) Wool (c) Silk (d) Jute • Manmade Fibers <ol style="list-style-type: none"> (a) Polyester (b) Polyamide (c) Rayon 	15
2. Yarn <ul style="list-style-type: none"> • Simple Yarn • Novelty yarn 	3


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<ul style="list-style-type: none"> • Textured yarn <p>3. Fabric : Different construction methods :</p> <ul style="list-style-type: none"> • Weaving • Parts of loom • Steps in weaving • Types of weaves: Plain <ul style="list-style-type: none"> Twill Satin • Knitting • Felting • Lacing • Braiding 	10
<p>4. Technical textiles</p> <ul style="list-style-type: none"> • Categories and use in daily life <ul style="list-style-type: none"> i. Mobiltech ii. Agrotech iii. Geotech iv. Meditech 	2
<p>Unit – II Apparel Selection and Care</p>	
<p>5. Finishing</p> <p><u>Basic Finishes</u></p> <ul style="list-style-type: none"> • Bleaching • Sizing • Desizing • Singeing • Tentering <p><u>Functional finishes</u></p> <ul style="list-style-type: none"> • Wash and wear • Mercerising • Sanoforizing • Flame retardant • Water resistant • Moth proofing 	10
<p>6. Dyeing and Printing</p> <ul style="list-style-type: none"> • Classification of dyes <ul style="list-style-type: none"> i. Natural ii. Synthetic • Classification of printing <ul style="list-style-type: none"> i. Direct ii. Resist iii. Discharge 	6
<p>7. Selection of suitable fabrics and garments for different ages – infants, toddlers, pre-school children, school going children, adolescents</p>	10
<p>8. Selection of suitable fabrics and garments for different ages – infants, toddlers, pre-school children, school going children, adolescents</p>	5
<p>9. Selection of suitable fabrics and garments for different ages – infants, toddlers, pre-school children, school going children, adolescents</p>	3
<p>10. Selection of suitable fabrics and garments for different ages – infants, toddlers, pre-school children, school going children, adolescents</p>	2

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<p>8. Climate, occasion, occupation, fashion, figure</p> <p>9. Clothing for people with special needs: maternity and lactation, old age and physically challenged.</p> <p>10. Selection of readymade garments</p> <ul style="list-style-type: none"> • Appearance– Size, design, line and colours, • Fabric- Durability, ease of care • Workmanship- Cutting, sewing and finishing • Cost & Fitting <p>11. Labelling</p> <ul style="list-style-type: none"> • Textile fiber symbols • Care labelling symbols <p>12. Care and storage of.</p> <ul style="list-style-type: none"> • Cotton • Silk • Wool 	
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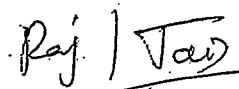
Unit – III**Designing & Traditional Textiles**

<p>13. Elements of design –Line, form, colour and texture.</p> <p>14. Principle of design – Proportion, Harmony, Balance and Emphasis</p> <p>15. Traditional textile</p> <ul style="list-style-type: none"> • Woven: Brocade • Printed ; Sanganer, Bagru, Kalamkari • Dyed ;Bandhani,Patola • Embroidered ;Kasuti, Kantha, Phulkari, Chikankari, Kutch 	<p>15</p> <p>15</p>
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References :

1. Susheela Dhantyagi “Fundamentals of Textiles and their care”Orient Longman Ltd.4th edition 1983 Reprinted1994
2. Shrivastave. K.N and Gupta.M “Paramparagat Bhartiya Vastra” Hindi Granth Academy, 2011
3. Bela Bhargava (2003)“ Vastra Vigyan avam dhulai kriya” University Book House Jaipur
4. Joseph, M. L. (1988), Essentials of Textiles, 5th edition, Holt Rinehart and Winston, New York.
5. Ruby Jain (2006). “Basic Stitching Processes” CBH Publications

TEXTILES AND CLOTHING (PRACTICAL IV)**Maximum marks: 50****Minimum marks: 18****Teaching workload: 1 practical/ week (2 hours/ practical)****Total teaching workload: 24 practical/ batch**


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Course Outcome: The beneficiary of the course will be equipped to differentiate between different types of fabrics. They will be able to master the art of garment construction as they will have hands on experience in all basic seams, finishing of edges in form of hems and curves and fullness techniques. They will also be able to do surface ornamentation with embroidery and tie and dye.

Objectives

Contents

Hours

Textiles

Make a Scrap book of the following

1. Fiber samples

- Cotton fiber from - (Muslin, 2x2 Rubia , 2x1 poplin, Khadi)
- Silk fiber from -(Georgette, Chiffon, Crepe, Tussar, Mulberry,)
- Wool fiber from - Felt (wool)
- Jute fibre from Gunny Bags & Ropes
- Nylon fibre from Plastic Cord
- Polyester fibre from Sewing Thread
- Rayon fibre from Artificial Silk Dupatta

2. Yarn : Ply, textured and metallic yarn

3. Fabric Samples: Woven, Knitted and Non woven - Felt (wool)

4. Collection of care labels washing, ironing, dry-cleaning, bleaching

5. Fiber symbols (cotton, wool, silk)

6. Technical textiles : Bandages & Scotch Brite

Clothing

7. Clothing techniques (sample of each)

- Simple stitches – hemming and tacking
- Seam – plain, French and run and fell
- Dart – straight and curve
- Tucks – Pin tucks
- Pleat – knife, box
- Gathers – simple gathers
- Finishing of curve – piping and facing
- Placket opening – continuous wrap & two piece placket
- ix Garment construction - 'A' line frock with any sleeve and Collar
- x Embroider the frock using few basic stitches

8. Tie & dye prepare two sample through any 2 techniques

9. Product design – construction of any one product

- Two cushion covers
- Shoulder Bag with any fastener
- Pouch with zip

Examination scheme

Major problem – 20marks

Construct any one garment


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Drafting and cutting of a garment -

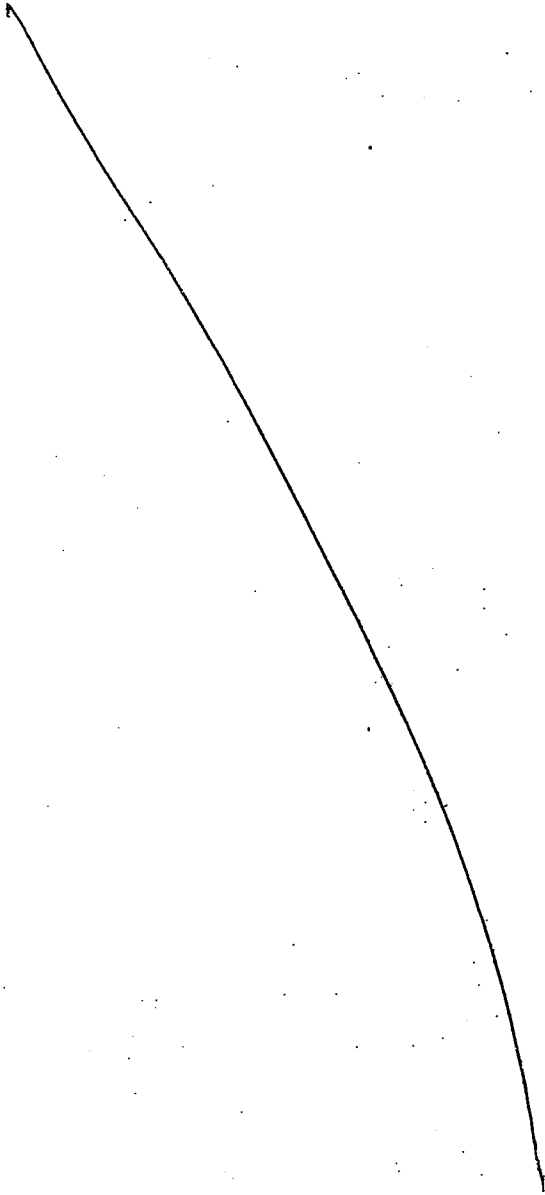
Stitching and finishing of a garment -

Minor Problem - 10 marks

Identification of textile yarn / fabrics -

Tie and dye one sample using two colours and two different techniques / two samples of any clothing techniques -

Internal - 20 marks



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14. Textile Craft

B.A. Part-II 2020

SCHEME : B.A/B.Com PART-II

		Duration	Max mark	Min mark
1. Theory:	Paper-I	3Hrs	30	22
	Paper-II	3 Hrs	30	
2. Practical :	Paper-I	3Hrs	35	25
	Paper-II	3 Hrs	35	
3. Submission	Paper-I		35	25
	Paper-II		35	

Paper-I : Weaving Theory-I

UNIT-I

Yarn numbering system –Indirect (cotton, metric, woollen and worsted count) and Direct (Tex and Denier)

Yarn Twist and their types, Balance of fabric

Methods of fabric construction: Braiding & Lacing, knitting, felting and weaving

UNIT-II

Types of loom- Shuttle & Shuttle less; introduction to shuttleless looms- airjet, waterjet, projectile and rapier loom

Preparation of Warp and Weft for weaving

Draft, Peg plan, Weave, Repeat, Design

UNIT-III

Derivatives of Plain weave- Rib and Basket

Derivative of twill weave- Regular, Irregular, Left hand, Right hand, Pointed and curved twill

Fabric defects, Selvedge, Types of Selvedge's

Paper-II: Dyeing Theory –I

UNIT-I

Difference between dyeing and printing

Mechanical finishes- basic process of beating, singeing, napping, calendaring and embossing.

UNIT-II

Stages of Dyeing (fibre, yarn & fabric)

Wool dyeing and silk dyeing

Dyeing machines- Jigger and Winch dyeing machine


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UNIT-III

Steps of printing- preparation of cloth & colour
 Methods of Direct printing- Block & Roller printing
 Thickeners and types of thickeners

Practical (Paper-I)

1. Thread count and Balance of the cloth
2. Weave samples of derivatives of plain and twill weave

Practical (Paper-II)

1. Introduction to motif, repeat and layout
2. Block printing- samples preparation
3. Batik-spot, crack, scratch and painting (samples)

Submission (Paper-I)

1. Assessment of samples
2. Preparation of weave samples

Submission (Paper-II)

1. Any one article using block
2. Any one article using batik

Examination Scheme:

One Major Problem: 20 Marks

One Minor Problem: 15 Marks

Reference books :

Sahnai, V.A. (1989) Theory of Dyeing, Sevak publications. Mumbai

Trotman, E.R. (1985) Technology of Dyeing, John wiley & sons Inc London. London

Pryag, R.S. (1994) Technology of Printing, India publisher.

Pryag, R.S. (1995) Technology of Finishing, India publisher.

Bucker, (1998) Textiles, Abhishek publications.

Kulkarni, M.M., Weaving technology, Virindra publication, Jalgon

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Unit 3: Homogeneous linear differential equations, Simultaneous differential equations. Exact linear differential equations of nth order. Existence and uniqueness theorem.

Unit 4 : Linear differential equations of second order. Linear independence of solutions. Solution by transformation of the equation by changing the dependent variable/the independent variable, Factorization of operators, Method of variation of parameters, Method of undetermined coefficients.

Unit 5: Partial differential equations of the first order. Lagrange's linear equation. Charpit's general method of solution. Homogeneous and non-homogeneous linear partial differential equations with constant coefficients. Equations reducible to equations with constant coefficients.

Reference Books :

1. R.S. Senger, Ordinary Differential Equations with Integration, Prayal Publ. 2000.
2. D.A. Murray, Introductory Course in Differential Equations, Orient Longman (India), 1967.
3. E.A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall of India, 1961.

Paper – III: Numerical Analysis and Vector Calculus

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks:

40 (Science)

54 (Arts)

Note: (i) This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

(ii) Non-Programmable Scientific Calculators are allowed.

Unit 1: Differences. Relation between differences and derivatives. Differences of a polynomial. Newton's formulae for forward and backward interpolation. Divided differences. Newton's divided difference, Lagrange's interpolation formula.

Unit 2: Central differences. Gauss's, Stirling's and Bessel's interpolation formulae. Numerical Differentiation. Derivatives from interpolation formulae. Numerical integration, Derivations of general quadrature formulas, Trapezoidal rule. Simpson's one-third, Simpson's three-eighth and Gauss's quadrature formulae.

Unit 3: Relation between the roots and coefficients of general polynomial equation in one variable, transformation of equations, Descartes's rule of signs, solution of cubic equations by Cardon's method, biquadratic equations by Ferrari's method.

Numerical solution of Algebraic and Transcendental equations, Bisection method, Secant method, Regula-Falsi method, Iteration method, Newton- Raphson Method (derivation of formulae and rate of convergence only).

Unit 4: Gauss elimination and Iterative methods (Jacobi and Gauss Seidal) for solving system of linear algebraic equations. Partial Pivoting method, ill conditioned systems, Numerical solutions of ordinary differential equations of first order with initial condition using Picard's, Euler and modified Euler's method.

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15. Garment Production & Export Management

B.A. Part-II

B.A/B.Com.— Maximum Marks 40

Hrs.3

B.Sc. Maximum Marks 50

THEORY PAPER – 1

Fashion and Apparel Design

OBJECTIVES :-

1. To Develop Sensitivity & Understanding towards Historical World Costumes.
2. To Focus on Design Elements & Principles and their Details on Garments.
3. To Create Awareness About the Techniques of Pattern Making & Principle of Fittings.

SECTION –A

TRADITIONAL COSTUMES

1. Study of traditional costumes of various regions of India.
2. History of costumes of Indian civilization.
3. Brief knowledge of world costumes ; French , German, Greek, European

SECTION –B

TECHNIQUES IN PATTERN MAKING

4. Eight head theory – principles and advantages.
5. Pattern making techniques- drafting, draping, flat pattern.
6. Colour and colour schemes, psychological effects of colour on clothes.
7. Fitting – principles of fitting, factors to be considered while fitting, common fitting problems, remedying fitting defects of bodice, sleeves, and skirts.

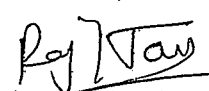
SECTION – C

DESIGN

8. Classification of design – structural and decorative
9. Elements and principles of design.
10. Layout of design of fabric in cutting - floral , checks, plaids, lines.

References :

1. Erwin, M. D., Kinchen, L.A. & Peters, A. (1979). Clothing for moderns. Macmillan publishing new York.
2. Jo, K. M. (1985). Clothing construction I&II. Prentice Hall.
3. Mathews, M. (1974). Practical clothing construction part I & II. Chennai, Cosmic press.
4. Doogaji, & Deshpandey, R. (1988). Basic process and clothing construction. Raaj Prakashan.


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THEORY PAPER – II

ELEMENTS OF MARKETING AND FINANCE

B.A./B.Com.-Maximum Marks 40

Hrs. – 3

B.Sc. – Maximum Marks 50

OBJECTIVES :

1. To create awareness about the procedures to select, proceed & start the Small Scale Industry.
2. To guide the process of product development according to the market needs.
3. To become familiar with the methods of payment in foreign trades & about types or bills.

SECTION A

1. Market structure- Types of market, market survey, elements of cost.
2. History of readymade garment industry, Problem and prospects in global market
3. Branded versus non -branded market.
4. Types of garments exported.

SECTION B

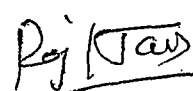
5. Elementary knowledge of working capital factors affecting working capital, operating cycle.
6. Sources of finance.
7. Letter of credit
8. Methods of payment in foreign trade
9. Various typed of bills.
10. Insurance

SECTION C**Brief study of ;**

11. ECGC (export credit and guarantee corporation)
12. EIC (export inspection council)
13. IIP (Indian institute of packaging)
14. ICA (Indian of arbitration)

References :

1. Srivastav, & Aggarwal. (). Vipdan prabandh.
2. Mamoria, C.B., Joshi, R. L. & Mulla, N.I. (2003). Principles & practice of marketing in india. Kitab Mahal distributors.
3. Satya narayan; Sales management.
4. Daver R.S. (2009). Salesmanship and Publicity. Vikas publishing house Pvt Limited.


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PRACTICAL- 1

APPAREL DESIGNING

B.A./B.Com.-Maximum Marks 60

Hrs.- 4

B.Sc. - Maximum Marks 25

OBJECTIVES :

To familiarize with basics of color

To develop expertise in drawing croquis and draping dresses on them.

Contents:

1. Colour wheel and colour scheme.
2. Introduction to eight head theory and stick figure 9.5", 10.5".
3. Developing an adult croquis from block figure.
4. Draping of garments on croquis (at least 8 sheets) using different colours schemes and occasions.
5. Preparation of a portfolio.

Examination Scheme :

B.A./B.COM:-Max Marks:-60

B.SC:-Max Marks:-25

1. Major Problems-30

1. Major Problem:-10

2. Minor Problems:-20

2. Minor Problems:-10

Internal:-10

Internal:-5

PRACTICAL - II

CLOTHING CONSTRUCTION

B.A./B.Com.-Maximum Marks 60

Hrs- 4


B.Sc. - Maximum Marks - 25

OBJECTIVES :

1. To be able to make basic drafts of bodice, sleeve and collar.
2. To learn the knowhow of stitching and all basic processes and ornamentation techniques.

Contents :

1. Pattern making
 1. Child basic block and sleeve block.
 2. Sleeve variations; slash and spread method-puff, bell, legomutton, bishops sleeves.
 3. Sleeve bodice combination; Magyar, raglan, dolman sleeves.
 4. Different types of collars.
 5. Different types of yokes.


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2. Stitching of each sleeve, collar and yokes on bodice block.
3. Fashion designing (5 each) on sheet baby frocks, a line frocks, rompers. sun suits skirts and tops, bush-shirts with shorts.
4. Redesigning of old garment using the idea such as; to consider factors such as money, creativity, individuality, skills, needs,
 - (i) Patchwork
 - (ii) Ornamental fabric.
 - (iii) Decorative embroideries
 - (iv) Trims
 - (v) Paints and dyes
 - (vi) Introduction of fashion designing in fashion shows.
5. Introduction fashion designing in fashion shows.

References :

1. Jo, K.M. & Beazley. (1985). The sewing book of a complete guide. Prentice Hall.
2. Ireland, P. J. (1982). Fashion designing drawing and presentation. Batsford Ltd. 4th Revised edition.
3. Chase, R.W. (1997). CAD for fashion design. Prentice Hall; Pap/DSKT edition.

Examination Scheme :

B.A./B.Com.-Max Marks:-60

1. Major Problems-30

2. Minor Problems:-20


Internal:-10

B.Sc:-Max Marks:-25

1. Major Problem:-10

2. Minor Problems:-10

Internal:-5


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16. INVESTIGATIVE BIO-TECHNOLOGY

Scheme :	Min. Pass Marks	Max. Marks
Paper-I	40	
Paper-II	40	
Paper-III	40	
Practical	120	

Paper-I: Bio Chemistry and Systemic Bacteriology
Section - A

Bio-Chemistry. II

1. Blood sugar and its regulation
2. Chemical examination of urine
3. Glucose tolerance test
4. Diabetes mellitus, Ketosis, Diabetic coma
5. Non-protein nitrogenous compounds
6. The Plasma Proteins and A.G. Ratio
7. Lipids
8. Enzymes
9. Tests of Gastric Function. Occult Blood
10. Test in Liver and Biliary Tract Disease
11. Tests in Pancreatic Disease, Steatorrhoea
12. Acid Base Regulation
13. Basal Metabolism, Blood Oxygen
14. Regulation of pH in blood and body fluids
15. Vitamins and their tests
16. Chemical Examination of Cerebrospinal fluid
17. Milk Analysis

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18. Stones (Urinary and Gallbladder)
19. Faecal Pigments
20. Drugs and Poisons, alcohol
21. Water management and its analysis.

Section - B

Systemic Bacteriology and other microbes

1. Classification of bacteria
2. Normal bacterial flora and its importance
3. Introduction and Laboratory methods of identification of:
 - (i) Staphylococci
 - (ii) Streptococci
 - (iii) Pneumococci
 - (iv) Neisseria
 - (v) Diphtheria
 - (vi) Anthrax
 - (vii) Clostridia
 - (viii) Enteric Gram Negative Rod
 - (ix) Cholera
 - (x) Pseudomonas
 - (xi) Haemophilus and Bordetella
 - (xii) Spirochetes
 - (xiii) Spirillum and Leptospira
 - (xiv) Rickettsial and Chlamydia
4. Mycology : General characters of Fungi : Yeast like fungi and their diseases; Dermatophytoses
5. Virology : general characters and classification, Diagnostic methods, materials collected for virus isolation and preservation of material.
6. Bacteriology of water, milk and food.

Paper-II : Serology and General Pathology Max. Marks : 40

Serology :

1. Antigens and antibodies
2. Complement and fixation test
3. Agglutination
4. Precipitation
5. Flocculation
6. Neutralization
7. Immunofluorescence

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8. Immune electrophoresis
9. Serology of Syphilis
10. Haem Agglutination and Haem Agglutination Inhibition
11. Skin Tests

Section - B

General Pathology

1. Introduction to pathology (Morbid Anatomy and Histology)
2. Degeneration, Necrosis and gangrene and how to recognise them
3. Infection, Thrombosis and Embolism
4. Inflammation
5. Neoplasia, Benign and Malignant tumors

Practical (75×3 periods)

Max. Marks 120

Unit-I

Bio-Chemistry

1. Cholesterol, Triglycerides, H.D.L., L.D.L.
2. Enzymes, S.G.O.T., S.G.P.T., L.D.H.
3. Alkaline and Acid phosphatase
4. F.T.M. Gastric analysis
5. Serum Electrolytes
6. Principle and application of Spectrophotometer, Turbidimeter and chromatography.

Unit-II

A. Haematology :

1. Erythrocyte Sedimentation Rate (E.S.R.) and Packed Cell Volume (P.C.V.) and Total R.B.C. count
2. Red cell indices and their calculation
3. Staining of Reticulocyte and their counting
4. Total Eosinophil Count
5. Cytochemical stains used in bone Marrow and P.B.F. for diagnosis.
6. Blood Grouping and Rh typing and cross matching.
7. Anti "D" Titres in Maternal blood.
8. Coomb's Test.
9. Demonstrations of collection of Blood for transfusion.

B. Serology and Bacteriology:

1. Cleaning and sterilisation
2. Widal Test

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Unit 2: Real sequences- Limit and Convergence of a sequence, Monotonic sequences. Cauchy's sequences, Subsequences, Cauchy's general principle of convergence. Properties of continuous functions on closed intervals.

Unit 3: Properties of derivable functions, Darboux's and Rolle's theorem. Notion of limit, continuity and differentiability for functions of several variables. The directional derivative, the total derivative, expression of total derivative in terms of partial derivatives.

Unit 4: Riemann integration – Lower and Upper Riemann integrals, Riemann integrability, Mean value theorem of integral calculus, Fundamental theorem of integral calculus. Functions of bounded variations. Introduction, properties of functions of bounded variations, total variation.

Unit 5: Sequence and series of functions – Pointwise and Uniform convergence, Cauchy's criterion, Weierstrass M-test, Abel's test, Dirichlet's test for uniform convergence of series of functions, Uniform convergence and Continuity of series of functions, Term by term differentiation and integration.

Reference Books :

1. K.A. Ross, Elementary Analysis: The Theory of Calculus, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.
2. R.G. Bartle D.R. Sherbert, Introduction to Real Analysis (3rd edition), John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.
3. Charles G. Denlinger, Elements of Real Analysis, Jones and Bartlett (Student Edition), 2011.
4. S. Kumaresan, Topology of Metric Spaces, Narosa Publishing House, Second Edition 2011.
5. G. F. Simmons, Introduction to Topology and Modern Analysis, Mcgraw-Hill, Edition 2004.

Paper – II: Differential Equations

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks:

40 (Science)
53 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Degree and order of a differential equation. Equations of first order and first degree. Equations in which the variables are separable. Homogeneous equations and equations reducible to homogeneous form. Linear equations and equations reducible to linear form. Exact differential equations and equations which can be made exact.

Unit 2: First order but higher degree differential equations solvable for x,y and p. Clairaut's form and singular solutions with Extraneous Loci. Linear differential equations with constant coefficients, Complimentary function and Particular integral.

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3. Brucella Aggultination.
4. Alberts Stain and Neisser Stain.
5. A.F.B. Stain
6. Concentration method of A.F.B.
7. Smears of Leprosy (Nasal Smear Slit Smear)
8. Staining and examination of prepared smears of Pus, Sputum conjunctive etc. by GRAMS-A.F.B. (R.N. Method)
9. Demonstration of instruments for sterilization.
10. Composition of common laboratory cultures media.
11. Demonstration of some common types of growth of micro organism on different media.
12. Preparation and Staining of Smears from cultures.
13. Demonstration of Special Biochemical tests used in identification of organisms.
14. Collection of urine for culture from females, males and children, taking of throats swabs/conjunctival swabs.

C. Cytology and Histology :

1. Microscopy of urine and C.S.F.
2. Semen examination for sperms count and motility.
3. Demonstration of the paraffin embedding, sectioning for histopathology.
4. Himotoxylene and eosine staining of paraffin section and taking and staining of smears for sex chromation.
5. Making and fixing of smears from urine, sputum and Vaginal etc. for cytology.
6. Staining of smears for exfoliative cytology.

Practical - Bases on Theory syllabus - Max. marks 50

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17. Mathematics

B.A. Part-II

Teaching : 3 Hours per Week per Theory Paper.

2 Hours per Week per Batch for Practical

Examination Scheme:

		Min.Pass Marks	Max. Marks
		Science – 54	150
		Arts – 72	200
		Duration	Max.Marks
Paper – I	Real Analysis	3 hrs.	40 (Science) 53 (Arts)
Paper – II	Differential Equations	3 hrs.	40 (Science) 53 (Arts)
Paper – III	Numerical Analysis	3 hrs.	40 (Science) 54 (Arts)
Practical		2 hrs.	30 (Science) 40 (Arts)

Note:

1. Common paper will be set for both the Faculties of Social Science and Science. However, the marks obtained by the candidate in the case of Faculty of Social Science will be converted according to the ratio of the maximum marks of the papers in the two Faculties.
2. Each candidate is required to appear in the Practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the Principal in consultation with Local Head/Head, Department of Mathematics in the college.
3. An Internal/external examiner can conduct Practical Examination of not more than 100 (Hundred) Candidates.
4. Each candidate has to pass in Theory and Practical examinations separately.

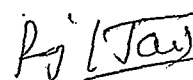
Paper – I: Real Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours Max. Marks: 40 (Science)
53 (Arts)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Real numbers as complete ordered field, Limit point, Bolzano-Weierstrass theorem, closed and Open sets. Concept of compactness and connectedness. Heine-Borel theorem. Holder inequality & Minkowski inequality, Metric space – Definition and examples, Open and Closed sets, Interior and Closure of a set, Limit point of a set in metric space.


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Unit 5: Scalar and Vector point functions. Differentiation and integration of vector point functions. Directional derivative. Differential operators. Gradient, Divergence and Curl. Theorems of Gauss, Green, Stokes (without proof) and problems based on these theorems.

Reference Books :

1. B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, India, 2007.
2. C. F. Gerald and P. O. Wheatley, Applied Numerical Analysis, Pearson Education, India, 7th edition, 2008.
3. C.F. Gerald, P.O. Wheatley, Applied Numerical Analysis, Addison-Wesley, 1998.

Practical

Teaching: 2 hours per week per batch not more than 20 students.

Examination Scheme:

Duration: 2 Hours

	Science	Arts
Max.Marks	30	40
Min.Pass Marks	11	15

Distribution of Marks:

Two Practicals one from each group

10 Marks each	=	20 Marks (13 Marks each)	26
Practical Record	=	05 Marks	07
Viva-voce	=	05 Marks	07
Total Marks	=	30 Marks	40

The paper will contain TWO practical. The candidates are required to attempt both practical.

Practicals with Computer Programming in C Language.

Programming languages and problem solving on computers, Algorithm, Flow chart, Programming in C- Constants, Variables, Arithmetic and logical expressions, Input-Output, Conditional statements, Implementing loops in Programs, Defining and manipulation arrays and functions.

Group A:

1. Printing n terms of Fibonacci sequence.
2. Finding $n!$, $\sum n$, $\sum n^2$ etc.
3. Defining a function and finding sum of n terms of a series/sequence whose general term is given (e.g. $a_n = \frac{n^2+3}{n+1}$).
4. Printing Pascal's triangle.
5. Finding gcd and lcm of two numbers by Euclid's algorithm.
6. Checking prime/composite number.
7. Finding number of primes less than n, $n \in \mathbb{Z}$.
8. Finding mean, standard deviation and ${}^n P_r$, ${}^n C_r$ for different n and r.

Group B:

1. Numerical integration using Trapezoidal, Simpson's 1/3, 3/8 and Waddle rules.

Note:

1. Each Candidate (Regular/non-Collegiate) has to prepare his/her practical record.
2. Each Candidate has to pass in Practical and Theory examinations separately.

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18. Economics

B.A. Part-II

Scheme:	Min. Pass Marks	Max. Marks
Arts	72	200
Science	54	150

Each paper shall be of three hour duration and of 100 marks for Arts students and of 75 marks for Science students.

Paper – I	Introductory Macro Economics
Paper – II	(a) Elements of Statistics and Mathematics (b) History of Economic Thought

Note: There will be two papers of Economics. Each paper shall consist of three parts. Part A shall contain question No I consisting of very short type X (Ten) questions. The candidate is required to answer each question in 20 words. Part B shall contain question No 2 consisting of V (five) question. The candidate is required to answer each question in 100 words. Part C shall contain three essay type questions (one from each section) with internal choice.

A candidate will be required to attempt five questions in all. All questions of Part A and Part B are compulsory while rest 3 questions are to be attempted from parts C selecting one question from each section. All questions carry equal marks. Each question will carry 20 marks for Arts students and 15 marks for Science students.

Paper-I**Introductory Macro Economics****Section- A**

Macroeconomics, Meaning, Subject matter and Importance. Basic tenets of Classical, Keynesian, New-Classical and New –Keynesian economics, Macrocconomic variables, Circular flow of Income, National Income: Basic concepts, Measurement, Sectoral Accounts, Nominal and Real Aggregates.

Money function. Demand and Supply Quantity Theory of Money Transaction Approach. Cash Balance Approach. Keynes reformulation of the Quantity Theory of Money inflation Meaning and Impact. Theories of Inflation- Demand Pull (Keynesian and modern), Demand Push. Structural Theories of Inflation.

Section-B

Income and Employment Determination : Classical Modal and Keynesian Model, Consumption Function: Psychological Law of Consumption, Determinants of Consumption, Paradox of, Thrift, Investment Function: Determinants of investment, Marginal Efficiency of Capital and Marginal Efficiency of Investment, Concept of Multiplier and Accelerator.

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Section-C

Central Bank: Organizational set-up and functions of Central Bank (with special reference to RBI). Commercial Bank: Functions, Modern trends of Commercial Banking. Quantitative and Qualitative Credit control by RBI. Money Supply: Meaning & Definition, four measures (M_1 , M_2 , M_3 and M_4) Monetary Policy: Objectives, Targets and Indicators, Transmission Mechanism.

Recommended Books :

1. G.S. Gupta Macro Economics, Theory and Application, 4th Ed, McGraw Hill, New Delhi.
2. Dornbusch, Fisher and Startz: Macroeconomics, XI Edition, Indian Reprint, Tata McGraw-Hill, Publishing Company Ltd. New Delhi.
3. N. Gregory Mankiw, Macroeconomics, Worth Publishers (Latest Edition).
4. H.L. Ahuja. (Hindi and English edition) Macro Economics, Theory and Policy; S. Chand & Co. Ltd, New Delhi.
5. Suraj B. Gupta: Monetary Economics, S. Chand and Co. Ltd.
6. L.N. Nathuranmka, Parambhik Samashti Arthshastra, Ramesh Book Publishing House, Jaipur
7. Rana and Verma: Macroeconomic Analysis, Vishal Publications,
8. Richard T. Froyen, Macroeconomics, Theories and policies, (X Edition), Adapted by Pearson Education.

Paper –II (a): Elements of statistics and Mathematics

Duration: 3 hrs

Max Marks: 100

Section- A

Surds, Indices, Quadratic Equation, Logarithms, Permutation and Combination, Binomial Theorem, Arithmetic progression, Geometric Progression and Harmonic Progression, Analytical Geometry: Straight Line, Parabola and Hyperbola, Matrices and Determinants, solution of Simultaneous equations by Cramer's rule and Matrix Inverse. Simple differentiation, Partial differentiation (involving two independent variables). Maxima, minima point of inflexion. Simple Integration involving one independent variable, Application in Economics (Elasticity, Average, Marginal Concepts)


Section – B

Statistics-definition, nature and importance, Uses and relevance of statistical methods, Census and Sample survey, Methods of data collection and tabulation, Diagrammatic and Graphical representation of data; Measures of Central Tendency: Arithmetic Mean, Mode, Median, Geometric Mean, Harmonic Mean. Concept and Measures of Dispersion and Skewness.

Section – C

Simple Correlation: Karl Pearson's and Rank Correlation, Regression analysis, Fitting of Linear Regression lines using Least Square Method, Analysis of Time Series, Determination of trend by straight line trend equation, Index numbers, Interpolation (Binomial Expansion and Newton's method), Association of Attributes.

(Note: Use of non-programmable calculator is permitted)


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Books Recommended :

- 1 B.C. Mahta and G.M.K Madanani Elementary Mathematics for use in Economics Laxmi Narain Agarwal, Agra
- 2 S.C. Gupta. Statistical Methods. Sultan Chand and Sons. New Delhi
- 3 Murray R. Spiegel Theory and Problems of Statistics McGraw Hill Book London
- 4 S.C. Gupta and V.K. Kapoor Fundamentals of Applied Statistics: S Chand and New Delhi
- 5 Salvatore. D Mathematics and Statistics. Schaum's Series. Tata McGraw Hill
- 6 G.S. Monga Mathematics and Statistics for Economics, Vikas Publishing House. New Delhi
- 7 बी सी मेहता एवं जी एम के मदनानी अर्थशास्त्र में प्रारम्भिक गणित लक्ष्मीनारायण अग्रवाल आगरा।
- 8 कैलाशनाथनागर सांख्यिकी के मूलतत्व मीनाक्षीप्रकाशन मॅरठ।

Paper- II (b) History of Economic Thought**Section –A**

Mercantilism Views on Trade Money, Prices. Wages and Employment Physiocracy: Natutal Order. Primacy of Agriculture. Net Product and Circulation of Wealth. Theory of taxation and role of government. Classical School : Adam Smith. Views on Division of Labour. Theory of Value, Capital accumulation Distribution, International trade, Economic Development Critiques of Adam Smith T.R. Malthus .Theory of Population .Theory of gluts. David Ricardo. Theory of Valve and Distribution. Foreign Trade, Economic Development and Theory of Rent

Section-B

Critities of the Classical School – Sismondi. Robert Owen, Friedrich List. J.S. Mill theory of value. Views on Production and Distribution Karl Marx: Efforts at Scientific Socialism Theory of Money Labor Theory of Value, Theory of Capital Accumulation and crisis Distribution. German Historical School and the Development of Marginalism. Neo-classical School: Marshall-Price Determination and Elasticity. Consumer Surplus costs: Economics Rent and Profit

Section C

Economic of Kautilya, Economic thought of Dadabhai Naroji, Mahatma Gandhi, G.K. Mehta, Deendayal Upadhayaya.

Books Recommended :

1. Louise Haney, History of Economic Thought, Surjit Publication, New Delhi
2. Enc Roll: History of Economic Thought, Faber and Faber (Rupa)
3. Gide and Rist: History of Economic Doctrine
4. M.R. blaug, Economic Theory in Retrospect: History of Economic Thought from Adam Smith to J.M. Keynes. (5th Edition), Cambridge University Press, Cambridge.
5. T.N. Hajela. History of Economic thought, Ane's Student Edition, Daryaganj, New Delhi.
6. B.N. Ganguli, Indian Economic Thought: A 19th Century Perspective, Tata McGraw Hill, New Delhi.
7. J.A. Schumpeter, History of Economic Thought. Oxford University Press.


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19. Geography
BA/BSc - Pt - II

Scheme of Examination

Faculty	Min. Pass Marks	Max. Marks
Arts/Social Science	72	200
Science	54	150
Paper I	Resources Geography	Arts 75 Science 50
Paper II	Human Geography	Arts 75 Science 50
Practical	18	Arts 50 Science 50

Notes

1. Students are permitted to use the stencils, simple calculator and log tables wherever needed in both theory and practical examinations.
2. There will be a common paper for Arts and Science.
3. Q.1 will be compulsory and will cover the entire course of the paper.
Q. No. 1 of 20% marks of the maximum marks be set in two parts.
(a) Part (a) will have ten items for locating on a map (to be supplied by examination centre) carrying 10% marks of the maximum marks and candidates shall attempt any five items.
(b) Part (b) will have 10 short answer questions carrying 10% marks of the maximum marks and candidates shall attempt any five items.
4. Remaining 9 questions carrying equal marks will be set with three questions from each section of the syllabus.
5. Candidate will attempt 5 questions in all including question No. 1 selecting at least one question from each section.
6. Practical examination will be conducted by the board of examiners.
7. The candidate will have to pass in theory and practical separately.
8. The non-collegiate candidates will have to attend a practical training camp of 48 hours at a college affiliated to the University of Rajasthan, Jaipur notified by the University from time to time in which Geography subject is taught on payment of fee fixed by the University. The candidates appearing at examination from any examination centre located in Jaipur City will attend the practical camp at the University Post Graduate Department on payment of fee fixed by the University. The candidate will procure Certificate of successful completion of practical training camp from the College/Department of Geography and produce the same at the time of practical examinations.

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Paper I: Resources Geography

Section A

Nature, scope and significance of resources geography, definition and classification of resources: renewable and non renewable resources, resource classification of Zimmerman. Natural Resources: Distribution, exploitation, uses and conservation of forest, water, soils, fisheries, mineral resources, energy resources (coal, petroleum, natural gas and non-conventional energy resources).

Section B

Human resources: Population growth, distribution and density, causes of inequalities, population-resources relationship and problems, Agricultural resources: fisheries and cereal crops: rice, wheat, maize and barley; beverages: tea, coffee and tobacco, commercial crops: cotton, rubber, jute, sugarcane, silk and artificial fibres. Agricultural regions of the world.

Section C

Concepts of Resources utilization, their conservation. environmental and cultural constraints in resource utilization, water conservation and rainwater harvesting, soil and forest resources conservation, land capability classes, resources regions of the world, resources regions of the India, economic regions of the India, sustainable development.

Recommended Readings:

- Alexander, E.W. 1988: Economic Geography. Prentice Hall India, New Delhi.
 Bunting B.C., 1987: The Geography of Soil. Prentice hall, New York.
 कौशिक, एन.डी. 2010: संसाधन भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।
 माधुर, बी. 1998: संसाधन भूगोल। रस्तोगी प्रकाशन, मेरठ।
 Mitchell, Bruce. 1979: Geography and Resource Analysis. Longmans, London.
 Park, C.C. 2001: The Environment-Principles and applications. Routledge, London.
 Robinson, G.W. 1932 : Soils, their Origin, Constitution and Classification. London.
 Shafi, M. 2004: Agricultural Geography. Pearson India.

Paper II: Human Geography

Section A

Definition, aims and scope of human geography, relation of human geography with other social sciences. Principles of human geography, essential facts of human geography

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according to Brunhes and Huntington, schools of man-environment relations: determinism, possibilism and neo determinism

Section B

Human races: evolution and migration, zone-strata theory, classification of races: types, characteristics and distribution. human races in India, tribes of the world: eskimos, bushman, pigmy, masai, badduian and khirgiz; tribes in India: bhils, nagas, santhal, gond, gujjar of Jammu and Kashmir and toda. Population growth and theories, distribution and density of world population.

Section C

Migration of population: causes, types and impact: population regions and population policies in India. Rural settlements: factors affecting development of rural settlement, types and patterns of rural settlements, building materials and house types, urban settlements: process of urbanization, urban problems in India, impact of human activities on environment.

Recommended Readings:

- Chandna, R.C. 2000: Geography of Population. Kalyani Publishers; New Delhi.
 Dohrs, F.E. and Summners, L.W. (eds.) 1967: Introduction to Geography. Thomas Crowell Co., New York.
 Dear, M.J. and Flusty, S. (ed.) 2002: The spaces of Post modernity, Readings in Human Geography. Blackwell Publishers Ltd., Oxford.
 Fellmen, Getis and Getis, J. 1998: Human Geography-Landscape of human activities. Longman, London.
 Husain, M. 2012: Human Geography. Rawat Publications, Jaipur.
 हारुन, एम. 2006: संसाधन भूगोल। वसुन्धरा प्रकाशन, गोरखपुर।
 Leong, G.C. and Morgan, E.C. 1982: Human and Economic Geography. Oxford University Press, Oxford 2nd Edition.
 कौशिक, एस.डी. 2012: मानव भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।
 मौर्य, एस.डी. 2005: जनसंख्या भूगोल। शारदा पुस्तक भवन, एलाहबाद।
 पण्डा, वी.पी. 2001: जनसंख्या भूगोल। मध्यप्रदेश हिन्दी ग्रन्थ अकादमी, भोपाल।
 राव, वी.पी. एच. श्रीवास्तव, वी.के. 2008: मानव भूगोल। वसुन्धरा प्रकाशन, जयपुर।
 Singh, R.L. 2005: Fundamentals of Human Geography. Sharda Pustak Bhawan, Allahabad.

Practicals

Scheme of examination

Min. Pass Marks: 18

Max. Marks: 50

	Bifurcation of Marks	Time
Written test	24	3 hrs.
Field survey and viva voce	(10+0)	2 1/2 hrs.
Record and viva voce	08 (0+)	

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N.B. 1. There shall be 6 questions in written paper selecting at least two questions from each section. Candidates are required to attempt 3 questions selecting 1 question from each section. All question carry equal marks.

Section A

Definition of cartography, types of cartographic symbols and their uses, drawing instruments and materials, classification and representation of data with the help of squares, rectangles, circles, spheres, ring, pyramids, wheel diagrams, traffic flow diagram, isochronic chart.

Section B

Classification and uses of maps, drawing of isopleth, choropleth, chorochromatic, choroschematic and dot maps (simple, multiple and multi colour), measures of central tendency and dispersion: mean, median, mode, quartiles, standard deviation.

Section C

Elements of map reading. History of topographical maps in India, Scheme of topographical mapping in India as per National Map Policy, 2005. Conventional symbols and interpretation of physical and cultural features on topographical maps.
Prismatic Compass survey: equipments, methods of measurement of bearings, correction of bearings, record of survey closing error and its corrections.

Recommended Readings:

- Monkhouse, F. J. and Wilkinson, F.J. 1985: Maps and Diagrams. Methuen, London
Mahmood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi (fourth revised edition).
Raisz, E. 1962: General Cartography. John Wiley and Sons, New York. 5th edition.
Singh, R.L. and Singh, Rana, P.B., 1991: Elements of Practical Geography. Kalayani Publishers, New Delhi.
Sarkar, A. K. 1997: Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
शर्मा, जे.पी. 2011: प्रयोगात्मक भूगोल की रूपरेखा। रस्तोगी पब्लिकेशन्स, मेरठ।
Singh, L.R 2006: Fundamentals of Practical Geography. Sharda Pustak Bhawan, Allahabad.
Venkatramiah, C., 1997: A Text book of Surveying. University Press, Hyderabad.

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STATISTICS
20. STATISTICS
Marks Scheme

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Statistical Inference	50 mark	65 marks
Paper II	Statistical Applications in Society and Industry	50 mark	65 marks
Paper III	Practical based on Paper I, II	50 mark	70 marks
Total	Total	150	200

Note: In each Question paper, 10 (ten) questions will be set having 2 (Two) from each unit; Candidates have to answer five questions in all; taking not more than one from each unit.

Paper I
(Statistical Inference)
Unit-I

Sampling from a distribution : Concept of statistic and its sampling distribution. Sampling distribution for mean of Binomial, Poisson and Normal Distribution; Chi square Distribution: Definition, Derivation, Moments, MGF, C.G.F., Mode & Skewness Limiting and Additive Property. Distribution of ratio of Chi-square variates

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Testing Normal Population variance, Test for Goodness of fit, Contingency table & Independence of attributes, yate's correction 18 hours

Unit-II

t-Distribution : Definition of Student's-t & Fisher's t Statistic and derivations of their distributions, Constants, Limiting Property of 't' distribution. Applications-Testing of Single mean: Difference of two means: paired t-test and sample correlation coefficient. F-Distribution : Definition, Derivation, Constants, Application- Testing of equality of two variances. Relationship between t, F and Chi-square Distributions. 18 hours

Unit-III

Theory of Estimation: Point Estimation-Concept and Problem for Point Estimation; Criterion of a good estimator (Unbiasedness, Consistency, Efficiency, Sufficiency). MVUE. Method of moments Methods of Maximum Likelihood Interval Estimation-Concept, Confidence Interval, Confidence Coefficient; Construction of Confidence Interval for Population Mean, Variance; Difference of Population Means & Ratio of Variances of Normal Distributions. 18 hours

Unit-IV

Testing of Hypothesis: Simple, Composite, Null and Alternative Hypothesis. Types of error, Critical region BCR, Neyman-Pearson's Lemma for BCR. BCR in case of Binomial, Poisson, Normal and Exponential Population. 18 hours

Unit-V

Large sample tests Testing of single mean. proportion. Testing of difference of means and proportions. Non-Parametric Tests-Definition Merits & Limitations. Sign test one sample and two sample cases. Run Test; Median test. 18 hours

REFERENCES:

1. Good A.M. Gupta M.K., Das Gupta B. (1991): Fundamentals of Statistics, Vol.1, World Press, Calcutta
2. Hodges J.L. and Lehman E.L. (1964): Basic Concepts of Probability and Statistics, Holden Day.
3. Mood A.M., Graybill F.A. and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
4. McGraw Hill

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5. Freund J.E. (2001): Mathematical Statistics, Prentice Hall of India.
6. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand and Sons., New Delhi.

ADDITIONAL REFERENCES:

1. Bhatt B.R. Srivenkatramana T and Rao Mahhava K.S. (1997): Statistics A Beginner's Text, Vol.II New Age International (P) Ltd.
2. Rohatgi V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor G.W. and Cochran W.G. (1967): Statistical Methods: Iowa State University Press.
4. E.J. Dudewicz & S.N. Misra: Modern Mathematical Statistics John Wiley and Sons.

Subject : Statistics Paper II

(STATISTICAL APPLICATIONS IN SOCIETY AND INDUSTRY)

(Also Common with Subject: Applied Statistics)

Unit-I

Demographic Methods: Sources of demographic data-census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality-Crude death rates, Infant mortality rates, Death rate by cause, Standardized death rate, Complete life table-Construction and its main features, Mortality rate and probability of dying. Relation between different columns of life table uses of life table and its limitations. Measurement of fertility: Crude birth rate, General fertility rate, Specific fertility rate, Total fertility rate, Gross reproduction rate, Net Reproduction Rate,

18 hours

Unit-II

Economic Statistics: Index numbers-Defination, Applications of index numbers, Price relatives, Quantity & Value relatives, Link and Chain Relatives, Problems involved in computation of index number, Use of averages, Simple aggregative and Weighted average methods Laspeyre's Paasche's and Fisher's index number, Tests for index numbers. Consumer price index,

18 hours

Unit-III

Time Series Analysis: Definition its different components, illus-

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trations, additive and multiplicative models. Different Methods for determination of trend & seasonal fluctuation alongwith their merits & demerits. 18 hours

Unit-IV

Educational Statistics: Methods of standardization of scales and tests. Z-scores, t-scores Standard scores, Percentile score, Intelligence Quotient and its measurement and uses, validity of test scores reliability of scores and their determination. 18 hours

Unit-V

Statistical Quality Control: Concept of SQC, Process control & Product control. Causes of variation in quality, General theory of control charts, control limits, sub-grouping, Summary of out-of control criteria, Control charts for variables: Construction of Mean and Range charts. Concept of Defects and Defectives, Control Charts for attributes: Construction of np-chart, p-chart, c-chart and their merits and demerits. 18 hours

REFERENCES:

1. Croxton F.E., Cowden D.J. (1969): Applied General Statistics, Prentice Hall of India.
2. Duncan A.J. (1974): Quality Control and Industrial Statistics, Taraporewala and Sons.
3. Goon A.M., Gupta M.K., Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press, Calcutta.
4. Grant E.I. (1964): Statistical Quality Control, Mc Graw Hill.
5. Guilford J.P. & Fruchter B.: Fundamental Statistics in Psychology and Education (1980), Mc Graw Hill.
6. Guilford J.P. (1954): Psychometric Method, Mc Graw Hill.
7. Srivastava O.S. (1983): A Textbook of Demography, Vikas Publishing.
8. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi.

ADDITIONAL REFERENCES:

1. Freeman Frank S. (1962): Psychological Testing, Oxford & IBH Publishing Co.
2. Gupta and Mukhopadhyay P.P.: Applied Statistics, Central Book Agency.
3. Pressat R. (1978): Statistical Demography, Methuen and Co.

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Subject : Statistics Paper III

Practical Paper

Practical Paper

1. Tests of significance based on t , Chi-square, F. Testing of significance of sample correlation coefficient, use of Z transformation.
2. Large sample tests for means and proportions. Tests of goodness of fit and independence of attributes in contingency tables.
3. Non-parametric tests: Sign, Run, Median (for large samples)
4. Computation of mortality and fertility rates. Construction of life table.
5. Construction of Index Numbers by Laspeyre's, Paasche's, Fishers's, Chain Base Indices. Consumer price index.
6. Tests for Index numbers.
7. Determination of trend in a time series and construction of seasonal indices.
8. Drawing of \bar{X} , R , np , p and C-Charts.

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21. APPLIED STATISTICS, Pt-II, 2021
Marks Scheme

Name of Paper	Nomenclature	Marks		No. of hours per week
		Science	Arts	
Paper I	Statistical Inference	50 mark	65 marks	3 hours
Paper II	Statistical Applications in Society and Industry	50 mark	65 marks	3 hours
Paper III	Practical based on Paper I, II	50 mark	70 marks	4 hours
Total		150	200	10 hours

Note: In each Question paper, 10 (ten) questions will be set having 2 (Two) from each unit. Candidates have to answer five questions in all, taking not more than one from each unit.

Subject : Applied Statistics

Paper I (Statistical Inference)

Unit-I

Sampling from a distribution : Concept of statistic and its sampling distribution. Sampling distribution for mean of Binomial and Normal Distribution. Chi-square Distribution. Moments. C.G.F.

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proof) Applications - Testing Normal Population variance, Test for Goodness of fit; Contingency Table & Independence of attributes. Yates's correction. 18 hours

Unit-II

t-Distribution : Definition of Student's t & Fisher's t Statistic. Property and Applications of t -distribution for testing-Single mean, difference of two means, observed sample correlation coefficient Paired t -test., F-Distribution : Definition, Mean, Variance & mode. Application of F distribution- Testing of equality of two variances. Relationship between t , F and Chi-square Distributions. without proof. 18 hours

Unit-III

Theory of Estimation: Point Estimation- Problems for Point Estimation; Criterion of a good estimator (Unbiasedness, Consistency, Efficiency, Sufficiency). MVUE. Method of moments. Methods of Maximum likelihood Interval Estimation-. Confidence Interval for mean, variance, difference of means and ratio of variances for normal populations. 18 hours

Unit-IV

Testing of Hypothesis: Simple, Composite, Null and Alternative Hypothesis. Types of error, Critical region, BCR, Neyman-Person's Lemma (statement only) and its application, BCR in case of Binomial, Poisson, and Normal Population. 18 hours

Unit-V

Large sample test-Testing of single mean, proportion. Testing of difference of means and proportions. Non-Parametric Tests-Definition, Merits & Limitations. Sign test for one sample and two sample cases. Run Test. Median test. 18 hours

REFERENCES:

1. Goon A.M Gupta M.K., Das Gupta B. (1991): Fundamentals of Statistics, Vol. I. World Press, Calcutta.
2. Hodges J.L. and Lehman E.L. (1964): Basic Concepts of Probability and statistics, Holden Day
3. Mood A.M., Graybill F.A. and Boes D.C. (1974): Introduction to the Theory of Statistics, Mc. Graw Hill
4. Freund J.E. (2001): Mathematical Statistics, Prentice Hall of India.
5. S.C. Gupta & V.K. Kapoor, fundamentals of Mathematical Statistics, Sultan Chand and sons, New Delhi

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ADDITIONAL REFERENCES:

1. Bhatt B.R., Srivenkatramana T. and Rao Madhava K.S. (1967):
Statistics: A Beginner's Text, Vol. II New Age International (P)
Ltd.
2. Rohatgi V.K., (1967) An Introduction to Probability Theory and
Mathematical Statistics, John Wiley & Sons.
3. Snedecor G.W. and Cochran W.G. (1967): Statistical Methods.
Iowa State University Press.
4. E.J. Dudewicz & S.N. Misra: Modern Mathematical Statistics
John Wiley and Sons.

Subject : Applied Statistics

Paper I

Paper II

STATISTICAL APPLICATIONS IN SOCIETY AND INDUSTRY

Courses contents are same as that of subject statistics.

PAPER III

PAPER III

Practical Paper

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22. PSYCHOLOGY

B.A. Part-II

SCHEME OF EXAMINATION :

Faculty	Max. Marks	Min. Passing Marks
Arts	200	72 (Th.54 Pr.18)
Science	150	54 (Th.36 Pr.18)

Paper	Nomenclature	Duration	Max. Marks	
			Arts	Science
I	Abnormal Psychology	3 Hrs.	75	50
II	Psychological Statistics	3 Hrs.	75	50
	Practical	3 Hrs.	50	50

NOTE:-

- There will be three papers in Psychology. Each paper will be of 3 hours. There will be a common paper for Arts and Science. In I and II Papers there will be 3 Sections A, B and C and will cover the entire course content of the paper.

Section-A Will contain 10 questions of 20 words each. Each question will be of 1.5 marks for Arts students and 1 mark for Science students. Thus, Part-A will be of 15 marks for Arts students and of 10 marks for Science students.

Section-B Will contain 7 questions of 50 words each, out of which students are required to attempt 5 questions. Each question will be of 3 marks for Arts students and of 2 marks for Science students. Thus, Part-B will be of 15 marks for Arts student and of 10 marks for Science students.

Section-C Will contain 3 long questions each with internal choice. Each question will be of 15 marks for Arts students and 10 marks for Science students. Thus, Part-C will be of 45 marks for Arts students and 30 marks for Science students.

For clarification the distribution of marks is tabulated as below:-

Arts			
Section	No. of Questions	Marks	Total
A	10	1.5	15
B	5 (out of 7)	03	15
C	3 (with Internal Choice)	15	45
Total marks			75

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Science

Section	No. of Question	Marks	Total
A	10	01	10
B	5 (Out of 7)	02	10
C	3 (with internal choice)	10	30
Total Marks			50

2. Use of simple calculator will be allowed for statistical portions of all papers.

Paper I - Abnormal Psychology

Section: A

1. Mental Disorder : Definition; Indicators of Abnormality; DSM-5 and ICD - 10 Classification Systems, Mental Health Professionals.
2. Causal Factors and Viewpoints : Risk Factors and Causes; Necessary, Sufficient and Contributor y causes; Diathesis - Stress Models, Biological, Psychological and Social perspectives.
3. Clinical Assessment and Diagnosis : Basic elements in Assessment, Physical and Psychosocial Assessment.

Section: B

4. Anxiety, Obsession Compulsion and Trauma and Stress or Related Disorders : Types, Clinical Picture and Causal Factors .
5. Mood Disorders and Suicide : Types, Clinical Picture and Causal Factors.
6. Somatic Symptoms and Dissociative Disorders : Types, Clinical Picture and Causal Fact ors

Section: C

7. Feeding and Eating D is orders : Types, Clinical Picture and Causal Factors.
8. Schizophrenia and Other Psychotic Disorders : Types, Clinical picture and Causal Factors.
9. Psychological Treatment / Therapies : Behavioral Therapy, Cognitive and Cognitive -Behavioral Therapy, Humanistic-Existential Therapies, Psychodynamic Therapies .

Books Recommended :

- Butcher, J . N . , Hooley, J . M . & Mineka , S. (2017) . *Abnormal Psychology* . Noida : Pearson India Education.
- Oltmanns, T . F. & Emery, R . E . (2017) . *Abnormal Psychology* . Noida : Pearson India Education.
- David, B . H . & Durand V . M . (2007) . *Abnormal Psychology : An Integrated Approach* . New Del hi : Thomson .
- Ray, W . J . (2015) . *Abnormal Psychology* . New Del hi :Sage.

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Paper II - Psychological Statistics

Section-A

1. Introduction: Nature and Scope of Statistics and Psychological Data; Application of Statistics in Psychology; Nature and Levels of Measurement - Categorical and Continuous Variables.
2. Frequency Distribution: Drawing of Frequency Distribution. Bivariate Frequency Distribution, Graphical Representation of Grouped Data-Histogram, Polygon.
3. Measurement of Central Tendency: Purpose and Types; Characteristics and Computation of Mean, Median and Mode.

Section-B

4. Measures of Variability: Concept and Uses; Characteristics and Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
5. Correlation: Concept and Types- Pearson's Product Moment Correlation (for Ungrouped Data by Assumed Mean and Actual Mean); Spearman's Rank Order Correlation.
6. Hypothesis Testing and Inferences Making: Population and Sample, Types of Sampling, Standard error of Mean, 't' test (Independent group), Interpretation of 't' values, levels of Significance.

Section-C

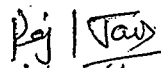
7. Non Parametric Tests: Nature and Assumptions of Distribution-free Statistics; Chi-Square; Equal Probability, 2 x 2 Contingency Table; Median Tests.
8. ANOVA: Purpose and Assumptions of ANOVA. One way ANOVA
9. Computer Analysis: Preparation of Data, Uses of SPSS.

Books Recommended :

- Broota K.D. (1992): *Experimental design in behavioural research*. New Delhi: Wiley Eastern.
- Garrett, H. (1981). *Statistics in psychology and education*. Mumbai: Vakil Febber and Simons.
- Minimum, E.W., King, B.M. & Bear. G. (1993). *Statistical Reasoning in Psychology and Education*. New York: John Wiley.
- Siegel. S. (1994). *Non-parametric Statistics*. New York: McGraw Hill.

Practical

1. Assessment of Mental Health
2. Assessment of State and Trait Anxiety
3. Measurement of Depression
4. Measurement of Coping – Styles
5. Assessment of Family Pathology
6. Word – Association Test
7. Eight-State Questionnaire
8. Neuropsychological Assessment
9. Stress: Measurement and Analysis of Group Data (Mean and Median)
10. Stress: Measurement and Analysis of Group Data ('t' test)


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23. राजस्थानी

स्कीम: इस परीक्षा में दो प्रश्न पत्र होंगे। प्रथम मध्यकालीन राजस्थानी गद्य,
द्वितीय मध्यकालीन राजस्थानी काव्य।

न्यूनतम उत्तीर्णांक 72

अधिकतम अंक 200

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प्रश्न पत्र

समय 3 घंटे

अधिकतम 100

द्वितीय प्रश्न पत्र

समय 3 घंटे

अधिकतम 100

प्रथम प्रश्न पत्र : मध्यकालीन राजस्थानी गद्य

(क) एक प्रश्न व्याख्या से संबंधित। प्रत्येक पुस्तक से एक (तीन व्याख्याएँ)

3×12=36

(ख) तीन पुस्तकों पर एक-एक आलोचनात्मक प्रश्न (कुल तीन प्रश्न)

3×16=48

(ग) एक प्रश्न—मध्यकालीन गद्य विधाओं और साहित्य पर।

1×16=16

पाठ्य पुस्तकें :

1. राजस्थानी बात संग्रह, सम्पादक मनोहर शर्मा, साहित्य अकादमी, रवीन्द्र भवन, नई दिल्ली। इस संग्रह की निम्नलिखित 15 बातें—
2,7,15,20,21,23,29,32,35,36,37,44,46,48
2. मारवाड़ रा उमरावां री बातों, संपादक—सोमसिंह सिंह शेखावत।

संदर्भ ग्रंथ :

1. राजस्थानी साहित्य की गौरवपूर्ण परम्परा—अमरचंद नाहटा, राधाकृष्ण प्रकाशन, दिल्ली
2. राजस्थानी बात साहित्य : डॉ. मनोहर शर्मा, राजस्थानी शोध संस्थान, चौपासनी, जोधपुर
3. राजस्थानी बात साहित्य : डॉ. पूनम दश्या, राजस्थानी भाषा, साहित्य एवं संस्कृति अकादमी, बीकानेर
4. राजस्थानी गद्य—उद्भव और विकास—डॉ. अचल, सार्वल राजस्थानी रिसर्च इन्स्टीट्यूट, बीकानेर।

द्वितीय प्रश्न-पत्र : मध्यकालीन राजस्थानी काव्य

इस प्रश्न पत्र में पाँच प्रश्न होंगे।

(क) प्रत्येक पुस्तक से एक-एक व्याख्या (कुल तीन व्याख्याएँ)

3×12=36

(ख) प्रत्येक पुस्तक पर एक-एक आलोचनात्मक प्रश्न (कुल तीन प्रश्न)

3×16=48

(ग) मध्यकालीन राजस्थानी काव्य विधाओं और साहित्य पर एक प्रश्न

1×16=16

पाठ्यपुस्तकें :

1. हालां झालां री कुण्डलियाँ—संपादक डॉ. मोतीलाल मेनारिया, राजस्थानी ग्रंथालय, University of Rajasthan, JAIPUR

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24. ANTHROPOLOGY

B.A. Part-II

Paper-I

Max Marks-100

Min Marks-36

Paper-II

Max Marks-100

Min Marks-36

Note- Each Paper will contain nine questions having three questions from each Unit. Candidates are required to attempt five questions in all selecting atleast one question from each Unit.

Paper-I Introduction to Physical and Archaeological Anthropology**UNIT-I**

Meaning, subject matter and scope of Physical Anthropology. Branches of Physical Anthropology. Relationship of Physical Anthropology with other Sciences.

Meaning, subject matter and scope of Archaeological Anthropology. Relationship of Archaeological Anthropology with other Natural and Social Sciences.

UNIT-II

Human evolution: Lamarckism, Darwinism and Synthetic Theory. Human Genetics: Mendelian Principles. Human Variation: Definition of Race.

UNIT-III

Major stone tool typology and technology. Palaeolithic: (Lower, Middle, Upper), Mesolithic and Neolithic Cultures. Study of Indus Valley Civilization: expansion, features and decline.

List of Books:

B.R.K. Shukla and S. Rastogi, Physical Anthropology and Human Genetics: An Introduction, New Delhi, Palka Prakashan.

Barnouw Victor, 1989, Physical Anthropology and Archaeology, California, Wadsworth.

Beals Ralph L. and Harry Hoijer, 1965, An Introduction to Anthropology, 3rd ed., New York, Macmillan Co.

Bhattacharya, D.K., 1966, An Outline of Indian Pre-history, Delhi, Palika Prakashan.

Das B.M., 1980, Outlines of Physical Anthropology, Allahabad, Kitab Mahal.

Sankalia, H.D., 1964, Stone Age Tools: Their Techniques, Names, and Probable Functions, Pune, Deccan College.

ए.आर.एन. श्रीवास्तव, 1992, शारीरिक मानवविज्ञान, पटना, ज्ञानदीप प्रकाशन

मार्टिनर व्हीलर, 1990, पृथ्वी से पुरातत्व, दिल्ली, हिंदी माध्यम कार्यान्वय

गार्डन चाइल्ड, 1991, मानव प्रगति की कहानी, लखनऊ, उत्तरप्रदेश हिंदी संस्थान

डॉ. ए.एन. शर्मा एवं डॉ. (श्रीमति) एन.एम. शर्मा, 1966, शारीरिक मानव विज्ञान, इलाहाबाद, अभिव्यक्ति प्रकाशन,

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Paper-II Research Methodology

UNIT-I

Meaning, relevance and types of Research: Science and Scientific method. Nature of Anthropological Research. History of field work in Anthropology.

Formulating a research problem: importance and source.

UNIT-II

An introduction to major theoretical perspectives:

Evolutionism: Basic idea, contributions of major theorists (L.H.Morgan, E.B.Tylor).

Diffusionism: British, German Austrian school and American Distributionism .

Functionalism: B. Malinowski's Contribution, Theory of Needs).

UNIT-III

Data : meaning and types. Sources of data: Primary (meaning, types, advantages and limitations of - Interview, Observation, Questionnaire), Secondary (Census, Historical documents and Personal documents).

Lists of Books

Bernard, H.R., 2008, Research Methods in Anthropology, New Delhi, Rawat Publications.

Danda, Ajit, 1992, Research Methodology in Anthropology, New Delhi, Inter-India.

Goode & Hatt, 1983, Methods in Social Research, McGraw Hill International.


Pritchard, E.E. Evans, 1966, Social Anthropology and Other Essays, New York, Free Press.

Srivastava, V.K. ed., 2004, Methodology and Fieldwork, New Delhi, Oxford University Press.

Wilkinson, T.S. & Bhandarkar, P.L., 1994, Methodology and Techniques of Social Research, Bombay, Himalaya Publishing House.

Young, Pauline, 1984, Scientific Social Surveys and Research, New Delhi, Prentice Hall of India.

पाण्डेय, गया, मानवशास्त्रीय सिद्धान्तः शास्त्रीय एवं आधुनिक, नई दिल्ली, कान्सेप्ट पब्लिशिंग हाऊस


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B. A. Part – II (Drama) Examination 2022-23

Paper-I Acting and Speech (Theory)

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- I. Introduction to acting, Definition and its elements
- II. History of acting in Special reference to Indian theatre:
 - A- Chaturdik abhinay siddhant
 - B- introduction to Rasa and bhava
- III. Applied Acting Techniques and Training
 - a. Mime and Movement.
 - b. Improvisation
- IV. Dramatic Speech – Mechanism and Technique:
 - a. Voice production Mechanism
 - b. Development of dramatic Speech
 - c. Study of meter and rhythm
 - d. Punctuation and speech exercises
- IV. Play production as communion art and its requirement (Group work, stage ethics, etc.)

Books Recommended:

1. Natyashastra – Bharatmuni (Tr. Babu Lal Shastri)
2. Bhartiya Natya Saundarya – Manohar Kale -
3. Parsi Theatre – Ranbir Singh
4. Acting is Believing: A Basic Method – Charles McGraw
5. Voce and the Actor – Cicely Berry

Paper-II Dramaturgy (Theory)

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- I. Salient features of Sanskrit Plays
- II. Selective study of Dasarupak of Dhananjaya
- III. Structural aspects of parsi theatre plays
- IV. Detailed study of following plays:
 - a. Sanskrit plays
 1. Mrichchhkatikam
 2. Urubhangam
 3. Abhigyan Shakuntalam
 - b. Parsi plays
 1. Yahudi Ki Ladki – Aga Hashra Kashmiri
 2. Veer Abhimanyu – Radhey Shyam Kathavachak
 3. Ramayana – Narayan Prasad Betab
 - c. Modern Indian Plays
 1. Andha Yug
 2. Ashadh Ka Ek Din
 3. Khamosh Adalat Jari Hai

Books Recommended:

1. Natyashastra – Bharatmuni (Tr. Babu Lal Shastri)
2. Dasarupak – Dhananjay (Tr. Govind Trigunayat)
3. Bhartiya Natya Saundarya – Manohar Kale
4. Parsi Hindi Rangmanch – Laxmi Narayan Lal
5. Bhartiya Rangmanch Ka Udbhav Evam Vikas – Dashrath Ojha
6. Natya Samikha – Dashrath Ojha
7. All the plays prescribed in Ch. IV

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B. A. Part – II (Drama) Practical Examination 2022-23

PRACTICAL PAPER –I

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- I. 15 new yogic Asanas and psycho Games.
- II. Improvisations with given motives.
- III- Practice of emotions based on Rasa and bhava

PRACTICAL PAPER –II

Duration – 3 Hours

Max. Marks – 50

Min. Pass Marks - 18

- I. Voice & Speech – Various exercises
- II. Participation in the production
- III. Submission of work Book and special assignments.

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26. PHYSICAL EDUCATION

There shall be two theory papers of 60 marks each and a practical examination carrying 80 marks. A candidate must pass in theory and practical exam. separately.

Paper I: Anatomy and physiology of Exercise

Time: 3 hours

Max. Marks: 60 Min. Pass Marks

Introduction Unit I : Introduction

(A) Meaning and concept of Anatomy, Physiology and Exercise

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Physiology, its need and importance in Physical Education and Sports.

(B) Definition of cell, tissue, organ and systems. Microscopic structure of cell.

Unit II : Skeletal and Muscular System

(A) Elementary knowledge of skeleton system, teridnology of various movements around joints.

(B) Types of muscles (Voluntary, Involuntary and Cardiac) General characteristic (Properties) of Muscles (Elasticity, Contractibility and Irritability).

Unit III : System

(A) Brief Introduction and structure of various systems of the body. (Cardio-vascular, Respiratory, Digestive, Nervous System)

(B) i. Pumping action of heart

ii. Mechanism of respiration.

iii. Role of Glands in growth, development and body function.

Unit IV : Physical Fitness and Training

(A) Physiological Concept of Physical fitness, training warming up, conditioning and fatigue.

(B) Physiological aspects of development of strength enhance, skill, speed and agility.

Unit V : Physiology of Exercise

(i) Effect of exercises on respiratory circulatory muscular system.

(ii) Nuro Muscular Co-ordination

(iii) Second wind, Oxygen dept. and binesthetic sense.

(iv) Stich and Cramps

(v) Obesity and body weight control.

Books for Reference :

1. Morehouse & M Physiology of Exercise : C.V. Mosby Co., St. Louis.
2. Srivastava etc. : Textbook of Practical Physiology, Scientific Book Agency, Calcutta.
3. Cuyton A.C. : Functions of Human Body : W.B. Saunders Co. London.
4. Pearce Evelyn C. : Antomy and Physiology of Nurses : Faber & Faber Ltd. London.

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5. Karpovich and Sinnser : Physiology of Muscular Activity : W.B. Saunders Co. London.
6. Pearce J.W. : Anatomy for students and teacher of physical Education. Edward Arnold & Co., London.
7. Duvel Ellen Neill Kinology : The Anatomy of Motion.
8. देशपाण्डे सुरेश : मानव क्रिया विज्ञान : दशमान व्यायाम मण्डल, अमरावती।
9. सिंह टी.के. : शरीर रचना एवं शरीर क्रिया विज्ञान : दीपक प्रकाशन, जोधपुर।
10. आर्मस्ट्रॉंग व जैकसन : नर्सों के लिए शरीर सम्बन्धी ज्ञान : एन.आर. ब्रदर्स, इंदौर।
11. कंवर रमेश चन्द : शरीर क्रिया विज्ञान व स्वास्थ्य शिक्षा : अमित ब्रदर्स, नागपुर।
12. ध्यानी वी.एस. : शरीर क्रिया विज्ञानीया : चौखम्भा ओरियन्टल, वाराणसी।
13. पाण्डेय के. और वर्मा पी. : शरीर क्रिया विज्ञान, हिन्दी भा.का. विधेशालय, दिल्ली।
14. अजमेर सिंह और अश्वरथ शारीरिक शिक्षा स्वास्थ्य एवं खेलों की आधुनिक पाठ्य पुस्तक (बी.ए. पार्ट II, III) : कल्याणी पब्लिकेशंस, लुधियाना।

Paper-II : Managements & Methods of Physical Education
Time : 3 hours Max. Marks : 60 Min. Pass Marks : 22

Unit I : Introduction

1. Meaning and importance of "Teaching Methods", Factors to be considered in determining the methods of teaching.
2. Types of Teaching Methods.
3. Principles of Teaching.

Unit II : Organisation

Organisation of Sports and National, State, District and village Level for Educational Institutions, Open tournaments & Annual Sports Meet

Unit III : Tournaments

Meaning, types of Tournaments, Method of drawing fixtures, Merits and Demerit of various types of Tournaments.

Unit IV : Facilities and Equipments

1. Need and importance of equipments for Physical Education.
2. An ideal list of equipments for Physical Education.
3. Realistic approach in purchases, purchases procedures.
4. Development of improvised equipment and storekeeper.

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Unit V : Office Management and Budget.

- (a) Maintenance of Records, Filing and Office correspondence.
(b) Physical Education Budget and its preparation, Maintenance of Accounts, Income & Expenditure (Sources).

Books Recommended :

1. G. Tirunaryanan & S. Hariharan : Methods in Physical Education, Alagappa College of Physical Education, Alagappauram Karaijudi.
2. Hari Shankar Sharma : Physical Education - Organisation, Administration and Supervision (Hindi).
3. Knapp Clyde and Hagman, E.P. : Teaching Methods for Physical Education, New York : Mc Graw Hill Book Co. 1984.
4. Bucher C.A. : Administration of Physical Education and Auletic Programmes. The C.V. Kosby Company, London, 1983.
5. Zelgler, E.F. And Bowiew G.W. : Management Competency Development in sports and physical education, Lea and Febler, Philadelphia, 1983.
6. कवर आर.सी. : शारीरिक शिक्षा संगठन एवं प्रशासन, अमित ब्रदर्स, जयपुर।
7. अरोड़ा पी.के. : शारीरिक शिक्षा में संगठन, संचालन एवं मनोरंजन, प्रकाश ब्रदर्स, लुधियाना।
8. कमेंकर ए.के. और श्रीवास्तव ए.के. : शारीरिक शिक्षा संगठन; प्रशासन, पर्यवेक्षण एवं शिबिर, सुयोग प्रकाशन, अमरावती।
9. मोहम्मद वाहित और दीक्षित ए.के. : शारीरिक शिक्षा में शिक्षण विधियाँ : इन्डियन रेलवे क्रॉसिंग, लखनऊ।
10. पाण्डेय लक्ष्मीकान्त : शारीरिक शिक्षा की शिक्षण प्रवृत्ति, मैट्रोपोलिटन बुक कं. प्रा. लि., नई दिल्ली।
11. वैष्णव राजेन्द्र प्रसाद : शारीरिक शिक्षा का संगठन व विधियाँ : श्रीयांश पब्लिकेशन्स, जयपुर।
12. श्रीवास्तव ए.के. : शारीरिक शिक्षा और खेल में संगठन व पर्यवेक्षण, दिल्ली।
13. अजमेर सिंह और अन्य : शारीरिक शिक्षा स्वास्थ्य एवं खेलों की आधुनिक पाठ्यपुस्तक (बी.ए. पार्ट I, II, III) : कल्याणी पब्लिकेशन्स, लुधियाना।
14. सिद्धाना अशोक कुमार : शारीरिक शिक्षा सिद्धांत, मनोविज्ञान एवं इतिहास : श्रीयांश पब्लिकेशन्स, जयपुर।

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Syllabus B.A. Part-II

Practical

Max. Marks 80 Min. Pass Marks 28

The practical examination shall be conducted by a panel of examiners.

A candidate shall be required to show his/her familiarity (Rules & Techniques) and give performance/demonstration in the following :

1. Athletics (Compulsory)

Triple-Jump, Pole Vault, Javelin, Hammer and Walking. 40 Marks

2. Any one game of candidates choice from the following :

(a) Cricket (b) Hockey (c) Kho-kho (d) Yoga 40 Marks

40 Marks
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27 INDIAN HERITAGE IN RURAL HANDICRAFTS

Scheme	Max. Marks	Min. Pass Marks
1. Theory : One Paper 3 hrs.	60	22
2. Practical	80	28
3. Submission	60	22
Total	200	72

- Study of tools used in the early period made of:
(a) Stone (b) Copper & Bronze (c) Iron & Steel
- Machines and power tools-their uses, constructional particulars, operational processes and method maintenance, safety measures to be observed while operating them.
- Special jigs and props for minimising manual labour and to increase productivity in manufacturing rural handicrafts.
- Classification of raw materials method of identifying defects. Preservation and seasoning auxiliary methods of using different tools-safety precaution to be taken. Simple exercises involving cutting, fixing, fitting, drilling, forging, planning, polishing, etc.

Paper II (Practical) 5 Hrs. Duration

Max. Marks : 80 Min. Pass Marks : 28

- Wood work: Preparation of tools preparation of wood; marking and practice in different joints; making small objects like toys, paper weight and solid geometric forms.
- Paper machine work : Preparation of toys dolls pots and decorative items.

Submission Works

Max. Marks : 60 Min. Pass Marks : 22

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Note (1) : Submission work will be submitted to the head of the department of Rural Handicrafts of the college 15 days before the commencement of examination. The marks in the submission will be awarded by the subject teacher (internal). However the external examiner shall be empowered to review the work of submission in case there is a drastic difference between marks of the examination and submission.

(2) Candidates should pass in theory as well as in practical paper separately.

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COMPUTER APPLICATION (VOCATIONAL COURSE) FOR

B.A./B.Com/B.Sc. Part II

Paper-I

Paper Name : Operating System

Unit I

Concepts: Operating System & its need, Objectives of Operating System, Functions of Operating System, Types of OS: Simple Batch Systems, Multi-programmed Batch System, Time Sharing Systems, Parallel System, Distributed Systems and Real-Time Systems, Booting Process of OS, Operating System Structure.

Unit II

Process Management: Process Concept, Process States, Process Scheduling.
CPU Scheduling Algorithms: Basic Concepts, Scheduling Criteria, FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multiple Feedback Queue, Multiple- Processor Scheduling.

Unit III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Unit IV

Memory Management: Background, Why use memory management in OS, Logical versus Physical Address Space, Swapping, Contiguous Allocation (Fragmentation), Paging, Segmentation, Basic concept of Virtual Memory and Demand paging.
Introduction to File System : File Concepts(Operations and Attributes), Directory Structure, File System Structure

Unit V

Introduction of different Operating System(Linux, Unix, Windows Server), Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Input and Output, Inter Process Communication, network Structure, Security.

Recommended reference books:

1. A. Silberschatz and P.Galvin, "Operating System Concepts", Addison-Wesley, 5th Ed., 2001.
2. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition), Pearson Education, 2000.
3. Tanenbaum A.S., Modern Operating Systems, PHI Publ.
4. Peterson Richard, " The Complete Reference Linux " Tata McGraw Hill.
5. Simitabha Das, "Unix/Linux Concepts & Applications". Tata McGraw Hill
6. Achyut S. Godbole: Operating Systems, Tata Mc-Graw Hill Publishing Company Limited, 2000.
7. Harvey M. Deitel, Operating Systems, Pearson Education, 2001.

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Paper-II

Paper Name : Database Management System

Unit I

Data, Data Processing, Merits and demerits of file organisation. Database Overview, Purpose of the Database system, File systems Vs. Database Systems, View of Data: Data Abstraction, Instances, Schema, Data Models: Overview of Network, Hierarchical, and Relational Model, Database Architecture and Administrators, Codd's Rules.

Unit II

ER Model: Basic Terminology, Entity, Entity sets, attributes and keys, Relation and Relationship sets, Entity-Relationship Diagram, Weak and Strong entity types, Features of E-R Model, Specialization, Generalization Aggregation, Creating table from ER diagram.

Unit III

Basic Concept of functional dependencies, loss less decomposition and dependency preservation. Normalization and its types: 1NF, 2NF, 3NF and BCNF. Introduction to transactions, Transaction States.

Unit IV

Query Languages: DDL, DML, DCL, Introduction to SQL, Data Types, Basic SQL commands like Create, Alter, Drop, Truncate, Insert, Update, Delete etc.

Unit V

Transaction management and Concurrency control, Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), database recovery management.

Recommended Books:

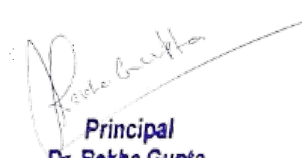
1. Korth H F and Silberschatz A, System Concepts, Sixth Edition; McGraw Hill, 2010
2. Leon, and Leon, SQL Tata McGraw Hill Pub. Co. Ltd.
3. Ivan Bayross; SQL/PL 4th Edn: BPB, 2009
4. Navathe S.B. Elmasri R.; Fundamentals of Database Systems, 5th Edn, Pearson 2011.
5. Ramakrishan and Gharke, Database Management Systems, 3rd Ed, TMHI, 2007.
6. Singh S.K.; Database Systems; 1 Edition; Pearson, 2006.

Paper-III

Paper Name : DBMS Lab

Content : Lab practical's based on paper II.

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28. COMPUTER APPLICATION

(Common for B.A./B.Com./B.Sc.)

	Science	Com./Arts	Science	Com./Arts
Paper I Data Base Management System			50	65
Paper II Structured Programming and Computer Graphics			50	65
Practical Programming Laboratory			50	70
On-the-Job training (4 weeks)				

The duration of these papers will be 3 hours.

Paper I Data Base Management System

Categorization of DBMS Systems. Network. Hierarchical and relational databases. Application of DBMS systems.

Relational databases management system. Why to use them and where. Data Description Language. Data Manipulation Language and Data Control Language.

Introduction to DBASE, DBASE commands. Development of an application under DBASE using forms, screens and PRG. files.

Security considerations in database management systems. Performance improvement in databases.

Relational databases, advanced concepts. Introduction to ORACLE/INGRES or a similar RDBMS on a multiuser environment.

Structured query language. Form design on a advanced RDBMS.

Report generator, Query by example and Report by form. Accessing

RDBMS using programming languages

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System management. User management Security considerations
Practical.

Design of a database for a business application. Design of data entry forms and report layouts for this database. Creation of programs to access and manipulate database.

Development of a business application in RDBMS.

Paper-II : Structured Programming and Computer Graphics

Introduction. Need of structured programming. Methods of documentation. Methods of analyzing a program requirements. Data flow diagrams. Entity relationship. Flow charts.

Various categories of programming language (3GL, 4GL, etc.), introduction to C and COBOL. Program development in C using structured programming concepts.

Why Graphics: Various types of graphics programs. Drafting packages. DTP packages. Microsoft Windows. Various documentation and DTP packages e.g. Wordperfect, Microsoft Word etc.

Introduction to a Pagemaker/Ventura or a similar package. Preparation of documents using DTP package. Formatting. Various fonts and characters set. Various type of printers used in DTP. Introduction to commercial DTP system available in market. Indian language fonts. Creation of Indian language fonts.

Practical

Development of a business application using C.

Preparation of a document and publishing it using a DTP System. Creation of fonts.

Managing a Microsoft Window session. Creating groups and program items under Window. Turning Windows for a computer system.

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**University of Rajasthan
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SYLLABUS

Three/Four Year U.G. Programme in Arts/Science

B.A.(UG9101)/B.Sc. Biology (UG0802)/B.Sc. Maths (UG 0803)

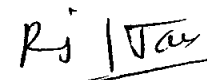
SUBJECT: GEOGRAPHY


(2023-24)

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Principal
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Kalwar, Jaipur

SEMESTER WISE PAPER TITLES WITH DETAILS

Three/Four Year U.G. Programme in Arts/ Science Subject: Geography									
S. No.	Level	Semester	Type	Title	Credits				Contact Hours
					L	T	P	Total	
1.	5	I	MJR	GEO-51T-101 Physical Geography-I	4	0	0	4	4
2.	5	I	MJR	GEO-51P-102 Practical-I	0	0	2	2	4
3.	5	II	MJR	GEO-52T-103 Human Geography	4	0	0	4	4
4.	5	II	MJR	GEO-52P-104 Practical-II	0	0	2	2	4


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Syllabus

B.A.(UG9101)/ B.Sc. Biology (UG0802)/B.Sc. Maths (UG 0803)

Semester I (2023-24)

GEO-51T-101-Physical Geography-I

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-51T-101	Physical Geography-I	5	4
Types of the Course	Delivery type of the Course		
Major	Lecture,60Lecturesincludingdiagnosticandformativeassessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To attain knowledge in detail about physical geography and associated branches.		

Duration- 3Hours

Max. Marks- 20+80

Min.Marks-8+32

Pattern of Examination	Bifurcation of Marks
Part A	10 ×2=20
Part B	15 ×4=60
Total	80

***Note:**

1. Internal assessment will be as per University Norms.
2. End Semester Examination question paper will comprise of two parts : Part A and Part B.
3. Part A will comprise of TWO questions consisting Map Work and Multiple-Choice Questions (MCQs)/ Short Answer type questions.
4. Part B will comprise of FOUR descriptive questions with Internal choice from each unit.
5. In all student will have to attempt total 6 questions, 2 questions from Part A and 4 questions from Part B.

Unit – I

Definition, Scope & Development of Physical Geography. Origin of the Earth-The Big-Bang Hypothesis; The Interstellar Dust Hypothesis. Geological History of the Earth. Origin of the Continents & Oceans- Continental Drift Theory; Plate Tectonic Theory.

Unit– II

Interior of the Earth.Earth Movements–Endogenetic&Exogenetic.Isostasy–viewsofAiry; Pratt & Holmes. Volcanoes & Earthquakes.

Unit– III

Mountain Building Theories– Kober & Holmes. Rocks– Classifications & Characteristics. Denudation- Erosion & Weathering; Cycle of Erosion– views of W.M. Davis & W. Penck. Drainage System & Pattern.

Unit– IV

Erosional & Depositional Work and Topographies of River, Underground Water, Glaciers, Wind & Oceanic Waves.

Recommended Readings:

- Bloom, A.L.(2003).Geomorphology:ASystematicAnalysisofLateCenozoicLandforms.New Delhi: Prentice-Hall of India.
- Christopherson, Robert W.(2011).Geo-systems:AnIntroductiontoPhysicalGeography8Ed. England: Macmillan Publishing Company.
- Ernst,W.G.(2000).Earthsystems:ProcessandIssues.Cambridge:CambridgeUniversityPress.
- Gautam, A. (2010). Bhautik Bhugol. Meerut: Rastogi Publications.
- Kale, V.S.andGupta,A.(2001).IntroductiontoGeomorphology.Hyderabad:OrientLongman.
- Selby, M.J.(2005).Earths Changing Surface. United Kingdom: OUP.
- Singh, S.(2009).Bhauatic Bhugolka Swaroop. Allahabnad: Prayag Pustak.
- Skinner,BrianJ.andStephen,C.(2000).TheDynamicEarth:AnIntroductiontophysicalGeology, John Wiley and Sons.
- Strahler ,A.N. and Strahler, A.H.(2005).Modern Physical Geography. John Wiley & Sons. Revised edition.
- Thorn bury, W.D.(1968).Principles of Geomorphology. Wiley.

Course Learning Outcomes:

By the end of the course ,students should be able to:

1. Identify the concepts of Origin of Earth and landforms
2. Illustrate the different force sacting over the Earth.
3. Compareandanalyzethedifferentcyclesoflandformerosionandtheirprocesses
4. Build competency and academic excellence for competitive exams

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GEO-51P-102-Practical-I

Code of Course	Title of the Course	Level of the Course	Credits of the Course
	Practical-I	5	2
Types of the Course	Delivery type of the Course		
Major	60contacthrs-Laboratorylecturesandfieldstudyincludingdiagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To make the students understand about the relief eat uresth rough scale and relief representation techniques.		

Duration- 4Hours

Max. Marks- 10+40

Min.Marks-4+16

Pattern of Examination	Bifurcation of Marks	Time
Written Test	20	2 Hours
Model/Chart and Viva-Voce	7+3	2 Hours
Record Work and Viva-Voce	7+3	

***Note-**

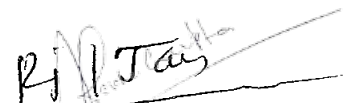
1. The students will have to prepare **B4 Size Record Book** which will be simultaneously checked by the Teacher in the class after teaching und evaluated during the examinations.
2. There will be 6 questions (3 questions from each unit) in written paper out of which student have to compulsorily attempt 2 questions from each unit.
3. The student will have to prepare Model/Chart **INDIVIDUALLY** form the practical syllabus of Geography and have to submit during the examination.
4. Simple Calculatoris permitted impractical examination.

Unit- I

Definition and Types of Scale: Simple, Comparative, Diagonal and Vernier. Methods of Relief Representation: Hachure, Hill-shading, Bench mark, Spot- Height, Form-lines and Contours.

Unit- II

Representation of Relief features through Contours and description – Conical hill, Plateau, Ridge, Cliff, Escarpment, Gorge, Waterfall, V-shaped valley, U- shaped valley and Hanging valley, Typesof Slopes-Gentle, Steep, Uniform, Undulatingand Terraced; Lake, Caldera, Spur.


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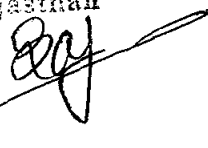
Recommended Readings:

- Monk house, F.J .and Wilkinson, H.R.(1973).Maps and Diagrams. London: Methuen.
- Rhind, D.W. and Taylor,D.R.F.(2000).Cartography:Past,PresentandFuture.International Cartographic Association.
- Robinson,A.H.,(2009).ElementsofCartography.NewYork:JohnWileyandSons.
- Robinson, A.H.(2000).Elements of Cartography. U.S.A. :John Wiley & Sons.
- Sarkar, A.K.(2005).PracticalGeography:ASystematicApproach.Calcutta:Oriental Longman.
- Sharma, J.P.(2010).Prayogik Bhugol. Meerut: Rastogi Publishers.
- Singh, R.L. and Dutt, P. K.(2010).Elements of Practical Geography. New Delhi: Kalyani Publishers.

Course Learning Outcomes:

By the end of the course, students should be able to:

1. To make students aware about the measurements and representative distances.
2. To develop skills and competency regarding area analysis and map making with relief features.


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Syllabus

B.A.(UG9101)/B.Sc. Biology(UG0802)/B.Sc. Maths (UG 0803)

Semester II (2023-24)

GEO-52T-103-Human Geography

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-52T-103	Human Geography	5	4
Types of the Course	Delivery type of the Course		
Major	Lecture, 60 Lectures including diagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To provide understanding of numerous dimension so human geography and cultural landscapes from global to local level.		

Duration- 3Hours

Max. Marks- 20+80

Min.Marks-8+32

Pattern of Examination	Bifurcation of Marks
Part A	10 × 2 = 20
Part B	15 × 4 = 60
Total	80

***Note:**

1. Internal assessment will be as per University Norms.
2. End Semester Examination question paper will comprise of two parts: Part A and Part B.
3. Part A will comprise of TWO questions consisting Map Work and Multiple-Choice Questions (MCQs)/ Short Answer type questions.
4. Part B will comprise of FOUR descriptive questions with Internal choice from each unit.
5. In all student will have to attempt total 6 questions, 2 questions from Part A and 4 questions from Part B.

Unit I

Human Geography: Definition, Nature, Scope and Principles. Inter-disciplinary approach. Understanding of Cultural landscape, Man- Nature Relationship: Determinism, Possibilism, Neo-Determinism.

Unit II

Cultural regions; Race (Griffith Taylor's Classification), Tribes-Eskimo, Bushman, Pygmy, Santhal, Nagas, Bhil. Religious and Linguistics composition of World Population.

Unit III

World Population: Growth, Distribution, Density, Sex-Ratio and Literacy. Population Growth Theory (Malthusian and Demographic Transition Theory). Human Development Index (HDI).

Unit IV

Factors, Types and Consequences of Migration, Griffith Taylor's Migration Theory. Trends and Patterns of Urbanisation of the World. Settlements-Types and Patterns. Christaller's Central Place Theory.

Recommended Readings:

- Bergwan, Edward E. (1995). Human Geography: Culture, Connections and Landscape. New Jersey: Prentice-Hall.
- Carr, M. Patterns. (1987). Process and change in Human Geography. London: MacMillan Education.
- Chandna, R.C. (2010). Population Geography. New Delhi: Kalyani Publisher.
- De Blij, H.J. (2000). Human Geography, Culture, Society and Space. New York: John Wiley.
- Fellman, J.L. (1997). Human Geography: Landscapes of Human Activities. USA: Brown and Benchmark Pub.
- Hassan, M.I. (2005). Population Geography. Jaipur: Rawat Publications.
- Hussain, Majid (2012). Manav Bhugol. Jaipur: Rawat Publications.
- Johnston, R.J. (2000). Dictionary of Human Geography. New York: Oxford.
- Kaushik, S.D. (2010). Manav Bhugol. Meerut: Rastogi Publication.
- Maurya, S.D. (2012). Manav Bhugol. Allahbad: Sharda Pustak Bhawan.
- Mc Bride, P.J. (2000). Human Geography Systems, Patterns and Change. U.K.
- Michael, Can. (1997). New Patterns: Process and Change in Human Geography.
- Singh, K.N. (2000). People of India. An Introduction Seagull Books.

Course Learning Outcomes:

By the end of the course, students will be able to:

1. Identify branches of human geography and distinguish between the different concepts of man environment relationship.
2. Classify the different tribes of the world and use various factors to interpret the spatial distribution of population.
3. Visualize the various patterns of migration, settlements and summarize the major problems of urbanisation in World.

GEO-52P-104-Practical-II

Code of Course	Title of the Course	Level of the Course	Credits of the Course
GEO-52P-104	Practical-II	5	2
Types of the Course	Delivery type of the Course		
Major	60contacthrs-Laboratorylecturesandfieldstudyincludingdiagnostic and formative assessments during lecture hours		
Prerequisites	Central Board of Secondary Education or Equivalent		
Objectives of the Course	To attain the knowledge about the geographical data representation with the help of cartographical skills.		

Duration- 4Hours

Max. Marks- 10+40

Min.Marks-4+16

Pattern of Examination	Bifurcation of Marks	Time
Written Test	20	2 Hours
Field Survey and Viva	7+3	2 Hours
Record and Viva	7+3	

***Note-**

1. The students will have to prepare **B4 Size Record Book** which will be simultaneously checked by the Teacher in the class after teaching and evaluated during the examinations.
2. There will be 6 questions (3 questions from each unit) in written paper out of which student have to compulsorily attempt 2 questions from each unit.
3. The student will have to prepare Survey Sheet **INDIVIDUALLY** during the examination.
4. Simple Calculatoris permitted in practical examination.

Unit- I

Definition and Types of Profiles: Serial, Superimposed, Projected and Composite. Weather instruments with description and diagrams, Weather Symbols, Interpretation of Indian daily Weather maps (July and January).

Unit- II

Graphs: Hythergraph and Climograph, Climatograph, Water budget graph, Wind rose. Surveying: Meaning, Classification and Significance. Chain and Tape Surveying: Open Traverse and Tie-line.

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Recommended Readings:

- Mishra, R.P & Ramesh. (1986).A Fundamentals of Cartography. New Delhi: McMillan Co.
- Monk house, F.J. and Wilkinson , H.R.(1973).Maps and Diagrams. London: Methuen.
- Rhind, D.W. and Taylor, D.R.F.(2000).Cartography :Past, Present and Future. International Cartographic Association.
- Robinson,A.H.,(2009).ElementsofCartography.NewYork:JohnWileyandSons.
- Robinson, A.H.(2000).Elements of Cartography. U.S.A. :John Wiley & Sons.
- Sarkar ,A.K. (2005).Practical Geography: A Systematic Approach. Calcutta: Oriental Longman.
- Sharma, J.P.(2010).Prayogic Bhugol. Meerut: Rastogi Publishers.
- Singh, R.L. and Dutt, P.K.(2010). Elements of Practical Geography. New Delhi: Kalyani Publishers.

Course Learning Outcomes:

By the end of the course, students will be able to:

1. Developskillsandcompetencyregardingstatisticalanalysisandrepresentationof geographical data.
2. Understandabouttheweatherinstrumentsandvariousclimaticconditions.

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SYLLABUS

(Three/Four Year Under Graduate Programme in Social Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

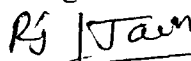

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SCHEME OF EXAMINATION FOR UNDERGRADUATE PROGRAMME AS PER
UGC FRAMEWORK FOR THE SESSION 2023-24

Subject: Political Science

1. 1 Credit =25 marks for examination/evaluation. Continuous assessment in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous Assessment (20% weightage) and End of Semester Examination (EoSE) (80% weightage).
2. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of the study.
3. Each paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration.
4. 'Part A' of the paper shall have 10 multiple short answer questions of 2 marks each. This question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
5. 'Part B' of the paper shall consist of 4 questions, each taken from different unit and the student shall attempt any 2 questions that carries 10 marks each.
6. 'Part C' of the paper shall consist of 8 descriptive questions with 2 questions having internal choices, taken from each unit. Question shall be drawn from each unit and also the corresponding internal choice from the same unit. Student shall attempt 1 question from each unit. Each question shall be of 20 marks.
7. 75% attendance is mandatory for appearing in EoSE.
8. To appear in the EoSE of a course/subject, the student must appear in the mid-semester examination and obtain at least C grade in the course/subject.
9. Credit points in a course/subject will be assigned only if, the student obtains at least C grade in midterm and EoSE examination of a course/subject.


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SEMESTER-WISE PAPER TITLES WITH DETAILS

UG9101 - Three/Four-Year Bachelor of Arts										
								Credit		
Level	Semester	Type	Title				L	T	P	Total
5	I	MJR	POL-51T-101-Foundations of Political Science				6	Nil	Nil	6
5	II	MJR	POL-52T-102-Indian Political Thought				6	Nil	Nil	6

Syllabus: B.A.-Semester-I

(2023-2024)

POL-51T-101-Foundations of Political Science:

Code of Course	Title of the Course	Level of the Course	Credit of the Course
POL-51T-101	Foundations of Political Science	5	6
Type of the Course		Delivery Type of the Course	
Major		Lecture, 90 hours	
Objectives of the Course:	Objectives of the Course: <ol style="list-style-type: none"> 1. This course introduces various ways of theorising the political dimensions, concepts and ideologies. 2. The idea is to make understand the development of various notions, theories, ideas about the government, as well as Political System. 3. This course will familiarise students with the basic normative and empirical concepts of Political Science and encourage them to understand how they manifest in social practices. 4. The understanding and internalisation of these notions and ideas will help students to develop qualities of responsible and active citizens in a democracy. 5. Study and analyse political contexts from critical and constructive perspective. 		

Syllabus

POL-51T-101-Foundations of Political Science:

Max. Marks: 30+120

Min. Pass. Marks : 12+48

POL-51T-101-Foundations of Political Science: 3 Hours duration

30+120 Marks

Unit - I (25 Lectures)

Origin and Evolution of Political Science as a Discipline: Meaning, Nature and Scope; Traditional and Modern Approaches; Behaviouralism and Post Behaviouralism; Political Science and other Social Sciences, Power, Authority, Legitimacy

Unit - II (20 Lectures)

Constitutionalism; Democracy and Dictatorship; Unitary and Federal Government; Parliamentary

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and Presidential Government; Political Parties and Pressure Groups

Unit - III (20 Lectures)

Theories of representations; Organs of government and their functions; Political system; Political Modernisation and Political Development; Political Culture and Socialisation

Unit - IV (25 Lectures)

Liberalism, Idealism, Marxism, Anarchism, Feminism

Suggested Books and References:

A Heywood (1992): *Political Ideologies*, Macmillan, Basingstoke

R Bhargava and Acharya(2010): *Political Theory: An Introduction*, Pearson Longman, Delhi

Andrew Vincent (2010): *Modern Political Ideologies*, Blackwell Publishing Ltd, USA

W. Pye, Lucian and Verba, Sidney(1965): *Political Culture and Political Development*, Princeton University Press Princeton, New Jersey

Giovanni Sartori (1976): *Parties and Party systems a framework for analysis*, Cambridge University Press, UK

Peter Ronald and Sridharan (2006): *India's Political Parties*, Sage Publications India Pvt. Ltd , New Delhi

Suggested E-resources:

Online Lecture Notes and Course Materials:

www.archive.gov.in

www.libgen.io.in

<https://www.youtube.com/@kcsamota>

E-PG Pathshala (<https://epgp.inflibnet.ac.in/>)

अनुशासित पुस्तकें (हिन्दी में):

राजीव भार्गव और अशोक आचार्य(2008), राजनीतिक सिद्धांत: एक परिचय, पियरसन, नई दिल्ली।

संजीव कुमार (2019), राजनीतिक सिद्धांत की समझ, ओरियण्ट ब्लैकस्वान, दिल्ली।

के सी सामोता (2023), राजनीति विज्ञान के मूल आधार, नोशन प्रेस प्रा. लिमिटेड, चैन्नई।

रजनी कोठारी (2005), भारत में राजनीति: कल और आज, वाणी प्रकाशन, नई दिल्ली।

आशुतोष वाशेय, जितेन्द्र कुमार (अनु.) (2018), अधुरी जीत: भारत का अप्रत्याशित लोकतंत्र, ऑक्सफोर्ड प्रेस, नई दिल्ली।

के सी सामोता (2020), तुलनात्मक राजनीति के सिद्धांत, नोशन प्रेस प्रा. लिमिटेड, चैन्नई।

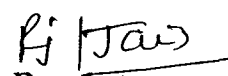
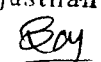
फिलिप कॉटलर (2017), लोकतंत्र का पतन: विश्व का पुनर्निर्माण, सेज, नई दिल्ली।

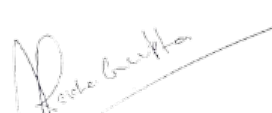
ओ पी गाबा: राजनीति के मूल आधार तत्व, मयूर पब्लिशिंग, आगरा।

इकबाल नारायण: राजनीतिशास्त्र के सिद्धांत।

Course Learning Outcomes:

After completing the course, the learner will be able to:


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1. Understand the various traditional and contemporary approaches of Political Science.
2. Understand multiple frames by which the idea of political society is analysed, debated and constructed.
3. Understand the significance of theorising and then applying theory into practice.
4. Gain critical thinking and develop the ability to make logical inferences about socio-economic and political issues, on the basis of understanding of various aspects, concepts, views, ideas and theories in the sphere of Political Science.

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Syllabus: B.A.-Semester-II

(2023-2024)

POL-52T-102-Indian Political Thought:

Code of Course	Title of the Course	Level of the Course	Credit of the Course
POL-52T-102	Indian Political Thought	5	6
Type of the Course		Delivery Type of the Course	
Major		Lecture, 90 hours	
Objectives of the Course:	Objectives of the Course: 1. The primary objective of the course is to make students familiar with the works and studies related to Indian Political Thinkers. 2. The basic focus of study is on individual thinkers whose ideas are however framed by specific themes and facilitated socio-political transformation. 3. The course as a whole is meant to provide a sense of the broad streams of Indian thought, while encouraging a specific knowledge of individual thinkers and texts. 4. The thinkers have been consciously selected to represent a wide spectrum of ideologies and vantage points within the modern Indian thought tradition. 5. The course content will help students in understanding how these thinkers built up their arguments and developed their views on respective themes.		

Syllabus

POL-52T-102-Indian Political Thought

Max. Marks: 30+120

Min. Pass. Marks : 12+48

POL-52T-102-Indian Political Thought 3 Hours duration

30+120 Marks

Unit - I (25 Lectures)

Buddhism, Jainism, Manu, Kautilya, Sukracharyya

Unit - II (25 Lectures)

Raja Ram Mohan Roy, Swami Dayanand Saraswati, Mahatma Jyotiba Phule, Swami Vivekananda

Unit - III (20 Lectures)

Gopal Krishna Gokhale, Bal Gangadhar Tilak, Mahatma Gandhi, Jawaharlal Nehru

Unit - IV (20 Lectures)

Bhimrao Ambedkar, Manvendra Nath Roy, Jayaprakash Narayan, Deen Dayal Upadhyay

Suggested Books and References:

Kancha Ilaiah Shepherd (2019): *God as Political Philosopher*, Sage Publication, Delhi

Altekar (1958): *The Kingship in State and Government in Ancient India*, Motilal Banarsidas

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B R Ambedkar (1957): *Buddha and His Dhamma*, Siddhartha College Publications, Mumbai
 Gail Omvedt (2003): *Buddhism in India*, Sage Publication, New Delhi
 Buddha Dhamma Foundations, <https://dhammadharm.org>
 Walpola Rahula (2007): *What the Buddha Thought*, open road, Delhi
 Jafer D Long (2009): *Jainism: An Introduction*, Bloomsbury Academic,
 Wendy Doniger, Brian Smith (1991): *The Laws of Manu*, Penguin books
 R. Shamasastri(1915): *Kautilya's Arthashastra*, from-www.archive.com
 B D Basu (1914): *Sacred books of the Hindus, The Sukraniti*, Indian press, Allahabad
 Akash, Silika Mohapatra (2010): *Indian Political Thought, A Reader*, Rutledge, Delhi
 V P Verma, (1952): *Hindu Political Thought and Its Metaphysical Foundations*, Motilal
 Banarsidass, Delhi
 Christophe Jaferlor (2000): *Dr Ambedkar and Untouchability*, Hurst & Company, London
 S. Collins, (2001): *Agganna Sutta: An Annotated Translation*, Sahitya Academy, New Delhi
 S. Collins, (2001): *Agganna Sutta: The Discussion on What is Primary (An Annotated Translation
 from Pali)*, Delhi
 V. Mehta, (1992): *Foundation of Indian Political Thought*, Manohar, Delhi
 R. Kangle, (1997): *Arthashastra of Kautilya-: A Study*, Motilal Banarsidass, Delhi
 Appadorai, Arjun(1980): *Political thoughts in India: 400 B.C.*, Rupa Publications
 L. Jayasurya, 'Budhism, Politics and Statecraft', International Journal of Buddhist Thought &
 Culture, 11, 2008

Suggested E-resources:

Online Lecture Notes and Course Materials:

www.archive.gov.in

www.libgen.io.in

<https://www.youtube.com/@kcsamota>

E-PG Pathshala (<https://epgp.inflibnet.ac.in/>)

अनुशंसित पुस्तकें (हिन्दी में):

कैलाश चन्द्र जैन(1930), जैन धर्म का इतिहास, डी के प्रिन्ट वर्ल्ड, नई दिल्ली।

बलदेव उपाध्याय, (1930), बौद्ध दर्शन, शारदा मंदिर, बनारस।

राहुल सांस्कृत्यायन (1944), बौद्ध दर्शन, किताब महल प्रकाशन, इलाहाबाद।

सूर्यनारायण चौधरी (अनु.1956), सौंदरानंद काव्य, संस्कृत भवन, कटौतिया, बिहार।

बी आर अम्बेडकर: बुद्ध और उसका धम्म, सम्पूर्ण वाङ्मय, अम्बेडकर फाउण्डेशन, दिल्ली।

एल जी मेश्राम,विमलकीर्ति(2023), महात्मा जोतिबा फुले रचनावली-1, राधाकृष्णन प्रकाशक प्रा लिमिटेड, दिल्ली।

एम एस चतुर्वेदी, प्रमुख भारतीय राजनीतिक विचारक, कॉलेज बुक हाउस, जयपुर।

वी पी वर्मा, (2020): आधुनिक भारतीय राजनीतिक चिंतन, लक्ष्मीनारायण अग्रवाल।

के सी सामोता (2023), भारतीय राजनीतिक चिंतन, नोशन प्रेस प्रा. लिमिटेड, चैन्नई।

एस एम अग्रवाल, अंबेडकर व गांधी के चिंतन का तुलनात्मक अध्ययन

बाबा साहेब अम्बेडकर, सम्पूर्ण वाङ्मय, खण्ड-1 से 40, सामाजिक न्याय एवं अधिकारिता विभाग, अम्बेडकर फाउण्डेशन।

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Course Learning Outcomes:

After completing the course, the learner will be able to:

1. Critically understand and evaluate the Indian Political thought.
2. Identify and describe the key characteristics of Indian political thought and develop a strong understanding of selected historiographical debates.
3. Think, discuss and debate about issues, conditions & challenges in ancient, medieval, contemporary India, from multiple vantage points, including its significance in the making of modern India.
4. Develop tolerance and respect for diverse opinion and at the same time, to admire and appreciate the plurality within the Indian intellectual tradition.

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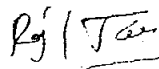
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SYLLABUS


(Three/Four Year Under Graduate Programme in Social Science)

I & II Semester

Examination-2023-24


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As per NEP - 2020


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B. A.

Semester: I CC 1

Credits: 06

Paper I: History of India (From the Beginning Upto 1200C.E.)

Theory: 120 Marks;

Mid-Semester Assessment: 30 Marks

Course Objective: This course aims to provide students with a comprehensive understanding of the history of India up to 1200 CE. It seeks to familiarize students with the main sources and methodologies used in the study of ancient Indian history. By exploring the major political, social, economic, religious, and cultural developments during different periods of ancient Indian history, the course aims to develop student's knowledge and critical thinking skills.

Course Outcome: By the end of this course, students will have a sound knowledge of the main sources and methodologies used in studying ancient Indian history. Overall, the course aims to provide a comprehensive understanding of ancient Indian history and develop analytical and critical thinking skills in interpreting historical sources.

Unit-I

Main sources of the history of India up to 300 CE. A brief survey of Prehistoric times in India. Harappan civilization – origin, extent, salient features, and continuity. The Vedic Age – Vedic literature, polity, society, economy and religion, a brief survey of Iron Age cultures in India. Rise of Janapadas and Mahajanapadas – monarchies and republics.

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Unit-II

Rise of Magadhan imperialism up to the Nandas; Jainism and Buddhism – origin, teachings, contribution. The Mauryan empire – main sources, Chandragupta Maurya and Asoka's Dhamma -its nature and propagation. Mauryan state and administration, society and economy, art and architecture, Decline of the Mauryas.

Unit-III

The Post – Mauryan period (c.200 B.C. E to 300 C.E.) achievements of the Sungas, Satavahanas, Sakas and Kushanas. Social, Religious and Economic life and development of literature and arts during the post-Mauryan period. The Sangam Age – literature, society, economy, and culture.

The Gupta empire- achievements of Samudragupta, Chandragupta II Vikramaditya, Skandagupta; State and administrative institutions; Social and economic life; Religious thought and institutions; Development in literature, arts and science.

Unit - IV

Post Gupta Period up to 750 CE. – Achievements of the Vardhanas, Chalukyas Pallavas. Tripartite Struggle.

The Imperial Cholas and their achievements. A study of social and economic changes and a brief survey of cultural life during the c. 750 to 1200 CE.

Recommended Readings

H.D Sankalia, *Prehistory of India*, Murishiram Monoharlal, New Delhi, 1977

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- Dilip K. Chakarbarti, *India. An Arachnological History (Palaeolithic beginnings to Early Historic Foundations)* Oxford University Press, New Delhi, 1999
- B.B. Lal, *India 1947-1997: New Light on the indus Civilisation, Delhi 1998*
- R.K. Mookerjee, *Chandragupta Maurya and His Time, Delhi, 1952 (also in Hindi)*
- B.N. Puri, *India under the Kushanas, Bombay, 1965*
- A.N. Sastri, *A History of South India (also in Hindi)*
- Romila Thapar, *A History of India, Vol I, Penguin, 1966*
: *Asoka & the Decline of the Mauryas, 3rd impression, Delhi, 1999*
- Upinder Singh, *A History of Ancient and Early Medieval India (From the Stone Age to the 12th Century)* Pearson Longaman, Delhi 2009
- Majumdar, R.C &
A.C. Altekar : *The Vakataka Gupta Age (Also In Hindi)*
- Baij Nath Sharma : *Harsha & his times, Varansai, 1970*
- Neelkanth Sastri : *A History of South India (also in Hindi)*
- Romila Thapar : *A History of India, Vol I, Penguin, 1966*
- Upinder Singh : *A History of Ancient and Early Medieval India (From the Stone Age to the 12th Century)* Pearson Longaman, Delhi 2009

- विदुला जायसवाल – भारतीय इतिहास का नव-प्रस्तर युग, दिल्ली, 1992
- के.के. थपलियाल एवं एस.पी. शुक्ला – सिन्धु सभ्यता लखनऊ, 1976
- मदनमोहन सिंह – बुद्धकालीन समाज और धर्म, पटना 1972
- पी. एल. गुप्त – गुप्त साम्राज्य
- विशुद्धानन्द पाठक – उत्तर भारत का राजनीतिक इतिहास, लखनऊ, 1990
- बलराम श्रीवास्तव – दक्षिण भारत का इतिहास, वाराणसी, 1968
- के. सी. श्रीवास्तव – प्राचीन भारत का इतिहास तथा संस्कृति, इलाहाबाद

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B. A.

Semester II CC-2

Credits 6

History of Modern World

Theory 120 Marks

Mid-Semester Assessment- 30 Marks

Course Objective: The objective of this course on the History of Modern World is to provide students with a comprehensive understanding of key events, movements, and transformations that shaped the modern era. By studying the Renaissance, Reformation, revolutions, nationalism, imperialism, world wars, and major social movements, students will gain insights into the political, economic, social, and cultural developments that occurred globally from the 15th century to the post-Cold War era. The course aims to foster critical thinking, analytical skills, and a broader historical perspective, enabling students to analyse historical events in a nuanced manner and understand their relevance in shaping the modern world.

Course Outcome:

Overall, this course aims to equip students with the historical knowledge and critical thinking skills necessary to comprehend and analyse the complex developments that have shaped the modern world.

Unit-I

Renaissance and the beginning of the modern era. Reformation and counter-Reformation. Economic Changes- Feudalism to Capitalism; The American

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Revolution– causes, nature and consequences. The French Revolution– causes, main events, and impact. Napoleon Bonaparte: rise and downfall.

Unit-II

Industrial Revolution– causes, processes and impact. Revolutions of 1830 and 1848 in Europe. Rise of Nationalism in the 19th Century. National unification of Germany and Italy with special reference to Bismarckian diplomacy and system of alliances. Age of Conservatism. Modernisation of Japan.

Unit-III

Growth of Imperialism and Colonialism – exploitation of New World with special reference to countries of Asia and Africa; Nature of European Imperialism in China. Revolution of 1911 in China – principles of Sun-Yat Sen. The Russian Revolution of 1917. The Great Economic Depression and Recovery. Fascism in Italy and Nazism in Germany.

Unit-IV

Second World War- causes and consequences. United Nations Organisation – objectives, achievements and limitations. The Chinese Revolution of 1949. Civil Rights Movement: Martin Luther King and Malcolm X, Women's Movements- issues and debates, Politics of Cold War and Post-Cold War Order.

Recommended Readings

- A.G. Dickens : *The Age of Humanism and Reformation*, New Jersey, 1972
Christopher Hill : *Reformation to Industrial Revolution*, Penguin, 1970
H.B. Parks : *The United State of America: A History*, Indian Reprint
Calcutta, 1976

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- Georges Lefebvre : *The Coming of the French Revolution*, Princeton, 1989
- C.D. Hazen : *Modern Europe upto 1945*, Indian Reprint, Delhi 1977
- David Thomson : *Europe since Napoleon*, Penguin, 1966
- H.A. Davies : *Outline History of World*, 1968
- Lynn Hunt : *Politics, Culture and Class in the French Revolution*.
- Andrew Porter : *European Imperialism*,
- George Vernadsky : *A History of Russia*, 1961
- Jean Chesneaux, et al. : *China from the 1911 Revolution to Liberation*.
- A.J.P Taylor : *The Origins of the Second World War*
- H.A. Davies : *Outline History of the World*, OUP, 1947
- Bruce J. Dierenfield : *The Civil Rights Movement [Revised ed.]*, London: Routledge, 2008.
- S. Kemp and J. Squires : *Feminisms*, OUP, 1997
- Eric Hobsbawm : *Fractured Times: Social and Cultural History of the Twentieth Century*
- Sneh Mahajan : *Issues in Twentieth Century World History*, Delhi: Macmillan, 2009 (available in Hindi)
- बनारसी प्रसाद सक्सेना – *अमेरिका का इतिहास पटना*, 1972
- सी. डी. हेजन – *आधुनिक यूरोप का इतिहास (अनुवाद) आगरा*
- देवेन्द्र सिंह चौहान – *यूरोप का इतिहास (1815–1919) भोपाल* 1995
- जॉर्जवर्नादस्की – *रूस का इतिहास (अनुवाद) भोपाल*, 1971
- हेराल्ड एम. दिनाके – *पूर्व एशिया का आधुनिक इतिहास (अनुवाद) लखनऊ*, 1982
- पार्थसारथि गुप्ता – *यूरोप का इतिहास, हिन्दी माध्यम कार्यान्वयन निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली*
- लाल बहादुर – *यूरोप का इतिहास (1815–1919) भोपाल* 1995
- के.के. कौल – *पश्चिमी एशिया का आधुनिक इतिहास: 1808–1973 लखनऊ*, 1977

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SYLLABUS

(Three/Four Year Under Graduate Programme in Social Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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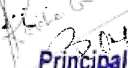


UNIVERSITY OF RAJASTHAN

**Programme Name: UG -9101-THREE/FOUR YEAR BACHELOR OF ARTS
DISCIPLINE: - PUBLIC ADMINISTRATION**

S.No.	Discipline/Subject	Page No.
1.	Index	1
2.	Scheme of Examination	2
3.	Exit and Entrance Policy	3
4.	Letter and Grade Points	4
5.	Semester wise paper details and detailed syllabus for Three/Four Year Bachelor of Arts (UG 9101 - PAD)	5-12
6.	Semester wise paper details and detailed syllabus Three/Four Year Bachelor of Arts (Public Administration) – (UG -9110 – PAD)	13-29


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SCHEME OF EXAMINATION FOR UNDERGRADUATE PROGRAMME AS PER UGC FRAMEWORK FOR SESSION 2023-24.

1 Credit =25 marks for examination/evaluation

Continuous assessment in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous Assessment (20% Weightage) and (End of Semester Examination) EoSE (80% Weightage).

1. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of the study.

2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration.

- Part A of the paper shall have 10 multiple short answer questions of 2 marks each. This first question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
- Part B of the paper shall consist of 4 questions and the student shall attempt only 2 questions that carries 10 marks each.
- Part C of the paper shall consist of 4 units carrying 2 descriptive questions with internal choice from each unit of the syllabus. Question shall be drawn from each unit specifically to the corresponding internal choice. Student shall attempt 1 question from each unit. Each question carries 20 marks.
- 75% attendance is mandatory for appearing in EoSE.
- To appear in the EoSE of a course/subject must appear in the mid-semester examination and obtain at least a C grade in the course/subject.
- Credit points in a course/subject will be assigned only if, the student obtains at least a C grade in mid-term and EoSE examination of a course/subject.

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Exit and Entrance Policy

1. Students who opt to exit after completion of the first year and have secured 48 credits will be awarded a UG Certificate if, in addition, they complete an internship of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.
2. Students who opt to exit after completion of the second year and have secured 96 credits will be awarded the UG diploma if, in addition, they complete one internship of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.
3. Students who wish to undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 150 credits and satisfying the minimum credit requirement.
4. A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 200 credits and have satisfied with minimum credit requirements.
5. Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University/College. The research project/dissertation will be in the major discipline. The students who secure 200 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

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Letter Grades and Grade Points

Letter Grade	Grade Point	Marks Range (%)
O (Outstanding)	10	91-100
A+ (Excellent)	9	81-90
A (Very Good)	8	71-80
B+ (Good)	7	61-70
B (Above Average)	6	51-60
C (Average)	5	40-50
P (Pass)	4	
F (Fail)	0	
AB (Absent)	0	

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**UG -9101-THREE/FOUR YEAR BACHELOR OF ARTS
DISCIPLINE: PUBLIC ADMINISTRATION
COURSE CONTENT**

Semester	Level	Type	Paper Nomenclature	Paper Code	Total Credit	Max. Marks 120+30	Total Learning/ Lecture Hours 15X6
I	5	MJR (Theory)	Introduction to Public Administration	UG -9101PAD-51T-101	6	150	90
II	5	MJR (Theory)	Indian Government and Administration	UG -9101PAD-52T-102	6	150	90

Student Progress Evaluation

Type	Paper Code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
Theory	UG-9101-PAD- 51T-101- Introduction to Public Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE
Theory	UG-9101-PAD-52T-102- Indian Government and Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE

Note:-

1. MJR = Major
2. PAD = Public Administration
3. MT = Mid Term
4. EoSE = End of Semester Examination

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SEMESTER-WISE PAPER TITLES WITH DETAILS

Syllabus: B.A. Pass Course
Semester- I
Public Administration
(2023-24)

Paper Code	Title of the Paper	Level	Type	Credit
UG -9101PAD- 51T- 101	Introduction to Public Administration	5	Major	6

Objectives: The paper highlights the foundations of the public administration as a discipline that explores the fundamentals, historical underpinnings and conceptual dimensions of the subject. Besides, it imparts the approaches to its study and principles executed in an organization. The student who studies this paper will be able to understand the underlying conceptual dimensions of Public Administration.

Unit – I

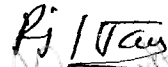
Public Administration – Meaning, Nature, Scope and Significance; Evolution of Public Administration as a Discipline; Public and Private Administration - Similarities and Dissimilarities; Public Administration: Art or Science and its Relationship with other Social Sciences (Political Science, Sociology, Law, Economics and Psychology); New Public Administration; New Public Management.

Unit – II

Approaches to the Study of Public Administration – Classical and Human Relations. Bases and Types of Organization - Formal and Informal; Principles of Organization – Hierarchy, Unity of Command, Unity of Direction, Span of Control, Centralization and Decentralization.

Unit – III

Chief Executive – Types, Role and Functions of Chief Executive; Authority and Responsibility, Co-ordination, Delegation, Supervision, Line - Staff and Auxiliary Agencies.


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Unit – IV

Administrative Behavior – Decision Making (Herbert Simon), Communication, Morale, Motivation and Leadership.

Learning Outcome

After studying this unit, the student will be able to:

- Explain the development of Public Administration as a discipline.
- Understand the relationship of Public Administration with other disciplines.
- Analyse the different approaches to the study of Public Administration
- Discern the principles of administration.

References:-

- Avasthi. A & Maheshwari. S, Public Administration, Agra: Lakshminarain Agrawal (English & Hindi).
- Fadia. B.L. & Fadia, Kuldeep. Public Administration: Administrative Theories and concept, Agra: Sahitya Bhawan Publication. (English & Hindi)
- सुरेन्द्र कटारिया, लोक प्रशासन के तत्व, मलिक एण्ड कंपनी, जयपुर।
- M.P. Sharma and B.L. Sadana, Public Administration in Theory and Practice, New Delhi: Kitab Mahal (English & Hindi).
- S.P. Naidu, Public Administration: Concepts and Theories: New Delhi, New Age International.

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सेमेस्टर – I

प्रश्न पत्र – I

लोक प्रशासन का परिचय

इकाई – I

लोक प्रशासन: अर्थ, प्रकृति, क्षेत्र एवं महत्व; लोक प्रशासन का विषय के रूप में विकास; लोक तथा निजी प्रशासन – समानताएँ व विषमताएँ ; लोक प्रशासन – कला या विज्ञान एवं इसका अन्य सामाजिक विज्ञानों (राजनीति विज्ञान, समाज शास्त्र, कानून, अर्थशास्त्र तथा मनोविज्ञान) के साथ सम्बन्ध; नवीन लोक प्रशासन; नवीन लोक प्रबंधन।

इकाई – II

लोक प्रशासन के अध्ययन के उपागम – शास्त्रीय तथा मानवीय।

संगठन के आधार तथा प्रकार – औपचारिक तथा अनौपचारिक; संगठन के सिद्धान्त – पदसोपान, आदेश की एकता, निर्देश की एकता, नियंत्रण का क्षेत्र, केन्द्रीकरण एवं विकेन्द्रीकरण।

इकाई – III

मुख्य कार्यपालिका – प्रकार, भूमिका व कार्य; सत्ता एवं उत्तरदायित्व, समन्वय, प्रत्यायोजन, पर्यवेक्षण, सूत्र, स्टाफ व सहायक अभिकरण।

इकाई – IV

प्रशासनिक व्यवहार :- निर्णय निर्माण (हरबर्ट साइमन), संचार, मनोबल, अभिप्रेरणा तथा नेतृत्व।

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References:-

- Avasthi. A & Maheshwari. S, Public Administration, Agra: Lakshminarain Agrawal (English & Hindi).
- Fadia. B.L. & Fadia, Kuldeep. Public Administration: Administrative Theories and concept, Agra: Sahitya Bhawan Publication. (English & Hindi)
- सुरेन्द्र कटारिया, लोक प्रशासन के तत्व, मलिक एण्ड कंपनी, जयपुर।
- M.P. Sharma and B.L. Sadana, Public Administration in Theory and Practice, New Delhi: Kitab Mahal (English & Hindi).
- S.P. Naidu, Public Administration: Concepts and Theories: New Delhi, New Age International.

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Semester- II

Paper Code	Title of the Paper	Level	Type	Credit
UG -9101-PAD-52T-102	Indian Government and Administration	5	Major	6

Objectives: The course delineates the development of Indian administration since ancient period and traces the significance of constitutional dynamics. It analyses the administrative structure at the federal level that spreads across the three pillars of democracy and throws light on the constitutional institutions. The student who studies this paper will be able to understand the overall administrative setup in Indian context.

Unit – I

Development of Indian Administration during Mauryan, Mughal and British Period; Formation of Constitution Assembly; Philosophy of Indian Constitution and its Basic Features; Union Legislature: Composition, Powers and Functions; Legislative Control over Administration.

Unit – II


Union Executive – President, Prime Minister and Council of Ministers – Powers and Functions; Organization and Functions of Central Secretariat, Cabinet Secretariat and Prime Minister's Office; Role and Importance of Cabinet Secretary; Executive Control over Administration.

Unit – III

Indian Judiciary: Structure, Powers and Functions of Supreme Court and High Court; Judicial Review and Judicial Activism; Public Interest Litigation; Judicial Appointment System; Judicial Control over Administration.

Unit - IV

Administrative Institutions in India: Organization and Functions of Union Public Service Commission, Finance Commission, Election Commission, Comptroller and Auditor General of India, NITI Aayog, Central Vigilance Commission, Lokpal.


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Learning Outcome

After the completion of the course, the student will be able to:

- Trace the historical underpinnings of the constitutional development and can relate to the present day.
- Examine the working of three pillars of democracy at the Union level.
- Analyse the functions of Constitutional bodies
- Understand the dynamics of Indian administration.

References:-

1. S.R. Maheshwari: Indian Administration.
2. P. Sharan; Public Administration.
3. Ramesh Arora & Rajni Goyal: Indian Public Administration.
4. Awasthi & Awasthi: Indian Administration.
5. Hoshiyar Singh & Mohinder Singh: Public Administration in India: Theory and Practices.
6. बी. एल. फड़िया : भारत में लोक प्रशासन
7. पी. डी. शर्मा एव बी. एम. शर्मा : भारतीय प्रशासन
8. रविन्द्र शर्मा : भारत में लोक प्रशासन
9. सुरेन्द्र कटारिया : भारत में लोक प्रशासन
10. एस. आर. माहेश्वरी : भारतीय प्रशासन

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सेमेस्टर – II

प्रश्न पत्र – II

भारत सरकार एवं प्रशासन

इकाई – I

मौर्य काल, मुगल काल तथा ब्रिटिश काल के दौरान भारतीय प्रशासन का विकास; संविधान सभा का निर्माण; भारतीय संविधान का दर्शन तथा इसकी प्रमुख विशेषताएँ; संघीय विधायिका: संगठन, शक्तियाँ एवं कार्य; प्रशासन पर विधायिका का नियंत्रण।

इकाई – II

संघीय कार्यपालिका – राष्ट्रपति, प्रधानमंत्री व मंत्रिपरिषद की स्थिति, शक्ति एवं कार्य; केन्द्रीय सचिवालय, मंत्रीमण्डल सचिवालय एवं प्रधानमंत्री कार्यालय का संगठन एवं कार्य; मंत्रीमण्डल सचिव की भूमिका एवं महत्व; प्रशासन पर कार्यपालिका नियंत्रण।

इकाई – III

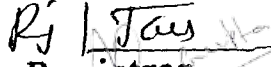
भारतीय न्यायपालिका : उच्चतम न्यायालय और उच्च न्यायालय की संरचना, शक्ति एवं कार्य; न्यायिक समीक्षा तथा न्यायिक सक्रियता; लोक हित याचिका; न्यायिक नियुक्ति प्रक्रिया; प्रशासन पर न्यायिक नियंत्रण।

इकाई – IV

भारत में प्रशासनिक संस्थाएँ : संघ लोक सेवा आयोग, वित्त आयोग, निर्वाचन आयोग, भारत का नियंत्रक एवं महालेखा परीक्षक, नीति आयोग, केन्द्रीय सतर्कता आयोग तथा लोकपाल के संगठन एवं कार्य।

References :-

1. S.R. Maheshwari : Indian Administration.
2. P. Sharan; Public Administration.
3. Ramesh Arora & Rajni Goyal : Indian Public Administration.
4. Awasthi & Awasthi : Indian Administration.
5. Hoshiyar Singh & Mohinder Singh : Public Administration in India : Theory and Practices.
6. बी. एल. फड़िया : भारत में लोक प्रशासन
7. पी. डी. शर्मा एवं बी. एम. शर्मा : भारतीय प्रशासन
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UG -9110-Three/Four Year Bachelor of Arts

Subject: PUBLIC ADMINISTRATION (B.A. in Public Ad)
COURSE CONTENT

Semester	Level	Type	Paper	Code	Total Credit	Max. Marks 130+20	Total Learning/ Lecture Hours 15X6
I	5	MJR (Theory)	Foundations of Public Administration	UG-9110-PAD-53T-103	6	150	90
	5	MJR (Theory)	Introduction to Indian Administration	UG-9110-PAD-54T-104	6	150	90
II	5	MJR (Theory)	Politics and Administration	UG-9110-PAD-55T-105	6	150	90
	5	MJR (Theory)	Economic Policy and Administration	UG-9110-PAD-56T-106	6	150	90

Student Progress Evaluation

Semester	Type	Paper Code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
I	Theory	UG-9101-PAD-53T-103- Foundations of Public Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE
	Theory	UG-9101-PAD-54T-104- Introduction to Indian Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE
II	Theory	UG-9110-PAD-55T-105- Politics and Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE
	Theory	UG-9110-PAD-56T-106- Economic Policy and Administration	1 Hrs- MT 3 Hrs- EoSE	30 Marks – MT 120 Marks- EoSE	12 Marks- MT 48 Marks - EoSE

Note:-

1. MJR = Major 3.EoSE = End of Semester Examination
2. MT = Mid Term 4. PAD = Public Administration

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SYLLABUS

(Three/Four Year Under Graduate Programme in Social Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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UG9112 Three/Four Year Bachelor of Arts									
Subject/ Discipline- Sociology									
							Credits		
	Level	Semester	Type	Title	L	T	P	TOTAL	
1.	5	I	MJR	Exploring Sociology	6			6	
2.	5	II	MJR	Basic concepts in Sociology	6			6	
3.	6	III	MJR	Sociology of Indian Society	6			6	
4.	6	IV	MJR	Social Research and Sociological Enquiry	4	2		6	
5.	7	V	MJR	Classical Sociological Traditions	6			6	
6.	7	VI	MJR	Indian Sociological Thought	6			6	

Scheme of Examination

CA: 20% and EOSE- 80 %

SOC 1-6: 6 credits= 150 marks (30 CA and 120 EOSE)

Continuous assessment- Compulsory to appear in mid-semester exam and obtain at least C grade

Sessional work: Class test/ Mid-semester examination/ homework assignment to be decided by BOS

EOSE: Duration 3 hours; 2 parts

Part A: One question with two parts each carrying 20 marks. The first part will have 20 Multiple choice questions of one mark each and the second part will have 10 short answer type questions carrying 2 marks each.

Part B: 04 questions to be set from each unit with one from each unit with internal choice. Third and Fourth question shall be based on application of topics/texts covered in syllabus (60%) and shall involve solving problems (40% weightage)

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SYLLABUS OF UG SEMESTER I (2023-24)

(Discipline: SOCIOLOGY)

Code of the Course	Title of the Course	Level of the Course	Credits of the course
SOC-51T-101	Exploring Sociology	5	6
Type of Course		Delivery Type of Course	
Major		Lectures	
Pre-requisites	None		
Objectives of the course	<ol style="list-style-type: none"> 1: The mandate of the course is to introduce the discipline to students from diverse academic and social backgrounds, trainings and capabilities. 2. The course is intended to introduce the students to a sociological way of thinking. 3. It will also provide a foundation for the other more detailed and specialized courses in sociology. 4. To familiarize the students with Sociology as a social science and the distinctiveness of its approach among social sciences 		
Learning Outcomes	<ol style="list-style-type: none"> 1. The students will learn to use the sociological lens to understand the dynamics of society and apply sociological concepts to the everyday life. 2. The student will be able to understand the changing conceptualisation of what it means to be scientific. They would develop an understanding of interdisciplinary nature of the social sciences. 		

SOC-51T-101: Exploring Sociology (6 credits)

Max. Marks: 150

Unit I: Sociology and Philosophy, History and Development of Global Sociology

History and Development of Indian Sociology, Cultural Ethnography

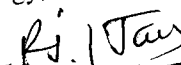
Unit II: Sociology and Other Social Sciences; Purposes of Sociology- Public Sociology, Radical/Critical sociology, New

Sociology

Sociology as a Profession, Role and Importance of Sociology in Life world

Unit III: Sociological Methods: Empirical, Historical, Evolutionary. and Comparative

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Unit IV: Society: A society, The society and Typology of Society (Herbert Spencer, Emile Durkheim and Karl Marx)
Community, Gesellschaft, Gemeinschaft, Imagined Community and Virtual Society

Suggested Readings:

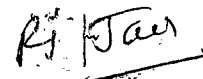
1. Beteille Andre, (2002) *Sociology: Essays on Approach and Methods*, OUP, New Delhi
2. Bierstedt Robert, (1963) *The Social Order: An Introduction to Sociology*, MacGraw Hill
3. Bottomore and Nisbet. (2004) *A History of Sociological Analysis*, Rawat Publications
4. Davis, Kingsley, (1949) *Human Society*, Collier Macmillan Ltd. (In Hindi also)
5. Giddens Anthony, (2005) *Sociology*, Polity Press, London. (In Hindi also)
6. Inkeles, Alex. (1987) *What is Sociology*, Prentice-Hall of India, New Delhi.
7. Jayaram, N. (1988) *Introductory Sociology*, Macmillan India, Madras.
8. Nagla B.K and Singh S.B. (2023) *Introducing Sociology*, Rawat Publications, Jaipur (in Hindi also)
9. Oommen T.K. and Venugopal C.N, 1988; *Sociology*, NLU Bar Council of India Trust
10. Mukherjee Ramakrishna. (1977) *Sociology of Indian Sociology*, Allied, New Delhi
11. Swingewood, Allen. (2000) *History of Sociological Thoughts*, Red Globe Press, London

Suggested E-resources: <https://epgp.inflibnet.ac.in/Home/>

SECOND SEMESTER

Code of the Course	Title of the Course	Level of the Course	Credits of the course
SOC-52T-102	Basic concepts in Sociology	5	6
Type of Course		Delivery Type of Course	
Major		Lectures	
Pre-requisites	None		
Objectives of the course	1. To introduce the students to fundamental concepts in Sociology 2. To enable the student to understand the complex nature and scope of sociology 3. To familiarize the student with the terminology used in sociology 4. Enable the student to understand and conceptualize the social processes		
Learning Outcomes	Upon completing the course, the students will be well versed in the sociological terminology. They would be able to apply the sociological concepts in understanding social phenomenon.		

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SOC-52T-102: Basic concepts in Sociology (6 credits)

Unit I: Social structure, Institution and Social systems

Social Groups, Status and Role, Culture, Norms and values

Unit II: Socialization: Concept, Agencies and Theories, Indoctrination

Social Stratification: Concept, Forms and Theories

Unit III: Social Change and Social Mobility: Concept, Forms and Theories

Social Control: Concept, Factors, Agencies and Theories

Unit IV: Social Interaction: The Social Process

Associative Social processes: Cooperation, Integration, Accommodation, Assimilation, Acculturation

Dissociative processes: Competition, Conflict, and Contravention

Suggested Readings:

1. Bottomore T. B. (1972) *Sociology: A Guide to Problems and Literature*, Bombay: George Allen and Unwin (India). (Hindi Edition also)
2. Doshi, S.L and Jain P.C. (2020) *Samajshastra: Nayi Dishayen*, National publishers, Jaipur.
3. Giddens A. and Sutton P.W. (2017) *Sociology*, Polity, London.
4. Giddens Anthony, (2005) *Sociology*, Polity Press, London
5. Harlambos, M. (1998) *Sociology: Themes and Perspectives*. Oxford University Press, New Delhi.
6. Inkeles, Alex. (1987) *What is Sociology*, Prentice-Hall of India, New Delhi.
7. Jayaram, N.1988. *Introductory Sociology*, Macmillan India, Madras.
8. Johnson, Harry M. (1995) *Sociology: A systematic Introduction*. Allied Publishers, New Delhi.
9. Macionis, John, J. (2019) *Sociology*, 17 Edition. Pearson. New Delhi.
10. Mac Iver and Page (1962) *Society: An Introductory Analysis*, MacMillan, (In Hindi also)
11. Nagla B.K and Singh S.B. (2023) *Introducing Sociology*, Rawat Publications, Jaipur (in Hindi also)
12. Rawat H.K. (2007) *Sociology: Basic Concepts*, Rawat Publications, Jaipur
13. Schaefer, Richard T. and Robert P. Lamm. (1999) *Sociology*, Tata-McGraw Hill, New Delhi.
14. Sidana, Jyoti. (2021) *Samajshastra: Ek Mulyankanatmak Parichay*, Rawat Publications, Jaipur
15. Singhi NK and Goswami, (2019) *Samajshastra Vivechan*, Rajasthan Hindi Granth Academy, Jaipur.

Suggested E-resources: <https://epgp.inflibnet.ac.in/Home/>

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UG9112 Four Year Bachelor of Arts				Subject/ Discipline- BA in Sociology				
					Credits			
	Level	Semester	Type	Title	L	T	P	TOTAL
1.	5	I	MJR	Exploring Sociology	6			6
2.	5	I	MJR	Basic concepts in Sociology	6			6
3.	5	II	MJR	Sociology of Indian Society	6			6
4.	5	II	MJR	Rural, Urban and Tribal Society in India	6			6

Scheme of Examination

CA: 20% and EOSE- 80 %

SOC 1-6: 6 credits= 150 marks (30 CA and 120 EOSE)

Continuous assessment- Compulsory to appear in mid-semester exam and obtain at least C grade

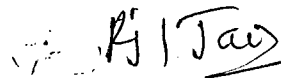
Sessional work: Class test/ Mid-semester examination/ homework assignment to be decided by BOS


EOSE: Duration 3 hours; 2 parts

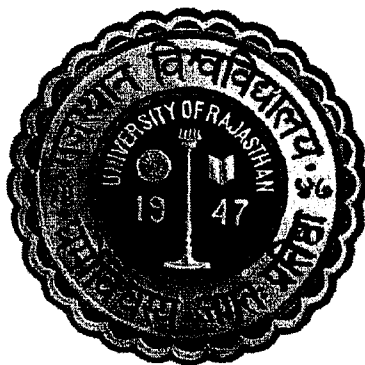
Part A: One question with two parts each carrying 20 marks. The first part will have 20 Multiple choice questions of one mark each and the second part will have 10 short answer type questions carrying 2 marks each.

Part B: 04 questions to be set from each unit with one from each unit with internal choice. Third and Fourth question shall be based on application of topics/texts covered in syllabus (60%) and shall involve solving problems (40% weightage)

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SYLLABUS

(Three/Four Year Under Graduate Programme)

B.A. -Home Science

I & II Semester

Examination-2023-24

As per NEP - 2020

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2

Structure of Four Year's Bachelor of Arts (Home Science)

Programme Code	UG9101	Programme Faculty	Arts	Programme Name	Four Year Bachelor of Arts (Home- Science)
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Eligibility / Pre-requisite of the Programme-12th Class from CBSE or Rajasthan Board or recognised Board

Degree Name -Four Year Bachelor of Arts (Home- Science)

Entry and Exit Policy

SEMESTER-I

Course Code	Course Title	Course Type	L	T	P	Credit
HSC 51T 101	Family Resources Management Theory	Discipline Centric Core (Major)	4	0	0	4
HSC 51P 102	Family Resources Management Practical	Discipline Centric Core (Major)	0	0	4	2
Total Credit						6

SEMESTER-II

Course Code	Course Title	Course Type	L	T	P	Credit
HSC 52T 103	Food and Nutrition Theory	Discipline Centric Core (Major)	4	0	0	4
HSC 52P 104	Food and Nutrition Practical	Discipline Centric Core (Major)	0	0	2	2
Total Credit						6

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Kalwar, Jaipur

PROGRAMME CODE – UG9101**Programme Faculty – Arts****Programme Name- Four Year Bachelor of Arts (Home- Science)****SEMESTER – I****CORE COURSE I**

Code of the Course	Title of the Course	Level of Course	Credits of course
HSC 51T 101	Family Resource Management Theory	5	4
HSC 51P 102	Family Resource Management Practical	5	2
Type of Course		Delivery Type of the Course	
Major		Theory- Lecture, Sixty Lecture including diagnostic and formative assessments - during lecture hours Practical- Laboratory work and field visits.	
Prerequisites	Central Board of Secondary Education or equivalent.		
Objectives of the Course (Theory)	<ul style="list-style-type: none"> To understand the meaning of resources management concepts related to management. To apply managerial process to management of time, energy and money. To understand saving, investment and credit pattern of family. To increase awareness about consumer problems, rights, responsibilities & protection laws 		
Objectives of the Course (Practical)	<ul style="list-style-type: none"> To help students understand various banking procedures. To help students understand house planning and interior decoration. 		

Theory Credit -4**60 Hours****HSC 51T 101-Family Resource Management****Syllabus -****Max. Marks: 20+80 marks****Min. Pass Marks: 8+32 marks****UNIT-I Housing****15**

- Function & family need of housing
- Principles of house planning: aspect, prospect, grouping of room, roominess, privacy, orientation, circulation, flexibility, spaciousness, aesthetics economy, ventilation services
- Site selection:
 - Vegetation:
 - size
 - soil types drainage
 - contour (shape)
 - orientation

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- 4
4. Elements and principles of arts and design as related to interior decoration with specific reference to color and light

UNIT -II Interior designing

15

5. Furniture
 - Types of furniture
 - Selection use & care
 - Arrangement of furniture in various rooms
6. Room arrangement and decoration - arrangement of furniture, furnishings and accessories in various rooms.
7. Kitchen planning, importance of counters, storage, principles, working heights.
8. Selection and care of household equipment (without reference to any specific equipment)
9. Household waste & its management by 3R

UNIT-III RESOURCE MANAGEMENT

15

10. Meaning, definition and importance of home management
11. Process of management:
 - planning,
 - Organization,
 - Implementation,
 - controlling and evaluation
12. Introduction to motivational factor (meaning and types)
 - Values
 - Goals
 - Standards
 - Decision Making
 - Resources
13. Management of Important Resources:
 - a) Time
 - Tools & Process
 - b) Energy
 - Process
 - Classes of change
 - c) Money
 - Family Income
 - Budget
 - Savings & Investment

UNIT-IV

15

14. Floor decoration with use of elementary art
15. Table setting & etiquettes
16. Flower decoration
 - Basic equipments
 - Vases and containers
 - Preparing plant material

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S

- Shaping an arrangement
17. Consumer problems, rights & responsibilities
 18. Seeking redressal to consumer problems with special reference to consumer courts

Suggested books and reference including links to e-resources -

- Agarwal S (2009). Grah Prabandh Manual. Shivam book house. Jaipur.
- Birrel Verla Leone (1967). Colour and Design. A Basic Text (Vol. I & II). Digest submitted in requirement for the degree of education in Teacher college Columbiauniversity
- Bryan Lawson (1980). How Designer Think. Architectural press Ltd.
- David H, Bangs Jr. The market planning guides. Gougotera Publishing. 3rd Ed
- Don Welers (1974). Who buys- A Study of the Consumer.
- Donnelly JH, Gibson JL and Ivancevich JM (1995). Fundamental of Management.Chicago.
- Fisher CD (1997). Human resource management Chennai: All Indian publishers anddistributors.
- Gillat M & Goldstein V (1967). Art Everyday Life. Oxford & IBH publishing Co.New Delhi.
- Goldsteim M & Goldstein V (1967). Art Everything Life. Mc Graw hill Books Comp.Ltd. New York.
- Gross I & Crandall E (1963), Management for Modern families, Appleton CounterContry Craft. New York.
- Gross IH Crandall, Crandall EW and Knoll MM (1980). Management for modernfamilies.Macmillan.
- Halse Altert O (1978). The use of colour in interior. Mc Graw Hill Books Comp. Ltd.New York. 2nd Ed.
- Harburgsen Gaillhyn (1980). Design Concepts. Allyn & Bacon Inc.
- Kale MG (1998). Management and human resources.
- Kolter Philip, Armstrong Greg (1992). Principles of Marketing. Prentice Hall ofIndian, New Delhi. 5th Ed.
- Leland, J. Gordon, Stewart, M, lee (1974). Economics and consumer. S'Van NostrandCo. New York. 7th Ed.
- Mullick, Premlata (2000). Textbook of Home Science. Kalyani Publishers, NewDelhi.
- Nickell P and Dosery JM (1970). Management in family living. Wiley Eastern Ltd.New Delhi.
- Patani M (2010). Home Management. Star publication, Agra.
- Sethi M and Seetharaman P (1994). Consumerism- A growing concept. PhoenixPublishing House, New Delhi.
- Sherlekar SA (1990) Trade Practices & consumerism. Himalaya Publishing House. Mumbai.
- Steidle RE & Bratton EC (1968). Work in the Home. John Wiley and Sons. NewYork, London.
- Thomson CH (1970). Home with Character. Massachusetts. C. Heath & Co.

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Co.Lexington. III rd Ed.

- Varghese MA, Ogle M, Srinivasan K (1985). Home Management. Wiley Eastern Publishers, New Delhi.
- - <https://www.skillshare.com/classes/Interior-Design-Basics-Simple-Steps-to-Your-Perfect-Space/822981848>
- https://wec.ifas.ufl.edu/extension/Urban_Hort/Affordable_Housing/documents/4_1_Site_Selection_Analysis.pdf
- <https://www.udemy.com/course/architectural-design-and-house-planning/>
- <https://www.huduser.gov/portal/publications/pdf/Needs-Preferences.pdf>
- <https://www.hgtv.com/>

Learning Outcome of the Course –

- Students will develop an insight in managing family resources i.e. time , money, and ,energy.
- The procedure of handling money and savings and investment will be learnt.
- There will be a general insight regarding consumer rights and responsibilities.
- Students will develop an insight in house planning and interior decoration

SEMESTER – I

CORE COURSE I – HSC-51P 102

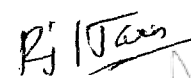
Practical Credit -2

30 Practicals (2 hours each)

HSC 51P 102- Family Resource Management

1. Syllabus -

- | | |
|--|----|
| 1. Project work on money management: | 10 |
| • How to open various accounts in the bank. | |
| • Filling up of slips/forms of bank and post office. | |
| i. Application for draft | |
| ii. Cheques | |
| iii. Withdrawal slip | |
| iv. Money order form | |
| v. Application for housing loan | |
| 2. Floor decoration: Alpana, Rangoli & Mandana | 2 |
| 3. Flower arrangement: fresh and dry arrangements. | 2 |
| 4. Table setting | 2 |
| 5. Best out of waste (one article) | 2 |
| 6. Cleaning of wood, stone, tiles, metal & glass. | 2 |
| 7. House plans: | 10 |
| • For various income groups (LIG, MIG, HIG) | |
| i. Drawing of architectural symbols of house plan | |
| ii. Architectural symbols of electricity plan | |


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7

- iii. Furniture symbols
 - Rooms (making any one paper model)
 - i. Drawing Room
 - ii. Dining cum leaving room
 - iii. Children study room
 - iv. Bed room
 - v. Pooja Room
 - Kitchen planning (making any one paper model)
 - i. One wall
 - ii. Two walls
 - iii. L shape
 - iv. U shape
2. **Scheme of Examination –**
- **Total Marks:** 50 marks
 - **Major:** house plan/paper plan of rooms/paper plan of kitchen : 20 marks
 - **Minor - I:** Table setting/flower arrangement: 10 marks
 - **Minor - II:** Floor decoration/cleaning/filling of forms: 10 marks
 - **Internal and Record - 10 marks**
3. **Suggested books and reference including links to e-resources –**
- Khanuja, Reena (2018) Grah Vyavasthaavam Grah Sajja. Agarwal Publications, Agra ISBN: 978-93-81124-96-3
 - Patni Manju & Sharma Lalita, Grah Prabandh, Star publications Agra.
 - Cherunilam, F., & Hedggade, O. D. (1987). Housing in Bombay: Himalaya Publishing House.
 - Craig, H. T. and Rush, O. D. (1966). Homes with Character. Heath, 1966.
 - Faulkner, R., and Faulkner, S., (1961). Inside Today's Home. Rev. ed., New York : Holt, Rinehart & Winston, Inc.
 - Goldstein. H & Goldstein .V. (1954) Art in Everyday Life Macmillan Publishers.
 - Rutt, A. H. (1963) Home furnishing, John Wiley & Sons, Inc.;
 - Supriya , K. B. (2004). Landscape gardening and designing with plants. Pointer Publishers.
 - Tercsa, P. Lanker. (1960). Flower Arranging: Step –by-step Instructions for Everyday Designs Florist
 - www.architecturaldigest.com
 - <http://www.goodhousekeeping.com/>
 - <https://egyankosh.ac.in/handle/123456789/29686>
 - <https://egyankosh.ac.in/handle/123456789/30021>
 - <https://egyankosh.ac.in/handle/123456789/39165>
 - <https://egyankosh.ac.in/handle/123456789/38016>

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Learning Outcome of the Course –

- Students grasp knowledge in money management, house planning, and home decor.
- Acquire the ability to open and operate various bank accounts, fill out necessary forms, and understand financial transactions.
- Develop proficiency in floor decoration, flower arrangement, table setting, and cleaning techniques.
- Gain competence in creating architectural symbols and paper models for different rooms and kitchen layouts.

SEMESTER – II
CORE COURSE II

Code of the Course	Title of the Course	Level of Course	Credits of course
HSC 52T 103	Foods and Nutrition Theory	5	4
HSC 52P 104	Foods and Nutrition Practical	5	2
Type of Course		Delivery Type of the Course	
Major		Theory- Lecture, Sixty Lecture including diagnostic and formative assessments - during lecture hours Practical- Laboratory work and field visits.	
Prerequisites	Central Board of Secondary Education or equivalent.		
Objectives of the Course (Theory)	<ul style="list-style-type: none"> • To learn about basics of nutrition, nutrients and metabolism. • To learn about meal planning for families and individuals. • To learn about Normal & Therapeutic nutrition. • To learn about Nutritional problems of health importance. 		
Objectives of the Course (Practical)	<ul style="list-style-type: none"> • To learn about basics of methods of cooking. • To learn the cooking of methods of various food groups. • To learn planning for Normal & Therapeutic nutrition. • Learning to plan and prepare foods for various nutritional problems of public health importance 		

Theory Credit -4

60 Hours

HSC 52T 103-Foods and Nutrition

Syllabus -

Max. Marks: 20+80 marks

Min. Pass Marks: 8+32 marks

UNIT I

10

1. Definition of foods and nutrition, 5 basic food groups, balanced diet
2. Function of food:
 - Physiological – hunger, appetite, satiety
 - Psychological
 - Social, economic, cultural
3. Meal Planning
 - Importance and factors affecting meal planning
 - Sample menu for adult male and female

UNIT II

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4. Functions, sources of:

- Macro nutrients
 - i. Carbohydrates
 - ii. Proteins
 - iii. Fats
- Micro nutrients
 - i. Minerals – calcium, iron, iodine, fluorine
 - ii. Vitamins
 - Water soluble – B complex vitamins, vitamin C
 - Fat Soluble – A, D, E & K

UNIT III

17

5. Normal nutrition – dietary guidelines for:

- Pregnancy
- Lactation
- Infancy (with special emphasis on breastfeeding and complementary feeding)
- Preschool child
- School going children
- Adolescent
- Adult
- Elderly person

UNIT IV

15

6. Therapeutic nutrition

- Modification of normal diet to therapeutic diet
- Dietary management of the following:
 - i. Weight management – obesity, underweight
 - ii. Diseases of gastrointestinal tract – diarrhoea and constipation

7. Nutritional importance of public health importance and their management:

- Protein Energy Malnutrition
- Anaemia

Suggested books and reference including links to e-resources –

- Srilakshmi B (2011). Dietetics. New Age International Publishers
- Srilakshmi, B. Food Science, new Age International (P) Ltd. Publishers, New Delhi,
- Swaminathan MS(2010) AaharevamPoshan, NR Brothers,MY Hospital Marg, Indore,
- Kumud Khanna,Sharda Gupta, Santosh Jain Passi, Rama Sethi, Ranjana Mahna & Seema Puri (2005), Elite Publishing House Pvt. Ltd. Ansari Road, Darya Ganj, New Delhi
- Mudambi, S.R. and Rajagopal. M.V., 1997 Fundamentals of Foods & Nutrition, New Age International (P) Ltd, New Delhi.
- https://www.who.int/health-topics/nutrition#tab=tab_1
- <https://www.who.int/news-room/fact-sheets/detail/anaemia>
- <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>

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- <https://www.who.int/news-room/fact-sheets/detail/malnutrition>
- <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==>
- <https://egyankosh.ac.in/handle/123456789/44151>
- <https://egyankosh.ac.in/handle/123456789/32947>
- <https://egyankosh.ac.in/handle/123456789/11137>
- <http://ecoursesonline.iasri.res.in/course/view.php?id=131>

Learning Outcome of the Course –

After studying the subject, the student will possess the basic knowledge of food groups, nutrients and basic metabolism related to nutrition in humans. This will further help them in the selection of healthy diet. Knowledge of various cooking methods and meal panning will enable them to cook and select healthy foods for themselves and their families. This subject will also give them basic understanding about nutritional needs in the various stages of life cycle and during disease.

SEMESTER – II

CORE COURSE II

Practical Credit -2

30 Practicals (2 hours each)

HSC 52P 104- Foods and Nutrition

1. Syllabus -

Methods of cooking: - Preparation of any four dishes by using the different methods of cooking (Steaming/Simmering/Frying/Baking/Roasting):

- Preparation of Beverages – Tea (hot & iced), Coffee (Hot & Cold), Chaach, lassi, milk shakes, fruit punch (using squashes & fresh fruits), lemonade, jaljeera, aamla shake, aam panna, mocktails (any 2) 3
- Cereal cookery – Chapaati, puri, Parantha, rice, Idli, (namak para, shakkar para), chowmein, pizza, sandwiches, Biscuit. Muthia. 6
- Legumes & pulses - daal (plain & daal fry), rajma/chhole, kadhi mangodi, dahivada, dal pakodi, besan pakodi, sprout chaat, dal halwa. Dhokla, Cheela. 6
- Vegetables –Dry Vegetables (for e.g.aalu gobi, methi aalu, arbi, bhindi), stuffed vegetables (bhindi, capsicum), vegetables with gravy (malai kofta, gatta, dum aalu, kadhai panner, shahi paneer), baked vegetables, soups (clear & cream). 4
- Milk & Milk products – Paneer, khoa, curd, shrikhand, kheer, rabri, fruit custard, raita, fruit cream, Kheer 4
- Savory food preparation- dosa, uttapam, mixed veg cutlets, hara bhara kabab, burger, samosa, kofta, kachori, vada, pav. bhaji, sago khichri, bhelpuri. 5
- Salads – vegetable, fruit. Mayonnaise and lemon-vinegar dressing. 2

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- Sweets- jalebi, sandesh, laddu, coconut barfi, gujiya, fruit stew (apple and pear), pudding, cupcake, brownie

Meal planning (with additional emphasis on nutritional problems) for: 5
25

- Exchange Lists
- Adult man/woman
- Pregnant Woman
- Lactating Woman
- Packed lunch for school going child
- Elderly

2. Scheme of Examination –

- Practical exam (total 50 marks)
- Internal and record: 10 marks
- Planning of two recipes: 20 marks
- Preparation of two recipes: 20 marks

3. Suggested books and reference including links to e-resources –

- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- <http://ecoursesonline.iasri.res.in/course/view.php?id=184>
- <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=19593>
- <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=19575>

Learning Outcomes-

- The learners will be able to prepare various recipes from different food groups based on principles and methods of cooking.
- The learners will be able to plan appropriate meals for people from different stages of life.

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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Arts (Hindi Literature))

I & II Semester

Examination-2023-24

As per NEP – 2020

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बी.ए. फसलकोर्स – प्रथम सेमेस्टर (हिन्दी)
प्रश्नपत्र – आदिकाव्य एवं भक्तिकाव्य

1 क्रेडिट – 25 अंक
6 क्रेडिट – 150 अंक
प्रश्न पत्र – 120 अंक
आंतरिक मूल्यांकन – 30 अंक

उद्देश्य (Objectives)	<ol style="list-style-type: none"> 1. विद्यार्थियों को आदिकाल और भक्तिकाल की सामाजिक, सांस्कृतिक, राजनीतिक, साहित्यिक आदि परिस्थितियों से अवगत कराना। 2. आदिकालीन और भक्तिकालीन काव्य तथा कवियों से परिचय कराना। 3. आदिकालीन साहित्य के स्वरूप, भाषा एवं शैली की विकास यात्रा से अवगत कराना। 4. भक्तिकालीन साहित्य और भक्ति आन्दोलन की अवधारणा स्पष्ट करना। 5. विद्यार्थियों में संवेदनात्मक अनुभूति विकसित करना।
अधिगम प्रतिफल (Learning Outcomes)	<ol style="list-style-type: none"> 1. आदिकालीन परिवेश : राजनीतिक, सांस्कृतिक, सामाजिक, धार्मिक आदि परिस्थितियों से परिचित हो सकेंगे। 2. आदिकालीन शोध की नवीन दृष्टि का विकास हो सकेगा। 3. भक्तिकाल की सामान्य परिस्थितियों तथा विशेषताओं से अवगत हो सकेंगे। 4. प्रमुख भक्त कवियों तथा उनकी रचनाधर्मिता से परिचित हो सकेंगे।

प्रश्नपत्र का अंक विभाजन

यह प्रश्नपत्र तीन खण्डों (अ,ब,स) में विभक्त है।

खण्ड – अ के अंतर्गत प्रश्न संख्या 1 अतिलघूत्तरी प्रश्न है, जिसमें सम्पूर्ण पाठ्यक्रम से 10 प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न 02 अंक का होगा।

खण्ड – ब के अंतर्गत प्रश्न संख्या 2,3,4,5 सप्रसंग व्याख्या का है, जिसमें इकाई 2, इकाई 3 एवं इकाई 4 में निर्धारित पाठ से कुल 04 काव्यांश (एक कवि से एक) आंतरिक विकल्प सहित व्याख्या हेतु पूछे जाएंगे। प्रत्येक प्रश्न 10 अंक का होगा।

खण्ड – स के अंतर्गत प्रश्न संख्या 6,7,8,9 निबंधात्मक प्रश्न है, जिसमें प्रत्येक इकाई से एक प्रश्न आंतरिक विकल्प सहित पूछा जाएगा। प्रत्येक प्रश्न 15 अंक का होगा।

इकाई – 1

- आदिकालीन काव्य की प्रमुख प्रवृत्तियाँ
- आदिकालीन साहित्य की अन्तरधाराएँ (सिद्ध साहित्य, नाथ साहित्य, जैन साहित्य एवं रासो साहित्य)
- भक्तिकाव्य की प्रमुख प्रवृत्तियाँ
- भक्तिकाव्य की प्रमुख अन्तरधाराएँ (संतकाव्य, सूफीकाव्य, कृष्ण काव्य एवं राम काव्य)

इकाई – 2

- ढोला मारू रा दहा – संपादक नरोत्तम दास स्वामी, सूर्यकरण पारीक, राम सिंह
दोहा संख्या – 8,9,10,19,20,21,37,38,40,49,52,61,69,112,116 = 15
- विद्यापति – विद्यापति, संपादक – शिवप्रसाद सिंह
नन्दक नन्दन कदम्बेरि तरुतरे (8)
सुन रसिया अब न बजाऊ बिपिन बैसिया (9)
देख देख राधा रूप अपार (10)
चाँद सार लए मुख घटना करु लोचन चकित चकोरे (14)
विरह व्याकुल बकुल तरुवर, पेखल नंदकुमार रे (26)
कुंज भवन से चलि भेलि हे रोकल गिरधारी (36)
सखि हे कतहु न देखि मघाई (55)
सखि हे कि-पुछसि अनुभव मोय (102)
- नरपति नाल्ह – बीसलदेव रास, संपादक – माता प्रसाद गुप्त – 1,3,4,6,7,8,9,10

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इकाई - 3

- कबीरदास - कबीर ग्रंथावली, संपादक - श्यामसुंदर दास, परिमार्जित पाठ - पुरुषोत्तम अग्रवाल
साखी - चैतावनी को अंग
मन को अंग
पद - मन रे जागत रहिये भाई (राग गौड़ी - 23)
पांडे कौन कुमति तोहि लागी (राग गौड़ी - 39)
हम न मरें मरिहैं संसारा (राग गौड़ी - 43)
काहे री नलिनी तू कुमिलानी (राग गौड़ी - 64)
मन रे हरि भजि हरि भजि हरि भजि भाई (राग गौड़ी - 122)
- जायसी - जायसी ग्रंथावली, संपादक - रामचन्द्र शुक्ल
सिंहलद्वीप वर्णन खण्ड, प्रथम 05 दोहे तक
नागमति वियोग खण्ड, प्रथम 05 दोहे तक

- तुलसीदास - विनय-पत्रिका
केसव! कहि न जाइ का कहिये (111)
मन पछितैहै अवसर बीते (198)
मोहि मूढ़ मन बहुत बिगोयो (245)
श्रीरामचरितमानस (बालकाण्ड) (दोहा संख्या 229 से 234)
सुमिरि सीय नारद बचन उपजी प्रीति पुनीत निरखि निरखि रघुबीर छबि बाढ़इ
प्रीति न थोरि।

इकाई - 4

- सूरदास - भ्रमरगीत सार, संपादक - रामचन्द्र शुक्ल
हमारे हरि हारिल की लकरी (52)
निर्गुन कौन देस को बासी (64)
बिन गोपाल बैरिन भई कुंजै (85)
उर में माखन चोर गड़े (95)
ऊधो मन नाहीं दस-बीस (210)
ऊधो भली करी अब आए (220)
देखियत कालिंदी अति कारी (278)
सँदेसो देवकी सौं कहियो (375)

- मीरां - मीरां पदावली, संपादक - शंभुसिंह मनोहर
निपट बंकट छवि नैना अटके (6)
मेरे तो गिरधर गोपाल दूसरौ न कोई (10)
मैं तो गिरधर के घर जाऊँ (12)
राणाजी थे जहर दियो म्हे जाणी (22)
मीरां मगन भई हरि के गुण गाय (23)
जोगिया जी! निसदिन जोऊं बाट (25)
हरि बिन कूण गती मेरी (38)
सखी री! मेरी नींद नसानी हो (56)

- रसखान - रसखान रचनावली, संपादक - विद्यानिवास मिश्र
पद संख्या - 1,2,6,8,11,14,15,31

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आन्तरिक मूल्यांकन हेतु किन्हीं दो विषयों पर निबंध लेखन (संभावित विषय)

2X15 = 30

- आदिकाल की पृष्ठभूमि (राजनीतिक, सामाजिक, सांस्कृतिक परिस्थितियाँ)
- आदिकाल का सीमांकन एवं नामकरण
- भक्तिकाल की पृष्ठभूमि (राजनीतिक, सामाजिक, सांस्कृतिक परिस्थितियाँ)
- भक्ति के उदय संबंधी विभिन्न मत
- भक्ति के निर्गुण और सगुण रूपों में समानता एवं अंतर
- निर्गुण पंथ और कबीरदास
- 'श्रीरामचरितमानस' का महत्त्व
- सूरदास का वात्सल्य वर्णन
- सूफी मत की विशेषताएँ
- रसखान का कृष्ण-प्रेम
- मीरा की विरह-वेदना

अनुशासित ग्रंथ—

1. हिन्दी साहित्य का इतिहास— आचार्य रामचन्द्र शुक्ल, नागरी प्रचारिणी सभा, काशी
2. हिन्दी साहित्य का इतिहास— डॉ. नगेन्द्र, संपादित, नेशनल पब्लिशिंग हाउस, दिल्ली
3. हिन्दी साहित्य का दूसरा इतिहास— डॉ. बच्चन सिंह, राधाकृष्ण प्रकाशन, दिल्ली
4. हिन्दी सूफी काव्य की भूमिका— रामपूजन तिवारी

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बी.ए. एम.स.कोर्स – द्वितीय सेमेस्टर (हिन्दी साहित्य)
प्रश्नपत्र – कहानी एवं उपन्यास

1 क्रेडिट – 25 अंक
6 क्रेडिट – 150 अंक
प्रश्न पत्र – 120 अंक
आंतरिक मूल्यांकन – 30 अंक

उद्देश्य (Objectives)	1. विद्यार्थियों में कल्पना शक्ति और विश्लेषणात्मक योग्यता का विकास करना। 2. कथा साहित्य के विश्लेषण की समझ और संवेदनात्मक अनुभूति का विकास करना। 3. प्रमुख कथाकारों एवं उनकी रचनाधर्मिता का परिचय कराना। 4. कहानी तथा उपन्यास कला को विकसित करना।
अधिगम प्रतिफल (Learning Outcomes)	1. जीवन की यथार्थ अनुभूति से परिचय हो सकेगा। 2. कथा लेखन तथा उसके प्रभाव का विश्लेषण सम्भव हो सकेगा। 3. आदर्श और सभ्य नागरिक बन सकेंगे। 4. आत्माभिव्यक्ति की भावना विकसित हो सकेगी तथा भावी लेखन की पृष्ठभूमि का विकास होगा।

प्रश्नपत्र का अंक विभाजन

यह प्रश्नपत्र तीन खण्डों (अ,ब,स) में विभक्त है।

खण्ड – अ के अंतर्गत प्रश्न संख्या 1 अतिलघुतरी प्रश्न है, जिसमें सम्पूर्ण पाठ्यक्रम से 10 प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न 02 अंक का होगा।

खण्ड – ब के अंतर्गत प्रश्न संख्या 2,3,4,5 सप्रसंग व्याख्या का है, जिसमें इकाई 2 एवं इकाई 3 में निर्धारित पाठ से एक-एक अवतरण (एक कहानी से एक) तथा इकाई 4 से दो अवतरण (उपन्यास) आंतरिक विकल्प सहित व्याख्या हेतु पूछे जाएंगे। प्रत्येक प्रश्न 10 अंक का होगा।

खण्ड – स के अंतर्गत प्रश्न संख्या 6,7,8,9 निबंधात्मक प्रश्न है, जिसमें प्रत्येक इकाई से एक प्रश्न आंतरिक विकल्प सहित पूछा जाएगा। प्रत्येक प्रश्न 15 अंक का होगा।

इकाई – 1

कहानी – परिभाषा एवं तत्त्व
हिन्दी कहानी – उद्भव एवं विकास के प्रमुख चरण
उपन्यास – परिभाषा एवं तत्त्व
हिन्दी उपन्यास – उद्भव एवं विकास के प्रमुख चरण

इकाई – 2

उसने कहा था – चन्द्रधर शर्मा गुलेरी
पूस की रात – प्रेमचन्द
आकाशदीप – जयशंकर प्रसाद
परदा – यशपाल

इकाई – 3

राजा निरबंसिया – कमलेश्वर
गदल – रामेय राघव
सिक्का बदल गया – कृष्णा सोबती
तिरिछ – उदय प्रकाश

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ग्लोबल गाँव के देवता - रणेन्द्र (उपन्यास)

आंतरिक मूल्यांकन हेतु किन्हीं दो विषयों पर निबन्ध लेखन (संभावित विषय)

2X15 = 30

- कहानी एवं उपन्यास के स्वरूप में समानता एवं अंतर
- हिन्दी कहानी के प्रमुख आन्दोलन - नयी कहानी, सचेतन कहानी, समानान्तर कहानी, साठोत्तरी कहानी, समकालीन कहानी
- प्रेमचन्द की कहानी कला
- पाठ्यक्रम में निर्धारित किसी एक कहानी की मूल संवेदना एवं शिल्प-विधान
- उपन्यास के प्रकार (सामाजिक, ऐतिहासिक, राजनीतिक, मनोवैज्ञानिक)
- हिन्दी उपन्यास : विकास के चरण
- हिन्दी उपन्यास परम्परा में प्रेमचन्द का महत्व

अनुशंसित ग्रंथ-

1. ग्लोबल गाँव के देवता - रणेन्द्र
2. मानसरोवर भाग-1 - प्रेमचन्द
3. हिन्दी उपन्यास का इतिहास- गोपाल राय, राजकमल प्रकाशन, नई दिल्ली
4. हिन्दी साहित्य एवं संवेदना का विकास- रामस्वरूप चतुर्वेदी
5. हिन्दी कहानी का विकास- मधुरेश, लोकभारती प्रकाशन, इलाहाबाद
6. कहानी : नई कहानी- नामवर सिंह, लोकभारती प्रकाशन, इलाहाबाद
7. कहानी की रचना प्रक्रिया- परमानन्द श्रीवास्तव, लोकभारती प्रकाशन, इलाहाबाद

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UNIVERSITY OF RAJASTHAN
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SYLLABUS

**3/4 Yrs. Undergraduate
Programme in Arts (Sanskrit)**

(I & II Semester)

SANSKRIT

Session - 2023-24

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बी.ए. (संस्कृत) वर्ष 2023-24

प्रथम व द्वितीय सेमेस्टर

सामान्य निर्देश -

1. प्रत्येक सेमेस्टर में एक प्रश्नपत्र होगा। प्रत्येक प्रश्नपत्र का पूर्णांक सैद्धान्तिक के साथ मध्यावधि मूल्यांकन सहित 150 अंक का होगा। प्रत्येक प्रश्नपत्र में न्यूनतम उत्तीर्णांक 48 तथा पूर्णांक 120 होंगे और समय 3 घंटे का होगा। इसके साथ प्रत्येक प्रश्नपत्र में 30 अंक मध्यावधि मूल्यांकन हेतु निर्धारित है। उत्तीर्णांक 40% होगा। आन्तरिक मूल्यांकन में उत्तीर्ण होने के पश्चात् ही मुख्य परीक्षा में परीक्षार्थी को बैठने की अनुमति होगी।
2. परीक्षा का प्रश्न पत्र केवल हिन्दी में बनाया जाएगा। परीक्षार्थी को यह छूट होगी कि हिन्दी, संस्कृत अथवा अंग्रेजी में से किसी एक भाषा में उत्तर दे सके। यदि परीक्षक ने किसी प्रश्न विशेष के लिए भाषा का निर्देश दिया है तो उस प्रश्न का उत्तर उसी भाषा में देना अनिवार्य होगा।
3. संस्कृत को केवल देवनागरी लिपि में ही लिखा जाना अपेक्षित है।
4. निर्धारित ग्रन्थ में से अनुवाद, व्याख्या, सरलार्थ एवं समालोचनात्मक प्रश्न पूछे जायेंगे।
5. प्रत्येक प्रश्न पत्र में 10 प्रतिशत अंक संस्कृत भाषा में उत्तर के लिए निर्धारित है।
6. प्रश्न पत्र में कुल पाँच प्रश्न होंगे। प्रथम प्रश्न अनिवार्य होगा जिसमें 10 प्रश्न लघूत्तरात्मक होंगे जिनमें से प्रथम 5 प्रश्नों का उत्तर संस्कृत भाषा के माध्यम से देना होगा, प्रत्येक प्रश्न के लिए 2 अंक निर्धारित हैं। प्रथम प्रश्न में सभी इकाईयों से प्रश्न पूछे जायेंगे तथा शेष इकाईयों से आन्तरिक विकल्पों के चयन के साथ एक-एक प्रश्न पूछा जायेगा। जिस प्रश्नपत्र में संस्कृत अनुवाद/ निबन्ध पूछे गए हैं वहाँ संस्कृत में उत्तर अपेक्षित नहीं हैं।

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प्रथम सेमेस्टर

दृश्य एवं श्रव्य काव्य

समय : 3 घण्टे


अंक 120

सामान्य निर्देश -

1. प्रत्येक प्रश्नपत्र में न्यूनतम उत्तीर्णांक 48 तथा पूर्णांक 120 होंगे और समय 3 घंटे का होगा।
2. परीक्षा का प्रश्न पत्र केवल हिन्दी में बनाया जाएगा। परीक्षार्थी को यह छूट होगी कि हिन्दी, संस्कृत अथवा अंग्रेजी में से किसी एक भाषा में उत्तर दे सके। यदि परीक्षक ने किसी प्रश्न विशेष के लिए भाषा का निर्देश दिया है तो उस प्रश्न का उत्तर उसी भाषा में देना अनिवार्य होगा।
3. संस्कृत को केवल देवनागरी लिपि में ही लिखा जाना अपेक्षित है।
4. निर्धारित ग्रन्थ में से अनुवाद, व्याख्या, सरलार्थ एवं समालोचनात्मक प्रश्न पूछे जायेंगे।
5. प्रत्येक प्रश्न पत्र में 10 प्रतिशत अंक संस्कृत भाषा में उत्तर के लिए निर्धारित है।
6. प्रश्न पत्र में कुल पाँच प्रश्न होंगे। प्रथम प्रश्न अनिवार्य होगा जिसमें 10 प्रश्न लघूत्तरात्मक होंगे जिनमें से प्रथम 5 प्रश्नों का उत्तर संस्कृत भाषा के माध्यम से देना होगा, प्रत्येक प्रश्न के लिए 2 अंक निर्धारित हैं। प्रथम प्रश्न में सभी इकाईयों से प्रश्न पूछे जायेंगे तथा शेष इकाईयों से आन्तरिक विकल्पों के चयन के साथ एक-एक प्रश्न पूछा जायेगा। जिस प्रश्नपत्र में संस्कृत अनुवाद/ निबन्ध पूछे गए हैं वहाँ संस्कृत में उत्तर अपेक्षित नहीं हैं।

पाठ्यक्रम

Unit- I - स्वप्नवासवदत्तम् (भास)	30 अंक
Unit- II - नीतिशतकम् (भर्तृहरि)	30 अंक
Unit- III - रघुवंशम् प्रथम सर्ग	30 अंक
Unit- IV - अनुवाद- संस्कृत से हिन्दी-कारक सम्बन्धी पाँच वाक्य तथा हिन्दी से संस्कृत दस में से पाँच वाक्य	30 अंक


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अंक- विभाजन

क्र. सं.	पुस्तक का नाम	प्रश्न संख्या 1 में लघूत्तरात्मक प्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	अंको का योग
1.	स्वप्नवासवदत्तम्	03 लघू.	06	2 अ 2 ब	24	14(7+7)+10=24
2.	नीतिशतकम्	03 लघू.	06	3 अ 3 ब	24	14(7+7)+10=24
3.	रघुवंशम् (प्रथमसर्ग)	02 लघू.	04	4 अ 4 ब	26	16(8+8)+10=26
4.	अनुवाद-कारक सम्बन्धी तथा हिन्दी से संस्कृत 12 में से 06 वाक्य	02 लघू.	04	5 अ 5 ब	18	8(4x2)+ 18(6x3)=18
	कुल	1	20	04	100	120

निबन्धात्मक / व्याख्यात्मक प्रश्न

Unit- I स्वप्नवासवदत्तम्

भाग अ में 3 लघूत्तरात्मक प्रश्न पूछे जायेंगे ।

06 अंक

भाग ब

1. 4 श्लोक पूछकर उनमें से किसी 2 की सप्रसंग व्याख्या पूछी जायेगी। 14 (7+7) अंक

2. दो विवेचनात्मक प्रश्न पूछकर किसी एक का उत्तर देय है। 10 अंक

Unit- II नीतिशतकम्

भाग अ में 3 लघूत्तरात्मक प्रश्न पूछे जायेंगे ।

06 अंक

भाग ब

1. 4 श्लोक पूछकर उनमें से किन्हीं 2 की सप्रसंग व्याख्या पूछी जायेगी। 14 (7+7) अंक

2. दो विवेचनात्मक प्रश्न पूछकर किसी एक प्रश्न का उत्तर देय होगा। 10 अंक

Unit- III रघुवंशम् (प्रथम सर्ग)

भाग अ में लघूत्तरात्मक प्रश्न पूछे जायेंगे ।

04 अंक

भाग ब

1. 4 श्लोक पूछकर उनमें से किन्हीं 2 श्लोकों की सप्रसंग व्याख्या पूछी जायेगी 16 अंक

2. दो विवेचनात्मक प्रश्न पूछकर किसी एक प्रश्न का उत्तर देय होगा। 10 अंक

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Unit-IV अनुवाद एवं कारक

भाग अ में 2 लघूत्तरात्मक प्रश्न पूछे जायेंगे ।

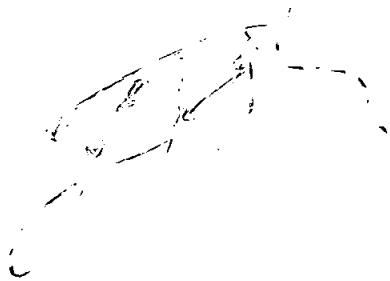
04 अंक

भाग ब

1. संस्कृत से हिन्दी— कारक संबंधी 04 वाक्यों का अनुवाद अपेक्षित है। 08 अंक
2. हिन्दी से संस्कृत— 12 वाक्य देकर 06 वाक्यों का अनुवाद अपेक्षित है। 18 अंक
प्रत्येक वाक्य के लिये 3 अंक निर्धारित है।

सहायक पुस्तकें—

1. स्वप्नवासवदत्तम्—डॉ. कृष्णदेव प्रसाद—जगदीश संस्कृत पुस्तकालय, झालानियों का रास्ता, जयपुर।
2. स्वप्नवासवदत्तम्—डॉ.रूपनारायण त्रिपाठी —रचना प्रकाशन, जयपुर।
स्वप्नवासवदत्तम्—संस्कृत हिन्दी व्याख्या —डॉ.जगन्नाथ पाण्डेय, जगदीश संस्कृत पुस्तकालय, झालानियों का रास्ता, जयपुर।
3. स्वप्नवासवदत्तम्—डॉ.सुभाष वेदालंकार, —अलंकार प्रकाशन, जयपुर।
4. स्वप्नवासवदत्तम्—डॉ.श्रीकृष्ण ओझा, अभिषेक प्रकाशन, चौडा रास्ता जयपुर।
5. नीतिशतकम्—डॉ. गोपाल शर्मा, हंसा प्रकाशन, जयपुर।
6. नीतिशतकम्—डॉ. श्रीकृष्ण ओझा,, राज प्रकाशन मंदिर, जयपुर।
7. नीतिशतकम्— डॉ.सुभाष वेदालंकार, हंसा प्रकाशन, जयपुर।
8. रघुवंशम् (प्रथम सर्ग)
9. संस्कृत व्याकरण— श्री निवास शास्त्री।
10. बृहद् अनुवाद चन्द्रिका — चक्रधर हंस नौटियाल
11. प्रौढरचनानुवाद कौमुदी, कपिलदेव द्विवेदी



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Dy. Registrar
Maharaja
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Ray

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बी.ए. (संस्कृत) वर्ष 2023-24
द्वितीय सेमेस्टर

भारतीय संस्कृति के तत्व, पद्य साहित्य, व्याकरण

समय : 3 घण्टे

अंक-120

सामान्य निर्देश -

1. प्रत्येक प्रश्नपत्र में न्यूनतम उत्तीर्णांक 48 तथा पूर्णांक 120 होंगे और समय 3 घंटे का होगा।
2. परीक्षा का प्रश्न पत्र केवल हिन्दी में बनाया जाएगा। परीक्षार्थी को यह छूट होगी कि हिन्दी, संस्कृत अथवा अंग्रेजी में से किसी एक भाषा में उत्तर दे सके। यदि परीक्षक ने किसी प्रश्न विशेष के लिए भाषा का निर्देश दिया है तो उस प्रश्न का उत्तर उसी भाषा में देना अनिवार्य होगा।
3. संस्कृत को केवल देवनागरी लिपि में ही लिखा जाना अपेक्षित है।
4. निर्धारित ग्रन्थ में से अनुवाद, व्याख्या, सरलार्थ एवं समालोचनात्मक प्रश्न पूछे जायेंगे।
5. प्रत्येक प्रश्न पत्र में 10 प्रतिशत अंक संस्कृत भाषा में उत्तर के लिए निर्धारित है।
1. प्रश्न पत्र में कुल पाँच प्रश्न होंगे। प्रथम प्रश्न अनिवार्य होगा जिसमें 10 प्रश्न लघूत्तरात्मक होंगे जिनमें से प्रथम 5 प्रश्नों का उत्तर संस्कृत भाषा के माध्यम से देना होगा, प्रत्येक प्रश्न के लिए 2 अंक निर्धारित हैं। प्रथम प्रश्न में सभी इकाईयों से प्रश्न पूछे जायेंगे तथा शेष इकाईयों से आन्तरिक विकल्पों के चयन के साथ एक-एक प्रश्न पूछा जायेगा। जिस प्रश्नपत्र में संस्कृत अनुवाद/ निबन्ध पूछे गए हैं वहाँ संस्कृत में उत्तर अपेक्षित नहीं हैं।

पाठ्यक्रम

Unit- I - भारतीय संस्कृति के तत्व -

30 अंक

क- भारतीय संस्कृति-विषय, पृष्ठभूमि, विशेषताएँ।

ख- भारतीय संस्कृति के विकास की रूपरेखा-पूर्ववैदिक काल, वैदिकोत्तरकाल, मध्यकाल एवं आधुनिक काल।

ग- प्राचीनकाल- राजनैतिक, सामाजिक एवं आर्थिक स्थिति।

घ- वर्ण, आश्रम, एवं संस्कार।

ड- शिक्षा (वैदिककाल से लेकर 7वीं शताब्दी तक)

च- लेखन-कला की उत्पत्ति।

छ- भारतीय दर्शन की प्रमुख विचारधाराएँ।

ज- भारतीय संस्कृति का मानव-कल्याण में योगदान।

14/Jan
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Unit- II - किरातार्जुनीयम्(प्रथम सर्ग)—भारविकृत

30 अंक

Unit- III - व्याकरण—लघुसिद्धान्तकौमुदी—संज्ञा, एवं संधि प्रकरण

30 अंक

क—संज्ञा प्रकरण—

ख—अच् संधि—

ग— हल् संधि—

घ— विसर्ग संधि—

Unit- IV - संस्कृत काव्य का इतिहास

30 अंक

अश्वघोष, कालिदास, भारवी, माघ, श्रीहर्ष, जयदेव, भर्तृहरि और उनके कार्य, महाकाव्यों की उत्पत्ति और विकास। रामायण और महाभारत। उपर्युक्त के विशेष संदर्भ में गीतिकाव्य, कवियों और उनकी कृतियों का उल्लेख किया। (चार में दो प्रश्न है।)

अंक— विभाजन

क्र. सं.	पुस्तक का नाम	प्रश्न संख्या 1 में लघूत्तरात्मक प्रश्न	अंक	निबन्धात्मक प्रश्न संख्या	अंक	अंको का योग
1.	भारतीय संस्कृति के तत्त्व	लघूत्तरात्मक 3	06	02 अ 02 ब	24	10 14(7+7)
2.	किरातार्जुनीयम् (प्रथम सर्ग)	लघूत्तरात्मक 3	06	02 अ 02 ब	24	14(7+7)+10
3.	लघुसिद्धान्तकौमुदी—संज्ञा, एवं संधि प्रकरण	लघूत्तरात्मक 2	04	03 03 ब 03 स 03 द	26	04+10+10+2
4.	संस्कृत काव्य का इतिहास	लघूत्तरात्मक 2	04	04 अ 04 ब 04 स	26	8+8+10
	कुल	10	20	10	70	100+20=120

प्रश्न-पत्र का निर्माण निम्नानुसार होगा -

निबन्धात्मक / व्याख्यात्मक प्रश्न

I - भारतीय संस्कृति के तत्त्व

भाग अ में 2-2 अंक के तीन लघूत्तरात्मक प्रश्न पूछे जायेंगे।

भाग ब

06 अंक

1. दो निबन्धात्मक प्रश्न पूछकर किसी एक का उत्तर अभीष्ट है। 10 अंक

2. चार विषयों पर टिप्पणी पूछ कर किन्हीं दो का उत्तर अभीष्ट है। 14 (7+7) अंक

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II - किरातार्जुनीयम् (प्रथम सर्ग)

भाग अ में 2-2 अंक के तीन लघूत्तरात्मक प्रश्न पूछे जायेंगे ।
भाग ब

08 अंक

1. 4 श्लोक पूछकर उनमें से किन्हीं 2 श्लोकों की सप्रसंग व्याख्या पूछी जायेगी। 14 (7+7) अंक
2. दो विवेचनात्मक प्रश्न पूछकर किसी एक प्रश्न का उत्तर देय होगा। 10 अंक

III - व्याकरण-लघुसिद्धान्त कौमुदी

भाग अ में 2-2 अंक के दो लघूत्तरात्मक प्रश्न से पूछे जायेंगे ।
भाग ब विसर्ग संधि से

04 अंक

04 अंक

अ. संज्ञा प्रकरण

4 सूत्र पूछकर किन्हीं 2 सूत्रों की सोदाहरण व्याख्या अपेक्षित है ।
प्रत्येक व्याख्या के लिये 2 अंक निश्चित हैं ।

04 अंक

ब. अच् संधि-

4 सूत्र पूछकर किन्हीं 2 सूत्रों की सोदाहरण व्याख्या अपेक्षित है ।
प्रत्येक व्याख्या के लिये चार में से दो सिद्धि निश्चित हैं ।

04 अंक

06 अंक

स. हल् संधि-

4 सूत्र पूछकर किन्हीं 2 सूत्रों की सोदाहरण व्याख्या अपेक्षित है ।
प्रत्येक व्याख्या के लिये चार में से दो सिद्धि निश्चित हैं ।

04 अंक

06 अंक

द. विसर्ग संधि-

2 सूत्र पूछकर किसी 1 सूत्र की सोदाहरण व्याख्या अपेक्षित है ।

02 अंक

IV - सहायक पुस्तकें- भारतीय संस्कृति

1. भारतीय सांस्कृतिक निधि- डॉ. रामजी उपाध्याय, महामनापुरी, वाराणसी।
2. भारतीय संस्कृति-श्री रामदेव साहू, श्याम प्रकाशन चौडा रास्ता, जयपुर।
3. भारतीय संस्कृति- वाई.एस.रमेश-रचना प्रकाशन, जयपुर।
4. भारतीय संस्कृति- डॉ. रामजी उपाध्याय, महामनापुरी, वाराणसी।
5. भारतीय दर्शन- डॉ. बलदेव उपाध्याय, चौखम्बा प्रकाशन, वाराणसी।

किरातार्जुनीयम्

1. किरातार्जुनीयम् (प्रथम सर्ग)-आचार्य नवल किशोर कांकर, विद्या वैभव भवन, जयपुर।
2. किरातार्जुनीयम् (प्रथम सर्ग)-डॉ. विश्वनाथ शर्मा, आदर्श प्रकाशन, जयपुर।
3. किरातार्जुनीयम् (प्रथम सर्ग)- डॉ.सुभाष वेदालंकार, -अलंकार प्रकाशन, जयपुर।

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अनुवाद के लिए

1. संस्कृत रचनानुवाद मंजरी-पं. नंदकुमार शास्त्री, अजमेरा बुक कम्पनी, त्रिपोलिया बाजार, जयपुर।
2. रचनानुवाद कौमुदी-डॉ. कपिलदेव द्विवेदी, वाराणसी।
3. रचनानुवादप्रभा-डॉ. श्रीनिवास शास्त्री, कुरुक्षेत्र।

व्याकरण के लिये

1. लघुसिद्धान्त कौमुदी- डॉ. बसंत जैतली एवं डॉ. राजेश कुमार, जगदीश संस्कृत पुस्तकालय जयपुर।
2. लघुसिद्धान्त कौमुदी- श्री महेश सिंह कुशवाहा, चौखम्भा संस्कृत प्रतिष्ठान, दिल्ली।
3. लघुसिद्धान्त कौमुदी- श्री धरानन्द शास्त्री, मोतीलाल बनारसीदास, दिल्ली।
4. लघुसिद्धान्त कौमुदी- भीमसेन शास्त्री।
5. संस्कृत व्याकरण- श्री निवास शास्त्री।
6. वृहद् अनुवाद चन्द्रिका - चक्रधर हंस नौटियाल

संस्कृत काव्य का इतिहास -

1. संस्कृत काव्यशास्त्र का इतिहास - पी.वी. काणे, मोतीलाल बनारसी, दिल्ली
2. संस्कृत साहित्य का इतिहास - बलदेव उपाध्याय
3. संस्कृत साहित्य का इतिहास - कपिल देव द्विवेदी
4. संस्कृत साहित्य का इतिहास - वाचस्पति गैरोला
5. संस्कृत काव्यशास्त्र का इतिहास - ए.बी. कीथ
6. अलंकारशास्त्रेतिहासः - डॉ. जगदीश चन्द्र मिश्रः

IV - संस्कृत काव्य का इतिहास -

1. किन्हीं दो कवियों के व्यक्तित्व कृतित्व सम्बन्धी प्रश्न पूछकर किसी एक कवि से सम्बन्धित उत्तर अभीष्ट है।
08 अंक
2. किन्हीं दो कवियों के काव्य के वैशिष्ट्य सम्बन्धी प्रश्न पूछकर एक कवि के सम्बन्ध में उत्तर अभीष्ट है।
08 अंक
3. रामायण एवं महाभारत सम्बन्धी निबन्धात्मक प्रश्न आन्तरिक विकल्प के साथ पूछा जायेगा।

10 अंक

R. K. Vignyan

Principal
Dr. Rekha Gupta

R.K. Vignyan (P.G.) Mahavidyalaya
Kalwa, Jodhpur



DEPARTMENT OF URDU & PERSIAN
UNIVERSITY OF RAJASTHAN,
JAIPUR-302004

SYLLABUS

(Three/Four Year Under Graduate Programme in Arts)

I & II Semester

Examination-2023-24

Rj / Jans
Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR *Boj*

As per NEP-2020

Dr. Rekha Gupta
Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
Kalwar, Jaipur

SEMESTER WISE PAPER TITLES WITH DETAILS

UG 9101		Four Year Bachelor of Arts Sub/Discipline-Urdu					
					CREDIT		
LEVEL	SEMESTER	TYPE	TITLE	L	T	P	TOTAL
1.	5	I	Major URD 51 T101 Prose & Grammar	6	Nil	Nil	6
2.	5	II	Major URD 52 T102 Poetry & Grammar	6	Nil	Nil	6

Syllabus: B.A. Arts (Urdu)

Semester-I

2023-24

URD 51 T101 Prose & Grammar

CODE OF COURSE	TITLE OF THE COURSE	LEVEL OF THE COURSE	CREDIT OF THE COURSE
URD 51 T101 Prose & Grammar	Prose & Grammar	5	6
Objective of the Course	Type of the Course Delivery Type of the Course Major Lecture 45 hours Objective of the Course 1. It explains basic grammar and the building blocks of the language. 2. It provides information about the summaries of the prose. 3. It teaches to frame critical questions and the importance of critic in language. 4. It gives the explanation of the texts.		

Syllabus

URD 51 T101 Prose & Grammar

Max. Marks: 30+120

URD 51 T101 Prose & Grammar

3 Hours duration

Min. Pass. Marks : 12+48

30+120 Marks

Unit-I

Explanation of two out of four text from Intakab-e-Nasr Hissa Awwal

(The following component of Urdu Grammar)

(1) Hurf-e-Teajji aur uske Iqam (2) Aerab (3) Tasdeed Aur Hamza (4) Rasmul Khat (5) Imla

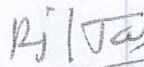
Unit-II

Attempt any question with internal choice.

(The following component of Urdu Grammar)

(1) Muhawre aur Kahawte (2) Sabeqe aur Laheqe (3) Wahid aur Jama, Tazkir-o-Tanees.
(4) Ism

1/2 L10 V Chapter from Intakab-e-Nasr Hissa Awwal


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Unit-III

Summary of two Prose Lesson with Internal choice **Intakab-e-Nasr Hissa Awwal**

(1) Fail (2) Zameer (3) Sifat

VI to X Chapter from **Intakab-e-Nasr Hissa Awwal**

Unit-IV

Critical appreciation of prose writer with internal choice.

(1) Ism, Zameer, Fail, Sifat ki Iqam.

XI to XIV Chapter from **Intakab-e-Nasr Hissa Awwal**

Books Prescribed:

1. *Intakab-e-Nasr Hissa Awwal : Uttarparadesh Urdu Academy, Lucknow*

Books Recommended:

2. *Jadeed il-ml-Balaghat by Abdul Majeed Khan*

3. *Dars-e-Balaghat : Taraqqi Urdu Buero, New Delhi*

Learning outcomes:

The learner will be able to:

1. It enables learner to have a grip on the grammar part.
2. The learner will be able to write summaries and frame questions without grammatical errors.
3. It makes learner friendly with the language.

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Principle
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Kalwar, Jaipur

Syllabus: B.A. Arts (Urdu)
Semester-II
Paper-I
2023-24
URD 52 T102 Poetry & Grammar

CODE OF COURSE	TITLE OF THE COURSE	LEVEL OF THE COURSE	CREDIT OF THE COURSE
URD 52 T102 Poetry & Grammar	Poetry & Grammar	5	6
Objective of the Course	Type of the Course Major Objective of the Course 1. It teaches the grammar at a moderate level. 2. It teaches ways to write poetry and explanation of its detained meanings. 3. It makes grammar more clear and understanding of critical questions.	Delivery Type of the Course Lecture 45 hours	

Syllabus

URD 52 T102 Poetry & Grammar

Max. Marks : 30+120

URD 52 T102 Poetry & Grammar

3 Hours duration

Min. Pass. Marks : 12+48

30+120 Marks

Unit-I

Explanation of two out of four Sheri Band from Shehpare (Nazm & Ghazliyat).

Unit-II

Summary of poetry with internal choice from Shehpare (Nazm).

Unit-III

Critical appreciation of Poetry Writer with internal choice(Momin, Meer, Dard).

Attempt any questions with internal choice:

(The following component of Urdu Grammar)

(1) Balaghat (2) Fasahat (3) Ilm-e-Bayan (4) Ilm-e-Badi

Unit-IV

Critical appreciation of Poetry Writer with internal choice (Nazeer, Hali, Ismail Merthi).

(The following component of Urdu Grammar)

Attempt any questions with internal choice:

(1) Sanay-e-Lafzi (2) Sanay-e- Manvi (3) Ramoz-e-Auqat (4) Tasgeer-o-Takreeb

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Books Prescribed:

1. Shehpare (Nazm) Published by Idar-e-Nashr-o-Ishat
Allahabad University (1991)
2. Kachhua aur Khargosh (Bachcho Ke Liye Nazme) Writer Mohd. Ismail Merthi
Educational Publication House, Dehli

The following are prescribed from the Book:

- (a) **Ghazliyat :**
Momin, Meer, Dard
- (b) **Nazmein:**
Nazeer, Hali, Ismail Merthi

Recommends Books:

1. **Jadeed il-mi-Balaghat** by Abdul Majeed Khan
2. **Dars-e-Balaghat : Taraqqi Urdu Buero, New Delhi**
3. **Tareekh-e-Adab Urdu** by Naseem Qureshi

Learning outcomes:

The learner will be able to:

1. It enables student to understand importance of grammar in the language.
2. It enables and critical appreciation.
3. It enables learner to be more fluent with the language.

P. J. Das
Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR *SN*

R.K. Vigyan
Principal
Dr. Rekha Gupta
R.K. Vigyan (P.G.) Mahavidyalaya
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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Arts & Social Science)

I & II Semester

Examination-2023-24

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Principal
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Kalwar, Jaipur

NEP-2020

UNIVERSITY OF RAJASTHAN, JAIPUR
FACULTY OF FINE ARTS

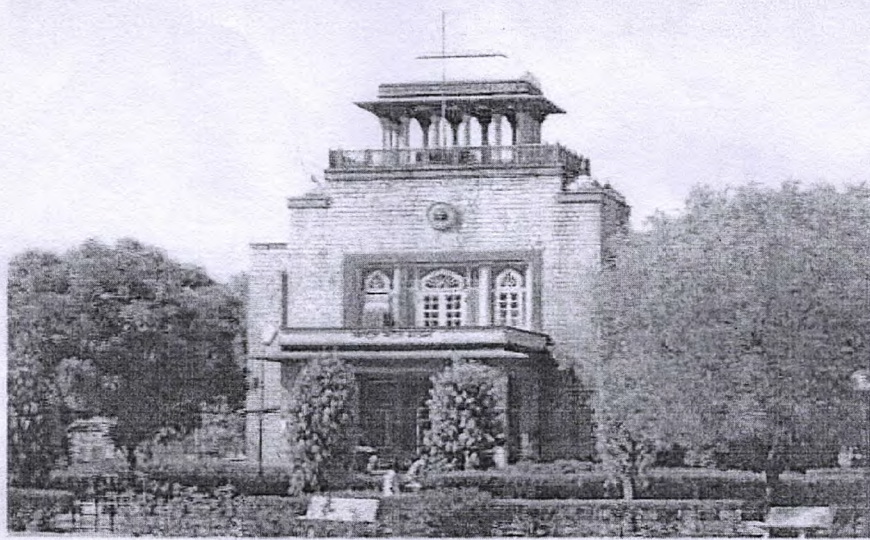


SYLLABUS

B.A. Semester – I & II

Drawing & Painting

Session – 2023-24



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UNIVERSITY OF RAJASTHAN, JAIPUR

Department of Drawing and Painting

SYLLABUS

B. A. SEMESTER-I & II

Aims & Objectives:

B.A. Drawing and Painting course is designed to give expression to one's visual thoughts on a canvas. To develop one's drawing skills, one will go through various exercises aimed at improving their skills to represent nature's designs on paper. Textures and colours will be added later to the practice so that you grow as an artist to represent your mental images better. Slowly one will explore one's own emotional images and start representing them with a brush. After this course, they have so many career options in different areas of arts and its related ones.

Suitability and Beneficial Aspects:

- The course helps to recognize and identify the benefits/disadvantages of paint systems, to understand the importance of surface preparation and to understand methods of application and testing.
- The course provides a method for looking at paintings, drawings and prints which is both flexible and clear.
- The course will enable students to learn how to look in a more objective and analytical way and learn the visual vocabulary and glossary of terms.
- The main objective of this course is to improve interest in painting, basic understanding about painting as an art, introduction to the various techniques used in painting, to develop aesthetical understanding, introduction to the history of art.
- It helps to develop a new ethical view to understanding the Art World.

Employment Areas:

- Academic Institutes
- Film Industry
- Old Artefact Museums
- Arts Content Writing
- News & Media Industry
- Arts & Gallery Centres
- Magazine Publications Houses

Job Types:

- Artists
- Visualizing Professional
- Art Critics
- Design Trainer
- Art Professional

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Details of AECC/SEC/ Generic Elective Courses

For Fresher's who will be admitted in the session 2023-24

Name of University: UNIVERSITY OF RAJASTHAN, JAIPUR

Name of Faculty: Fine Arts

Name of Discipline/ Subject: **Drawing and Painting**

List of Ability Enhancement Compulsory Courses (AECC)								
#	Level	Sem.	Sub. Code	Title				Credits
					L	T	P	Total
1	5	I	DRP-51T-101	Fundamental of Fine Arts (Theory)	2	-	-	2
2	5	I	DRP-51P-102	Study from object (Still Life)	-	-	4	4
								2 +4=6
3	5	II	DRP-52T-103	Fundamental of Fine Arts (Theory)	2	-	-	2
4	5	II	DRP-52P-104	Creative Design	-	-	4	4
								2 +4=6

1 Credit= 1 Hour Theory Lecture (L) per week

1 Credit= 2 Hours Practical (P) per week

SYLLABUS

B.A. SEMESTER-I & II 2023-24

EXAMINATION SCHEME :

SEMESTER-I

Name of Paper	Duration of Exam	EoSE Max. Marks	EoSE Min. Marks	Internal (CA) Max. Marks	Internal (CA) Min. Marks	Max marks	Min. Marks
Fundamentals of Fine Arts (Theory)	3 hrs.	40	16	10	04	50	20
Study from object (Still life) (Practical)	3 hrs.	80	32	20	08	100	40

Note:-Minimum 40% required in CA/Internal Exam to appear in EoSE(End of Semester Exam)

SEMESTER-II

Name of Paper	Duration of Exam	EoSE Max. Marks	EoSE Min. Marks	Internal (CA) Max. Marks	Internal (CA) Min. Marks	Max marks	Min. Marks
Fundamentals of Fine Arts (Theory)	3 hrs.	40	16	10	04	50	20
Creative Design (Practical)	3 hrs.	80	32	20	08	100	40

Note:-Minimum 40% required in CA/Internal Exam to appear in EoSE (End of Semester Exam)

EXAMINATION SCHEME OF THEORY PAPER :

Note : The theory paper consist of three parts :-

Part -I: Carries 10 marks and consist of 10 short type questions of 1 marks each.

Part -II: Attempt any four questions of 10 marks (2^{1/2} marks of each question) with internal choice. Candidates are required to write each answer with the limit of 50-60 words.

Part -III: Attempt any two questions of 20 marks (10 marks of each question) with internal choice. Candidates are required to write each answer with the limit of 500-600 words.

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B.A. SEMESTER-I
Paper I : FUNDAMENTAL OF FINE ARTS
(Theory)

Unit-I	Meaning and Definition of Art, Classification of Art (Painting, Sculpture, Architecture, Music, Dance and Drama)
Unit-II	Six limbs of Indian Art
Unit-III	Elements of Painting – Line, Form, Colour, Tone, Texture, Space
Unit-IV	Creative Process – Observation, Perception, Imagination and Creative Expression

Books Recommended :

1. Studies in Indian Art - V.S. Agarwal.
2. Roop Prad Kala Ke Mooladhar - Shri Kumar Sharma, R.A. Agrawal International Publishing House, Meerut, 2004.
3. Fundamentals of Design - Donald M. Enderson.
4. Principle of Art – R.G. Kalingwood
5. The Meaning of Art – Herbert Read
6. Anatomy and Drawing – Victor Perard
7. चित्रकला के मूलाधार – शुक्रदेव श्रोत्रिय, चित्रायन प्रकाशन,, मुजफरनगर
8. लोक –चित्रकला (परम्परा और रचना दृष्टि) डा. श्याम सुन्दर दूबे .
9. लयात्मक रेखांकन – डा. एन.एल. वर्मा, राज पब्लिशर्स, जयपुर
10. रूपांकन (Fundamentals of Plastic Art) – डा. गिराज किशोर अग्रवाल

Paper – II : STILL LIFE
(Practical)

Medium : Pencil and colour

Size : Half Imperial

Duration : 3 hrs.

A group of objects (not more than four) should be arranged against drapery background with a flat foreground. The objects should include common articles of daily use with fruits and vegetable etc.

Practical paper shall have one session of three hours.

- (a) 3 plates of pencil shading and 5 plates of study from objects with water colour.
- (b) A sketch book of not less than 25 sketches.

Note : EoSE of Practical Examination will be conducted and marking will be done by the External Examiner appointed by the University. Internal Exam / CA marking will be by the Internal Examiner done on the basis of Submission

Submission work will be retained till the declaration of the result and returned to the Candidate by the Department thereafter. If no claim is made within two months of the declaration of the result, the submission will be destroyed.

Note:

- (a) Candidate should pass in theory as well as in practical paper separately.
- (b) There should be minimum 08 hours for the regular study including two hours for sketching.
- (c) Minimum three demonstrations should be arranged by the subject expert during the session for each practical paper.

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- (d) The Department should also arrange for an Educational tour to Ancient Art centres like Ajanta, Ellora, Elephanta, Khujraho, Mahabalipuram etc. once a year.
- (e) Practical examination will be conducted at the centres and the practical work will be examined external examiner. The examiner will examine the answer books in consultation with and internal examiner who is the subject teacher of the Department of Drawing and Painting. University may centralize the practical examinations at few well equipped Departments to hold examination economically.

B.A. SEMESTER-II
Paper I : FUNDAMENTAL OF FINE ARTS
(Theory)

Unit-I	Principles of Composition – Unity, Harmony, Balance, Rhythm, Dominance, Proportion
Unit-II	Perspective, Drawing and Rendering, Colour Medium - Charcoal, Pastel, Water, Acrylic, Oil
Unit-III	Art Techniques– Fresco–Buno and Secco, Wash Painting, Tempera, Graphic Art – Relief (Lino and Wood Cut), Etching, Collagraph, Serigraph, Lithograph
Unit-IV	Introduction of Various Art Styles – Classical, Modern, Contemporary, Tribal, Folk Art and Child Art

Books Recommended :

1. Studies in Indian Art - V.S. Agarwal.
2. Roop Prad Kala Ke Mooladhar - Shri Kumar Sharma, R.A. Agrawal. International publishing house, Meerut, 2004.
3. Fundamentals of Design - Donald M. Enderson.
4. Principle of Art – R.G. Kalingwood
5. The Meaning of Art – Herbert Read
6. Anatomy and Drawing – Victor Perard
7. चित्रकला के मूलाधार – शुकदेव श्रोत्रिय, चित्रायन प्रकाशन,, मुजफरनगर
8. लोक –चित्रकला (परम्परा और रचना दृष्टि) डा. श्याम सुन्दर दूबे
9. लयात्मक रेखांकन – डा. एन.एल. वर्मा, राज पब्लिशर्स, जयपुर
10. रूपांकन (Fundamentals of Plastic Art) – डा. गिराज किशोर अग्रवाल

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Paper – II : CREATIVE DESIGN (Practical)

Medium : Any medium

Size : Half Imperial

Duration : 3 hrs.

Two dimensional design should be made giving stress on stylisation, colour-scheme and texture etc.

Practical paper shall have one sessions of three hours each excluding break of one hour.

- (a) 8 plates of creative design.
- (b) A sketch book of not less than 25 sketches.

Note : EoSE of Practical Examination will be conducted and marking will be done by the External Examiner appointed by the University. Internal Exam / CA marking will be by the Internal Examiner done on the basis of Submission

Submission work will be retained till the declaration of the result and returned to the Candidate by the Department thereafter. If no claim is made within two months of the declaration of the result, the submission will be destroyed.

Note:

- (a) Candidate should pass in theory as well as in practical paper separately.
- (b) There should be minimum 08 hours for the regular study including two hours for sketching.
- (c) Minimum three demonstrations should be arranged by the subject expert during the session for each practical paper.
- (d) The Department should also arrange for an Educational tour to Ancient Art centres like Ajanta, Ellora, Elephanta, Khujraho, Mahabalipuram etc. once a year.
- (e) Practical examination will be conducted at the centres and the practical work will be examined external examiner. The examiner will examine the answer books in consultation with and internal examiner who is the subject teacher of the Department of Drawing and Painting. University may centralize the practical examinations at few well equipped Departments to hold examination economically.

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University of Rajasthan Jaipur

SYLLABUS

(Three/Four Year Under Graduate Programme in Social Science)

I & II Semester

Examination-2023-24

As per NEP - 2020

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Principal
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UNIVERSITY OF RAJASTHAN

DEPARTMENT OF ECONOMICS

Programme Name: UG9101 –Three/Four Year B.A.

The Programme is divided into four parts and each part will consist of two semesters.

Part	Year	Odd Semester	Even Semester
Part-I	First Year	Semester-I	Semester-II
Part-II	Second Year	Semester-III	Semester-IV
Part-III	Third Year	Semester-V	Semester-VI
Part-IV	Fourth Year	Semester-VII	Semester-VIII

S. No.	Discipline / Subject	Page No.
1.	Programme Prerequisite and Outcome	01
2.	Scheme of Examination	02
3.	Contact Hours	04
4.	Exit and Entrance Policy	04
5.	Letter grade and Grade Points	05
6.	Semester wise Paper Detail and Detailed Syllabus of Economics	06-14


Name of University : University of Rajasthan, Jaipur

Name of Faculty : UG9101 –B.A.

Name of Discipline : Economics

Programme Prerequisites : Passed 12th Class

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Programme Outcomes (Pos):

- Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
- Provides a firm basis for much of the advanced thinking in the Economics discipline. It provides the student with a logical paradigm for modelling and interpreting the behaviour and interactions of households, firms, and government institutions.
- Understand the basic economic issues and problems of real world.
- Learn the mathematical and statistical techniques necessary for a proper understanding of the discipline, get trained to collect primary data and gain an understanding of proper policy responses to economic problems.
- Learn to use scientific empirical methods to arrive at conclusions about the validity of economic theories.
- Providing students the flexibility to prepare for careers in academia, law, management, journalism, government, and many other fields.


Scheme of Examination for the Session 2023-2024

Scheme of the Examination for Practical subjects:

1 Credit = 25 marks for examination/evaluation

Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous assessment (20% Weightage) and (End of Semester Examination) EoSE (80% Weightage).

1. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study.


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2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration.
 - Part-A of the paper shall have multiple questions of equal marks. This first question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
 - Part-B of the paper shall consist of 4 questions with an internal choice of each. The four questions will be set with one from each of the units with internal choice. Third to fourth questions shall be based on applications of the topics/texts covered in the syllabus (60% Weightage) and shall involve solving Problems (40% Weightage) if applicable.
3. 75% Attendance is mandatory for appearing in EoSE.
4. To appear in the EoSE examination of a course/subject student must appear in the mid-semester examination and obtain at least a "C" grade in the course/subject.
5. Credit points in a Course/Subject will be assigned only if, the student obtains at least a C grade in midterm and EoSE examination of a Course/Subject.

Scheme of the Examination for Non-practical subjects:

1 Credit = 25 marks for examination/evaluation

Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous assessment (20% weightage) and (End of Semester Examination) EoSE (80% weightage).

1. Sessional work will consist of class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study.
2. Each Paper of EoSE shall carry 80% of the total marks of the course/subject. The EoSE will be of 3 hours duration.
 - Part-A of the paper shall have multiple questions of equal marks. This first question shall be based on knowledge, understanding and applications of the topics/texts covered in the syllabus.
 - Part B of the paper shall consist of 2 questions with an internal choice of each. The questions will be set with one from each of the units.

- Part C of the paper shall consist of 4 questions with an internal choice of each. The four questions will be set with one from each of the units with internal choice. Third to fourth questions shall be based on applications of the topics/texts covered in the syllabus (60 % Weightage) and shall involve solving Problems (40% Weightage) if applicable.
3. 75% Attendance is mandatory for appearing in EoSE.
 4. To appear in the EoSE examination of a course/subject student must appear in the mid-semester examination and obtain at least a C grade in the course/subject.
 5. Credit points in a Course/Subject will be assigned only if, the student obtains at least a C grade in midterm and EoSE examination of a Course/Subject

Contact Hours

15 Weeks per Semester

L – Lecture	(1 Credit = 1 Hour/Week)
T – Tutorial	(1 Credit = 1 Hour/Week)
S – Seminar	(1 Credit = 2 Hours/Week)
P – Practical/Practicum	(1 Credit = 2 Hours/Week)
F – Field Practice/Projects	(1 Credit = 2 Hours/Week)
SA – Studio Activities	(1 Credit = 2 Hours/Week)
I – Internship	(1 Credit = 2 Hours/Week)
C – Community Engagement and Service	(1 Credit = 2 Hours/Week)

Exit and Entrance Policy


1. Students who opt to exit after completion of the first year and have secured 48 credits will be awarded a **UG Certificate** if, in addition, they complete one internship of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.

2. Students who opt to exit after completion of the second year and have secured 96 credits will be awarded the UG diploma if, in addition, they complete one internship of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.
3. Students who wish to undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 150 credits and satisfying the minimum credit requirement.
4. A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 200 credits and have satisfied the minimum credit requirements.
5. Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University/College. The research project/dissertation will be in the major discipline. The students, who secure 200 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

Letter Grades and Grade Points

Letter Grade	Grade Point	Marks Range (%)
O (outstanding)	10	91 - 100
A+ (Excellent)	9	81 - 90
A (Very good)	8	71 - 80
B+ (Good)	7	61 - 70
B (Above average)	6	51 - 60
C (Average)	5	40 - 50
P (Pass)	4	
F (Fail)	0	
Ab (Absent)	0	

When students take audit courses, they may be given a pass (P) or fail (F) grade without any credits.


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SEMESTER-WISE PAPER TITLES WITH DETAILS

Name of Programme: UG9101 –B.A.								
Subject/Discipline: Economics								
#	Level	Semester	Type	Title	Credits			
					L	T	P	Total
1.	5	I	MJR/MIN	UG9101-ECO-51T-101: Principles of Microeconomics	6	0	0	6
2.	5	II	MJR/MIN	UG9101-ECO-52T-102: Indian Economy	4	0	0	4
3.	5	II	MJR/MIN	UG9101-ECO-52P-103: Eco- Practical-I	0	0	2	2
4.	6	III	MJR/MIN	UG9101-ECO-63T-201: Principles of Macroeconomics	6	0	0	6
5.	6	IV	MJR/MIN	UG9101-ECO-64T-202 (A): Statistics	4	0	0	4
				OR				
				UG9101-ECO-64T-202 (B): History of Economic Thought	4	0	0	4
6.	6	IV	MJR/MIN	UG9101-ECO-64P-203: Eco- Practical-II	0	0	2	2
7.	7	V	MJR/MIN	UG9101-ECO-75T-301: Trade, Development and Finance	6	0	0	6
8.	7	VI	MJR/MIN	UG9101-ECO-76T-302(A): Mathematical Methods for Economics	4	0	0	4
				OR				
				UG9101-ECO-76T-302(B): Economic Review of Rajasthan	4	0	0	4
9.	7	VI	MJR/MIN	UG9101-ECO-76P-303: Eco- Practical-III	0	0	2	2

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Syllabus

UG9101 –B.A.

Semester -I: Economics

Session: 2023-2024

Type	Paper Code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
Theory	UG9101-ECO-51T-101: Principles of Microeconomics	1 Hrs -MT	30 Marks-MT	12 Marks-MT
		3 Hrs- EoSE	120 Marks-EoSE	48 Marks-EoSE

Semester	I
Code of the Course	UG9101-ECO-51T-101
Title of the Course/Paper	Principles of Microeconomics
NHEQF Level	5
Credits	6
Level of Course	Introductory
Type of the Course	Major/Minor
Delivery Type of the Course	Lectures
Prerequisites	NIL
Eligibility Criteria	Passed 12th Class
Objectives of the Course	This course is framed in such a way that students can equip themselves with the basic principles of microeconomic theory in order to deal with real-world micro economic problems.

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Course Outcome	The students learn some basic principles of microeconomics and interactions of supply, demand, household, production, cost and characteristics of markets.
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Detailed Syllabus

UG9101-ECO-51T-101: PRINCIPLES OF MICROECONOMICS

Unit -I

Subject Matter of Economics: Why study economics? Scope and method of economics; the economic problem: scarcity and choice; the concept of opportunity cost; three problems of economic system: the question of what to produce, how to produce and how to distribute output; science of economics; positive versus normative analysis.

Demand: Law of demand; determinants of demand; shifts of demand versus movements along a demand curve; market demand.

Supply: Law of supply; determinants of supply; shifts of supply versus movements along a supply curve; market supply; market equilibrium; elasticity and its application; consumer surplus; producer surplus.

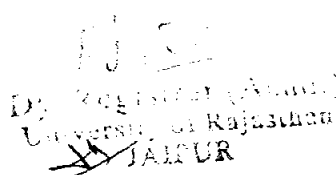
(25 Lecture)


Unit -II

The Households: The consumption decision - budget constraint, concept of utility, diminishing marginal utility, Diamond-water paradox, consumption and income/price changes. demand for all other goods and price changes; consumer choice: indifference curves, properties of indifference curves derivation of demand curve from indifference curve and budget constraint; consumer equilibrium, income and substitution effects; labour supply and savings decision - choice between leisure and consumption.

(20 Lecture)

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Unit-III

Production: Behaviour of profit maximising firms, production process, production functions, law of variable proportions, isoquant and iso cost lines.

Costs: Costs in the short run, costs in the long run, revenue and profit maximization, minimizing losses, short run industry supply curve, economies and diseconomies of scale, producer equilibrium. :

Perfect Competition: Assumptions, features, supply curve of a competitive firm, short run and long run equilibrium of a firm/ industry.

(25 Lecture)

Unit-IV

Monopoly: Meaning, source, types, assumptions, features, price and output determination in the short run and long run.

Monopolistic Competition: Features / characteristics, short run and long run equilibrium of a firm, role of advertising.

Oligopoly: Assumptions, features and characteristics.

(20 Lecture)

Suggested Books:

1. Ahuja H.L (2017). Advanced Economic Theory, S. Chand and Company, New Delhi.
2. Bernheim, B., Whinston, M. (2009). Microeconomics. Tata McGraw-Hill.
3. Dominick Salvatore (2002) Theory and Problems of Microeconomic Theory, Schaum's Outline Series, McGraw-Hill Book Company, Singapore.
4. H. R (2010). Intermediate Microeconomics: A Modern Approach, W. W. Norton and Company, 8th Edition.
5. Koutsoyiannis A, (2008). Modern Microeconomics, Macmillan, London.
6. Mankiw, N. (2007). Economics: Principles and applications, 4th ed. Cengage Learning, 2007.
7. Pindyck Robert S., and Daniel L. Rubinfeld, (2012) Microeconomics, Pearson Prentice Hall, New Jersey.


Syllabus


UG9101 –B.A.

Semester -II: Economics

Session: 2023-2024

Type	Paper Code and Nomenclature	Duration of Examination	Maximum Marks (Midterm + EoSE)	Minimum Marks (Midterm + EoSE)
Theory	UG9101-ECO-52T-102: Indian Economy	1 Hrs -MT	20 Marks-MT	08 Marks-MT
		3 Hrs- EoSE	80 Marks-EoSE	32 Marks-EoSE
Practical	UG9101-ECO-52P-103: Eco-Practical-I	1 Hrs -MT	10 Marks-MT	04 Marks-MT
		3Hrs- EoSE	40 Marks-EoSE	16 Marks-EoSE
		<u>EoSE Marks Distribution:</u>		
		1. Practicum Report : 20 Marks		
		2. Written Test : 12 Marks		
		3. Viva-Voce : 08 Marks		


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Semester	II
Code of the Course	UG9101-ECO-52T-102
Title of the Course/Paper	Indian Economy
NHEQF Level	5
Credits	4
Level of Course	Introductory
Type of the Course	Major/Minor
Delivery Type of the Course	Lectures
Prerequisites	NIL
Eligibility Criteria	Passed 12th Class
Objectives of the Course	Main objective of this course is to familiarise the students with the basic concepts and problems of Indian Economy. The main focus areas include growth and structural change, national income, population, poverty, education, health, inequality, industry, services and trade.
Outcome of the Course	Students will be able to develop a critical understanding of the contemporary issues of the Indian economy. This understanding will be helpful for students in getting jobs in various fields.

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Detailed Syllabus

UG9101-ECO-52T-102: INDIAN ECONOMY

Unit-I

Introduction- Indian Economy: Historical overview, basic features, comparative perspective; **National Income:** Growth and structural change; **Natural resources:** land, minerals, water, forest and power resources.

Population and Human Development: Demographic transition theory; demographic trends and issues; education; health; malnutrition; India's performance in human development Index.

(14 Lecture)

Unit-II

Agriculture and Land Reforms: Policies and Performance in Agriculture: role and importance, growth, productivity, agrarian structure and technology, capital formation, trade, pricing; **Land Reforms:** issues and policies.

Industry and Labour Reforms: Policies and Performance in Industry: growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment; **Labour reforms:** issues and policies.

(16 Lecture)

Unit-III

Service Sector: Importance, trends, performance, reforms and issues.

Foreign Trade: trends, performance, structural changes, reforms and issues; **Balance of Payments:** present scenario, Causes and remedial measures to correct unfavourable balance of trade; **Role and functions of IMF and WTO:**

(16 Lecture)


Unit-IV


Planning, Growth and Distribution: Planning: major objectives, achievements, functions of NITI Aayog; Growth and distribution: unemployment, poverty, inequality and policy intervention.

(14 Lecture)

Recommended books:

1. Economic Survey (Latest Ed), Ministry of Finance, Government of India (Hindi and English).
2. Laxmi Narayan Nathuramka: Bhartiya Arthshastra, College Book House (Latest Ed.)
3. Mishra and Puri: Indian Economy, Himalaya Publishing House (Latest Ed.) (Hindi and English).
4. Rudra Dutt and Sundaram: Indian Economy. S. Chand (Latest Ed.) (Hindi and English).
5. Uma Kapila: Indian Economy, Academic Foundation (Latest Ed).


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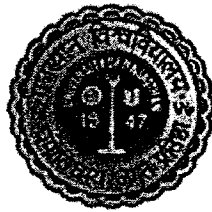

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Semester	II
Code of the Course	UG9101-ECO-52P-103
Title of the Course/Paper	Eco-Practical-I
NHEQF Level	5
Credits	2
Level of Course	Introductory
Type of the Course	Major/Minor
Delivery Type of the Course	Practicum
Prerequisites	NIL
Eligibility Criteria	Passed 12th Class
Objectives of the Course	Main objective of this course is to develop basic thoughts and ideas in students to analyse problems of Indian Economy.
Outcome of the Course	Provides better opportunities to get jobs.

Detailed Syllabus

UG9101-ECO-52P-103: Eco-Practical-I

1. **Case Studies:** Discussion on case study related to issues of Indian economy.
(20 Hour).
2. **Socio-Economic Survey and Field Work:** Field visits to identify local/regional economic issues/ problems.
(20 Hour)
3. **Report Writing:** Make observation including data collection, analyse the data and prepare a brief report on chosen topic.
(20 Hour)



UNIVERSITY OF RAJASTHAN
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SYLLABUS

Three/Four Year Undergraduate Programme in English

I & II Semester
Examination

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As per NEP 2020

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ENGLISH LITERATURE
BA Semester I
Paper I: Poetry and Drama – I

The Syllabus aims at achieving the following objectives:

- Interpretation and appreciation of selected texts from the genres of poetry, drama, prose and fiction.
- Strengthening skills of note making, summarizing and dialogue writing.
- Understanding texts with specific reference to genres, forms and literary terms.
- Appreciate the texts in terms of their aesthetic value
- Students should be able to evaluate the texts in terms of literary devices used such as simile, metaphor, personification, pun, and irony
- Evaluate the texts in terms of progression of history of English literature from William Shakespeare to the Neo-Classical era
- Develop a deeper understanding of Indian literary texts

Program Code: UG9103
Maximum Marks: 150
Division of Marks
Semester Examination: Marks: 120
Internal Examination: 30 Marks
Total: 150

Credits: 6
Min. Pass Marks: 40
Duration: 3 hrs

Question No. 1: Is compulsory and will have two parts and will be of 20 marks in total.

Part A - References to Context

Candidate will be required to explain four (4) passages of Reference to Context with 5 marks each with a total of 20 Marks.

Knowledge of Literary Terms and Poetry Appreciation and usages of drama is required.

Part B - The student will be required to attempt 2 questions out of 4. Each question will carry 10 marks each to a total of 20 marks.

Part C - The other 4 questions will be Essay-type questions of 20 marks each, one from each unit with internal choice.

UNIT I

1. History of English Literature from 1350 to 1660 (Social, Political and Cultural Background; Major literary movements and seminal characteristics of the period; Major writers and their works)

UNIT II

2. William Shakespeare : *A Consolation, The Triumph of Death, Soul and Body*
3. Francis Beaumont: *On The Tombs in Westminster Abbey*

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4. Ben Jonson: *The Noble Nature*
5. John Fletcher: *Melancholy*
6. John Donne: *Death be not Proud*
7. Andrew Marvell: *The Garden*
8. J. Milton: *On His Blindness*

UNIT III

The following poems from *The Golden Treasury of Indo – Anglican Poetry*, V. K. Gokak.

9. Vivekananda : *The Cup*
10. Henry L. Derozio : *To the Pupils of the Hindu College,*
The Harp of Indian
11. Toru Dutt : *Laxman, Our Casuarina Tree*
12. Shoshee Chunder Dutta : *Sivajee, India*

UNIT IV

13. W. Shakespeare : *Twelfth Night*
14. Tagore : *The Post Office*
15. Tutorials : *Quiz, Seminar, Group Discussion, Presentation, Project*

Reference Books-

Poet's Pen: An Anthology of English Verse Paperback – by Dustoor P.E. (Author), Homai P.Dustoor (Author) (Oxford University Press)

The New Oxford Book of English Verse, 1250-1950 (Oxford Books of Verse), Helen Gardner (Editor)

Indian Writing in English by K.R.Srinivasa Iyengar .Sterling Publishers Pvt.Ltd

A History of Indian English Literature by M.K.Naik Sahitya Akademi

The Golden Treasury of Indo-Anglian Poetry, 1828-1965 by Vinayak Krishna Gokak (Editor) Sahitya Akademi

The Golden Treasury: Francis T. Palgrave

History of English Literature by Hudson

Pelican Guide to English Literature by Boris Ford ed:

Note: The texts with colonial implications have to be taught from a postcolonial standpoint.

Semester II

Paper II – Prose and Fiction - I

The Syllabus aims at achieving the following objectives:

- Interpretation and appreciation of selected texts from the genres of poetry, drama, prose and fiction.
- Understanding texts with specific reference to genres, forms and literary terms.
- To develop knowledge of major literary terms and figures of speeches
- To be able to understand the political, economic, social and intellectual background
- To introduce essay as a genre of literature and acquaint with important essayists and their style of writing
- To enhance comprehension through a close study of short stories, their writers, narrative techniques and thematic concerns

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- To learn forms of formal communication

Program Code: UG9103
 Maximum Marks: 150
 Division of Marks
 Semester Examination: Marks: 120
 Internal Examination: 30 Marks
 Total: 150

Credits: 6
 Min. Pass Marks: 40
 Duration: 3 hrs

Question No. 1: Is compulsory and will have two parts and will be of 20 marks in total.

Part A - References to Context

Candidate will be required to explain four (4) passages of Reference to Context with 5 marks each with a total of 20 Marks.

Knowledge of Literary Terms and Poetry Appreciation and usages of drama is required.

Part B - The student will be required to attempt 2 questions out of 4. Each question will carry 10 marks each to a total of 20 marks.

Part C - The other 4 questions will be Essay-type questions of 20 marks each, one from each unit with internal choice.

UNIT I

1. Bacon : *Of Studies*
2. B. Russell : *Knowledge and Wisdom*
3. Lucas : *Third Thoughts*
4. Joseph Addison : *Popular Superstitions*
5. H. Belloc : *On Educational Reform*

UNIT II

6. Leigh Hunt : *On Getting Up on Cold Mornings*
7. R. L. Stevenson : *El Dorado*
8. H.H. Munro (Saki) : *The Open Window*
9. R.K. Narayan : *An Astrologer's Day*

UNIT III

10. K. Mansfield : *A Cup of Tea*
11. R. Tagore : *Living or Dead*
12. E. Hemingway : *Old Man at the Bridge*
13. George Orwell: *Animal Farm (Novel)*

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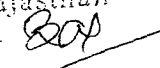
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UNIT IV

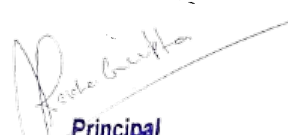
14. Prose Appreciation
15. Formal Communication
16. Report Writing
17. Presentations Skills
18. Tutorials : Quiz, Seminar, Group Discussion, Presentation, Project

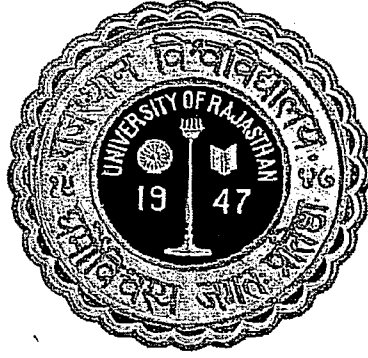
Reference Books

- English Prose Selections* (O.U.P.) ed. Dr. S.S. Deo et al.
The Art of the Essayist By Lockitt, C. H. (ed.)
Popular Short Stories ed. By Board of Editors (O.U.P.)
Malgudi Days by R. K. Narayan Indian Thought Publications
Mohan, Krishna., Raman, Meenakshi. *Effective English Communication*. Tata McGraw Hill, New Delhi, 2009.
The Handbook of Creative Writing. Ed. Steven Earnshaw, Edinburgh University Press, London, 2007.
English at the Workplace eds. Sawhney Panja and Varma (Macmillan)

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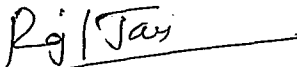
SYLLABUS


M.Sc. ZOOLOGY

(Annual Scheme)

M.Sc. (Previous) Examination 2023

M.Sc. (Final) Examination 2024


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SYLLABUS

M.Sc.

ZOOLOGY

(ANNUAL SCHEME)

M.Sc. (Previous) Examination 2022-2023

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UNIVERSITY OF RAJASTHAN

UGC CURRICULUM FOR POSTGRADUATES

M.Sc. Zoology Previous (Annual Scheme)

Paper –I	Biosystematics and Taxonomy
Paper –II	Structure & Function of Invertebrates
Paper –III	Molecular Biology and Biotechnology
Paper – IV	General Physiology
Paper – V	Biochemistry
Paper – VI	Biostatistics and Population Genetics

Note:- In M. Sc. Zoology Previous Examination the theory papers will have the following pattern.

Question papers will have 5 (five) questions in all having equal marks

- (i) Question number 1 will be compulsory and will have 20 very short answer question of 1 mark each.
- (ii) Question numbers 2 and 3 will consist of only short answer type questions with 4 subdivisions of 5 marks each. There will be internal choice in these questions.
- (iii) Question numbers 4 and 5 will be long answer type questions with internal choice.

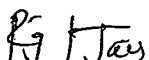
PAPER I: BIOSYSTEMATICS AND TAXONOMY

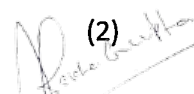
3 Hours duration

Max. Marks: 100

Periods : 80

1. Definition and basic concepts of biosystematics and taxonomy 10
 - 1.1 Historical resume of systematics.
 - 1.2 Importance and applications of biosystematics in biology.
 - 1.3 Manual basis of histo-systematics-different- attributes.
2. Trends in biosystematics: Concepts of different conventional and newer aspects 14
 - 2.1 Behavioural Taxonomy
 - 2.2 Chemotaxonomy
 - 2.3 Cytotaxonomy
 - 2.4 Molecular taxonomy
 - 2.5 Numerical taxonomy
3. Molecular perspective on the conservation of diversity 6
 - 3.1 Diversity and ecosystem process: Theory, achievements and future directions.
4. Dimensions of speciation and taxonomic characters 20

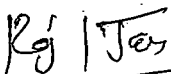

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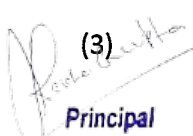

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- 4.1 Dimensions of speciation – Types of lineage changes; Production of additional lineage.
- 4.2 Mechanisms of speciation, Speciation in panmictic and apomictic species.
- 4.3 Species concepts and species category, Different species concepts: Subspecies and other infra-specific categories.
- 4.4 Theories of biological classification: Hierarchy of categories.
- 4.5 Taxonomic characters of different kinds, origin of reproductive isolation and biological mechanism of genetic incompatibility.
5. Procedure keys in taxonomy 20
 - 5.1 Taxonomic procedures: Taxonomic collections, preservation, correct process of identification.
 - 5.2 Taxonomic keys: Different kinds of taxonomic keys, their merits and demerits.
 - 5.3 Systematic publications and different kinds of publications.
 - 5.4 Process of Zoological types.
 - 5.5 International Code of Zoological Nomenclature (ICZN) and its operative principles, interpretation and application of important rules. Zoological nomenclature; formation of scientific names of various taxa.
6. Evaluation of biodiversity indices 10
 - 6.1 Shannon-Weinner index, dominance index.
 - 6.2 Similarity and dissimilarity index
 - 6.3 Association index

Recommended Books (All latest editions)

1. Avise, J.C., Molecular Markers, Natural History and Evolution. Chapman Hall, New York.
2. Kato, M., The Biology of Biodiversity, Springer.
3. Mayer, E., Principles of Systematic Zoology, McGraw Hill Book Company, New York.
4. Simpson, G.G., Principle of Animal Taxonomy. Oxford, IBH Publishing Company.
5. Tikadar, B.K., Threatened Animals of India, ZSI Publication, Calcutta.
6. Wilson, E. O., The Diversity of Life. W.W. Northern & Company.
7. Wilson, E.O., Biodiversity. Academic Press, Washington.


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Paper II: STRUCTURE & FUNCTION OF INVERTEBRATES

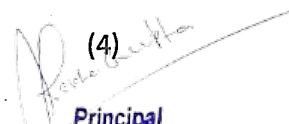
3 Hours duration

Max. Marks: 100

Periods : 80

1. Organization of Coelom 6
 - 1.1 Acoelomates
 - 1.2 Pseudocoelomates
 - 1.3 Coelomates: Protostomia and Deuterostomia.
2. Locomotion 14
 - 2.1 Flagellar and ciliary movement in Protozoa.
 - 2.2 Hydrostatic movement in Coelenterata, Annelida and Echinodermata.
3. Nutrition and Digestion 10
 - 3.1 Patterns of feeding and digestion in lower Metazoa.
 - 3.2 Filter feeding in Polychaeta, Mollusca and Echinodermata.
4. Respiration 10
 - 4.1 Organs of respiration: Gills, lungs and trachea.
 - 4.2 Respiratory pigments.
 - 4.3 Mechanism of respiration.
5. Excretion 8
 - 5.1 Organs of excretion: Coelom, Coelomoducts, Nephridia and Malpighian tubules.
 - 5.2 Mechanisms of excretion.
 - 5.3 Excretion and osmoregulation.
6. Nervous system 12
 - 6.1 Primitive nervous system: Coelenterata and Echinodermata.
 - 6.2 Advanced Nervous system: Annelida, Arthropoda (Crustacea and Insecta) and Mollusca (Cephalopoda)
 - 6.3 Trends in neural evolution
7. Invertebrate larvae 10
 - 7.1 Larval forms of free-living invertebrates
 - 7.2 Larval forms of parasites
 - 7.3 Strategies and evolutionary significance of larval forms
8. Minor Phyla 10
 - 8.1 Concept and significance (Mesozoa, Ctenophora, Rhynococoela, Protostomes, Deuterostomes)
 - 8.2 Organization and general characters.


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Recommended Books

1. Hyman, L.H., The Invertebrates, Vol. 1, Protozoa through Ctenophora, Mc.Graw Hill Company, New York.
2. Hyman, L.H., The Invertebrates, Vol. 2, Mc.Graw Hill Company, New York.
3. Hyman, L.H., The Invertebrates, Smaller Coelomate Groups, Vol. 5, Mc.Graw Hill Company, New York.
4. Hyman, L.H., The Invertebrates, Vol. 8, Mc.Graw Hill Company, New York.
5. Barington, E.J.W., Invertebrate Structure and Function. Thomas Nelson and Sons Ltd., London.
6. Branes, R.D., Invertebrate Zoology, W.B., Saunders Co., Philadelphia.
7. Russel-Hunter, W.D., A Biology of Higher Invertebrates. McMillan Company Ltd., London.
8. Cad, G.P., Animal Parasitism, Prentice Hall Inc., New Jersey.
9. Sedwick, A., Student Text Book of Zoology, Vol. I, II, and III, Central Book Depot, Allahabad.
10. Parker, T.J., Haswell, W.A., Text Book of Zoology, MacMillan Co., London.


PAPER III: MOLECULAR BIOLOGY & BIOTECHNOLOGY

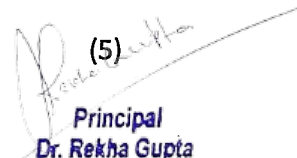
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Max. Marks: 100

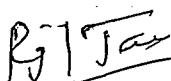
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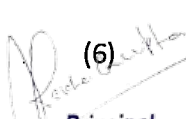
- | | |
|---|----|
| 1. DNA | 6 |
| 1.1 Equivalence rule | |
| 1.2 DNA structure: Primary & Secondary, Unusual secondary structures (slipped & cruciform, triple helix, tetraplex and G-quadruplex). | |
| 1.3 Packaging of DNA: Nucleosome, solenoid & scaffold | |
| 2. DNA replication | 12 |
| 2.1 Prokaryotic and eukaryotic DNA replication | |
| 2.2 Mechanics of DNA replication | |
| 2.3 Enzymes and accessory proteins involved in DNA replication | |
| 3. Transcription | 10 |
| 3.1 Prokaryotic transcription | |
| 3.2 Eukaryotic transcription | |
| 3.3 RNA polymerases | |
| 3.4 General and specific transcription factors | |
| 3.5 Regulatory elements and mechanisms of transcription regulation | |
| 3.6 Transcription termination | |
| 3.7 Transcriptional and post-transcriptional gene splicing | |


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4. Post-transcriptional modifications in RNA 10
 - 4.1 Cap formation
 - 4.2 End processing and polyadenylation
 - 4.3 Splicing, editing
 - 4.4 Nuclear export of mRNA.
 - 4.5 RNA stability
5. Translation
 - 5.1 Genetic code
 - 5.2 Prokaryotic and eukaryotic translation
 - 5.3 Translation machinery
 - 5.4 Mechanisms of initiation, elongation and termination
 - 5.5 Regulation of translation
 - 5.6 Co-and post-translation modifications of proteins.
6. Recombination and repair
 - 6.1 Holliday junction, gene targeting, gene disruption
 - 6.2 FLP/FRT and Crelox recombination
 - 6.3 RecA and other recombinases
 - 6.4 DNA repair mechanisms (Radiation damage, Direct reversal, Oxidative damage, Alkylation, Base excision repair, Nucleotide excision repair, Mismatch repair, ds break repair, SOS response, Translesion DNA system)
7. Molecular mapping of genome 10
 - 7.1 Genetic and physical maps
 - 7.2 Physical mapping and mapbased cloning
 - 7.3 Southern and fluorescence, *in-situ* hybridization for genome analysis
 - 7.4 Molecular markers in genome analysis, RFLP, RAPD, AFLP, DNA finger printing, single nucleotide polymorphism (SNPs), Sequence tagged site (STS)
 - 7.5 Application of RFLP and forensic disease prognosis, genetic counselling, pedigree varietal etc. Analysis; Animal tracking and poaching, germplasm maintenance and taxonomy.
8. Human Genome project, map project, the encode project 10
 - 8.1 Production Recent Technologies of transgenic animals and Knock out and its applications
 - 8.2 Embryonic stem cells and its applications
 - 8.3 Care and breeding of experimental animals including bioethics
9. Embryo technology 10
 - 9.1 Superovulation, cryopreservation of spermatazoa.
 - 9.2 *In Vitro* fertilization and embryo transfer.
 - 9.3 Embryo sexing and cloning


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- 9.4 Chimera formation.
- 9.5 Gene transfer through embryo transgenesis.
- 9.6 Surrogacy and ethics.
- 9.7 Assisted Reproductive Technologies-ICSO, GIFT, ZIFT, TET
- 9.8 Prenatal diagnosis and genetic counselling.

Recommended Books

1. Albert, B., Bray, D.D., Lewis, J., Raff M., Roberts, K, Walson, J.D., Molecular Biology of the Cell. Garland Publishing Company, Inc., New York.
2. Benjamin, Lewin, Gene VIII, Oxford University Press, U.K
3. Brown, T.A. (Ed.), Molecular Biology Labfax, Vol. 1, Bio Scientific Publishers Ltd, Oxford.
4. Dabre, P.D., Introduction to Practical Molecular Biology, John Wiley & Sons Ltd., New York.
5. Darnell, J., Lodish, H. and Baltimore, D.; Molecular Cell Biology, Scientific American Books, Inc., USA.
6. Karp, G Cell and Molecular Biology, Concepts and Experiments, John Wiley & Sons, Inc., New York.
7. Meyers, R.A. (ed.), Molecular Biology and Biotechnology. A Comprehensive Desk Reference. VCH Publishers, inc, New York.
8. Sambrook, J., Fritsch, E.F. and Maniatis, T Molecular Cloning: A Laboratory Manual. Cold Spring Harbor Laboratory Press, New York.
9. Watson, J.D., Hopkins, N.H., Roberts, J.W., Steiz, J.A., Weinef, A.M.; Molecular Biology of Gene. The Benjamin Cummings Pub. Co., Inc., California.

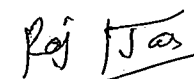
PAPER IV: GENERAL PHYSIOLOGY

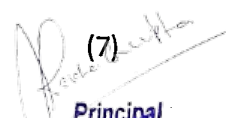
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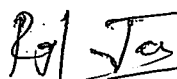
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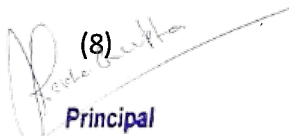
1. Thermoregulation and Cold Tolerance 8
 - 1.1 Basic principles of metabolism
 - 1.2 Heat balance and exchange
 - 1.3 Endotherms Vs Ectotherms
 - 1.4 Counter-current heat exchanger
 - 1.5 Torpor, hibernation and aestivation
 - 1.6 Adaptationsto very cold environments
2. Ionic andOsmotic Balance 8
 - 2.1 Osmoregulation vs. Osmoconfirming


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2.2	Osmoregulation in aquatic and terrestrial environments	
2.3	Kidney function and diversity	
2.4	Other osmoregulatory organs	
2.5	Nitrogenous waste excretion	
3.	Gas Exchange and Acid-base Balance	8
3.1	Oxygen and carbon dioxide transport in blood	
3.2	Role of haemoglobin	
3.3	Responses to altitude and hypoxia	
3.4	Swim bladder inflation in fish	
3.5	Regulation of body pH	
3.6	Gas transfer in air and water, gas exchanger design and function	
4.	Muscle Function and Movement	8
4.1	Anatomy of muscle	
4.2	Regulation of contraction	
4.3	Excitation-contraction coupling	
4.4	Molecular theory of muscle contraction	
5.	Nervous System	8
5.1	Anatomy of nervous system	
5.2	Neurons and membrane excitation	
5.3	Electrochemical potentials	
5.4	Action potentials	
5.5	Transmission between neurons	
5.6	Synapses and neurotransmitters	
5.7	Memory and learning	
6.	Sensory Transduction	10
6.1	Sensing the environment	
6.2	Auditory receptors	
6.3	Chemoreceptors, Taste and smell, homing in Salmon	
6.4	Mechanoreceptors: Tactile systems and escape responses	
6.5	Vision and photoreception	
6.6	Thermoreception and infrared detection: Prey detection in snakes.	
6.7	Echolocation and bats	
7.	Digestion and Metabolism	5
7.1	Nutritional uptake and distribution	
7.2	Effects of starvation	
8.	Stress Biology	10

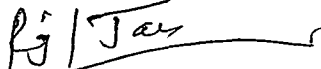

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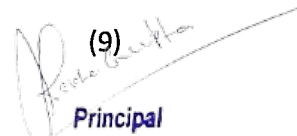

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- 8.1 Basic concept of environmental stress and strain: concept of elastic and plastic strain; stress resistance, stress avoidance and stress tolerance.
- 8.2 Adaptation, acclimation and acclimatization
- 8.3 Concept of homeostasis
- 8.4 Physiological response to oxygen deficient stress
- 8.5 Physiological response to body exercise
- 8.6 Meditation, yoga and their effects
9. Endocrinology 15
- 9.1 Aims and scope of endocrinology
- 9.1.1 Discovery of hormones.
- 9.1.2 Hormones as messengers.
- 9.1.3 Classification of hormones
- 9.2 Phylogeny of endocrine glands (Pituitary, pancreas, adrenal, thyroid, testis, ovary)
- 9.3 Ontogeny of endocrine glands.
- 9.4 Neuroendocrine system and neurosecretion
- 9.5 General principles, structure and hormone action
- 9.6 Hormones, growth and development.
- 9.7 Hormones and reproduction.

Recommended Books

1. Barrington, E.J.W., General and Comparative Endocrinology Claredon Press, Oxford.
2. Dejours, P.L., Bolis, L. Taylor, C.R., Weibel, E.R. (eds.); Comparative Physiology: Life in Water or Land, Liviana Press, Padova, Italy.
3. Eckert, R.W.H.; Animal Physiology, Mechanisms and Adaptations, Freeman and Company, New York.
4. Fochachka, P.W. and Somero, G.N.; Biochemical Adaptation, Princeton, New Jersey.
5. Gorbman, A., Dickhoff, W.W., Vigna, S.R., Clark, H.B., Ralphs, C.L.; Comparative Endocrinology, Wiley-Interscience Publication, New York.
6. Hill, R.W., Wyse, G.A., Anderson, M.; Animal Physiology, Sinauer Associates, Inc, Publishers, Sunderland, USA.
7. Hoar, W.S.; General and Comparative Animal Physiology, Prentice Hall of India.
8. Johnson, I.A., Bennett, A.F. (eds.); Animal and Temperature, Phenotypic and Evolutionary Adaptations, Cambridge University Press, Cambridge, U.K.
9. Louw, G.N.; Physiological Animal Ecology, Harloss, U.K.
10. Martin, C.R., Endocrine Physiology, Oxford University Press.
11. Newell, R.C. (ed); Adaptation to Environment: Essays on the Physiology of Marine Animals. Butter Worths, London, U.K.
12. Prosser, C.L.; Environmental and Metabolic Animal Physiology, Wiley-Liss, Inc, New York.


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13. Schemadt Nelsen; Animal Physiology: Adäptation and Environment. Cambridge University Press.
14. Strand, F.L.; Physiology: A Regulatory Systems Approach, Macmillan Publishing Co., New York.
15. Townsend, C.R. and Cawlow. P.; Physiological Ecology: An Evolutionary Approach to Resource Use, Blackwell, Sci. Publication, Oxford, U.K.
16. Vander, A.J., Shermen, J.H., Luciano, D.S.; Human Physiology, McGraw-Hill Publishing Company, New York.
17. Williams, R.H., Text Book of Endocrinology, W.B. Saunders.
18. Willmer, Stone, P.G and Johnson, I.; Environmental Physiology, Blackwell Sci. Publication, Oxford, U.K.

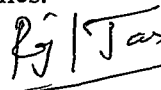
PAPER V: BIOCHEMISTRY

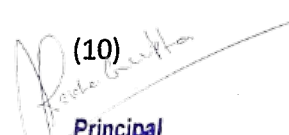
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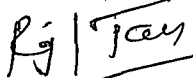
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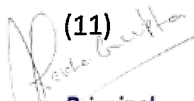
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|----|---|---|
| 1. | Covalent properties of Proteins | 6 |
| | 1.1 Structure and chemistry of amino acids | |
| | 1.2 Protein sequencing | |
| | 1.3 Peptide synthesis | |
| | 1.4 Covalent modifications | |
| | 1.5 Protein size and composition | |
| | 1.6 Protein splicing | |
| 2. | Protein secondary and tertiary structure | 6 |
| | 2.1 Protein tertiary structure and folding patterns. | |
| | 2.2 Common tertiary structural motifs. | |
| | 2.3 Role of packing constraints in tertiary structure patterns. | |
| | 2.4 Divergent vs. convergent evolution of similar structure. | |
| 3. | Globular and fibrous proteins. | 5 |
| | 3.1 Water and the hydrophobic effect. | |
| | 3.2 Tertiary and quaternary effect. | |
| | 3.3 Motifs in globular proteins. | |
| | 3.4 Properties of protein interiors and surfaces. | |
| | 3.5 Fibrous proteins. | |
| | 3.6 Structure of bone. | |
| 4. | Protein folding and thermodynamics | 5 |
| | 4.1 Protein folding and dynamics. | |


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- 4.2 Folding overview: Levinthal paradox.
- 4.3 Condensation and molten globules.
- 4.4 Ramchandaran plots and amino acid propensities.
- 4.5 Catalysis and assistance.
- 4.6 Amino acid sequence variation and membrane protein folding.
- 4.7 Chaperonin-assisted protein folding.
5. Allostery(Hemoglobin), Myoglobin structure and oxygen binding 3
- 5.1 Hemoglobin subunits co-operativity, Hill coefficient.
- 5.2 Quarternary structure changes and Sickle cell and other molecular diseases.
6. Fats 10
- 6.1 Fatty acids: structure, nomenclature, acyl glycerols, phospholipids, sphingolipids, glycolipids, lipoproteins.
- 6.2 Terpenoids and sterols: structure, properties and functions.
- 6.3 Function of lipids.
- 6.4 Signal transducing molecules.
7. Vitamins 10
- 7.1 Classification, occurrence of fat soluble vitamins.
- 7.2 Classification, occurrence and biological functions of thiamine, riboflavin, folic acid and B₁₂.
- 7.3 Phenolics and alkaloids: Structure, biological properties and functions.
8. Covalent properties of nucleic acids 5
- 8.1 Modified nucleosides.
- 8.2 Properties of polynucleotides.
- 8.3 Secondary and tertiary structure.
9. Nucleic acid structure 5
- 9.1 Duplex stability.
- 9.2 Hybridization.
- 9.3 RNA structure.
- 9.4 Hairpin and pseudoknot structures, tRNA.
10. Nucleic acids 5
- 10.1 DNA and RNA helical geometrics (A-Z), banding, deformation.
11. Nucleic acid analysis: DNA and RNA sequencing, determination of modified nucleotides. 4
12. RNA catalysis 3
- 12.1 Chemistry and structure of ribozymes.


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12.2 Evolutionary implications.

13. Enzyme mechanisms 8
- 13.1 Principles of enzyme catalysis.
 - 13.2 Proteases and polymerases, other examples.
 - 13.3 Coenzymes and Cofactors.
14. Inborn errors of metabolism 5

Recommended Books

1. Alberts R.H., Frey P.A. and Jencks W.P. Biochemistry Jones. & Bartlett Publisher, Boston/London. 1992.
2. Champe, P.C., Harvey, R.A.; Lippincott's Illustrated Reviews Biochemistry, Lippincott Williams & Wilkins, Philadelphia.
3. Deb A.C. Fundamentals of Biochemistry, New BcoK Agency Pvt. Ltd. Calcutta, 2006.
4. Elliott, W.H. and Elliott, D.C., Biochemistry and Molecular Biology, Oxford University Press, Oxford. 2001.
5. Harper's Biochemistry by Murray R.K., Granner D.K., Mays P.A., Rodwell V.W., McGraw Hill Publication, 2000.
6. Horton, H.R., Morsan, L.A., Scrimgeour, K.G., Perry, M.D., Rawn, J.D., Principles of Biochemistry, Pearson Educations, International, 2006.
7. Mathews, C.K., Van Holde, K.E., Ahern, KG., Biochemistry, Pearson Education Pvt. Ltd., Delhi, India, 2003.
8. McKee, T., McKee J.R., Biochemistry (The Molecular Basis of Life) McGraw Hill Company, Inc.
9. Nelson D.L. and Cox M.M. Lehninger Principles of Biochemistry, MacMillan/Worth Publishers, 2001.
10. Stryer L. Biochemistry. W.H. Freeman and Co. New York, 2001.
11. Voet D. Voet J.G. and Pratt C.W. Fundamentals of Biochemistry, Johan Wiley and Sons Inc., New York, 1999.
12. Wilson K. and Walker J. Principles and Techniques of Practical Biochemistry Cambridge University Press, Cambridge, 1994.
13. Zubay G.L., Parson, V.W. and Vence D.E. Principles of Biochemistry. Wm.C. Brown Publishers, Oxford, England, 1995.

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PAPER VI: BIOSTATISTICS AND POPULATION GENETICS

Duration: 3 Hours

Max. Marks: 100

Periods : 80

Biostatistics

Unit I:

1. Definition Scope and applications of biostatistics
2. Collection, organization and representation of data (graphical- Bar, Histogram, Frequency polygon, line diagram & diagrammatic).
3. Basic statistics-Arithmetic mean, Harmonic mean, Geometric mean, Median, Mode, Mean deviation. (Direct, short- cut and step -deviation for all)

Unit II

1. Statistics of dispersion, Coefficient of variation.
2. Standard error; Confidence limits.
3. Probability distributions (Binomial, Poisson and Normal).
4. Testing of Hypothesis, level of significance; Type I and II errors.
5. Tests of statistical significance (Student's t -test, Z - test, Chi-square test).
6. Correlation and regression.
7. Analysis of Variance (One way and two way ANOVA)

Population Genetics

Unit III

1. Concepts of evolution and theories of organic evolution with an emphasis on Darwinism. 5
2. Neo-Darwinism 10
 - 2.1 Hardy-Weinberg's law of genetic equilibrium.
 - 2.2 Detailed account of destabilizing forces-
 - (i) Natural selection
 - (ii) Mutation
 - (iii) Genetic drift
 - (iv) Migration
 - (v) Meiotic drive
 - 2.3 Genetic structure of natural populations.
 - 2.4 Variations -including transgressive variations
 - 2.5 Models explaining changes in genetic structure of populations.
 - 2.6 Factors affecting human disease frequency.
3. Molecular population genetics 5

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- 3.1 Patterns of change in nucleotide and amino acid sequences.
- 3.2 Ecological significance of molecular variations.
- 3.3 Emergence of Non-Darwinism-Neutral hypothesis.
4. Genetics of Quantitative traits in populations 10
- 4.1 Analysis of quantitative traits.
- 4.2 Quantitative traits and natural selection.
- 4.3 Estimation of heritability.
- 4.4 Genotype-environment interactions.
- 4.5 Inbreeding depression and heterosis.
- 4.6 Molecular analysis of quantitative traits.
- 4.7 Phenotypic plasticity.

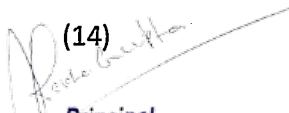
Unit IV

1. Genetics of speciations 10
- 1.1 Phylogenetic and biological concept of species.
- 1.2 Patterns and mechanisms of reproductive isolation.
- 1.3 Modes of speciation (allopatric, sympatric, parapatric & peripatric).
- 2 Molecular Evolution 10
- 2.1 Gene evolution.
- 2.2 Evolution of gene families, molecular drive.
- 2.3 Assessment of molecular drive.
- 2.4 Micro-and macro-evolution.
3. Molecular phylogenetics 12
- 3.1 Construction of phylogenetic trees.
- 3.2 Phylogenetic inference-distance methods, parsimony methods, maximum likelihood method.
- 3.3 Immunological techniques.
- 3.4 Amino acid sequence and phylogeny.
- 3.5 Nucleic acid phylogeny-DNA-DNA hybridizations, restriction enzyme sites, nucleotide sequence comparisons and homologies.
- 3.6 Molecular clocks.

Recommended Books

1. Batschelet, E.; Introduction to Mathematics for Life Scientists Springer, Verlag, Berlin.
2. Dobzhansky, T., Alaya, F.J., Stebbins, G.L., Valentine, J.M., Genetics and Origin of Species, Surjeet Publication, Delhi.


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3. Futuyamma, D.J., Evolutionary Biology, Suiñuauer Associates, Inc., Massachusetts, U.S.A.
4. Green, R.H.: Sampling Design and Statistical Methods for Environmental Biologists, John Wiley & Sons, New York.
5. Hart, D.L., A Primer of Population Genetics, Suiñuauer Associates, Inc., Massachusetts, U.S.A.
6. Jha, A.P. Genes and Evolution, John Publication, New Delhi.
7. Jorgenson, S.E.: Fundamentals of Ecological Modeling, Elseiver Press, New York.
8. King, M., Species Evolution: The Role of ChromosomalCharrge Cambridge University Press, Cambridge.
9. Lendern, D., Modelling in Behavioural Ecology, Chapman and Hall, London, U.K.
10. Merral,D.J., Holt, R. Evolution and Genetic, Richart and Winston, Inc.
11. Murray, J.D., Mathematical Biology, Springer-Verlag, Berlin.
12. Smith, J.M., Evolutionary Genetics, Oxford; University Press, New York.
13. Snedecor, H.W. and Cochran, W.G., Statistical Methods. Affiliated East-West Press, New Delhi.
14. Sokal, R.R. and Rolf, F.J.: Biometry; Freeman, San Francisco.
15. Strickberger, M.W., Evolution, Jones & Bartlett Publishers, Boston, London.
16. Swartzman, G.L. and Kaluzny, S.P.O.: Ecological Simulation Primer, MacMillan, New York.

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PRACTICAL EXERCISES

I. **Biosystematics and Taxonomy:**

1. Identification, Classification and study of the animals from major invertebrate group (Protozoa to Hemichordate including minor phyla) using museum specimens, microscopic slides, models or charts or photographs.

2. Problems based on Shannon weiner index, Dominance index. Estimation of population density of given sample by Mark recognition recapture method. Determination of population density by quadrat method.

II **Anatomy:**

a. **Major:**

1. **Leech:** Reproductive, excretory, nervous and haemocoelomic systems.
2. **Crab:** Nervous system.
3. **Scorpion:** Nervous and reproductive systems.
4. **Mollusca:** General anatomy and Nervous systems of *Patella*, *Lamellidens*, *Mytilus*, *Sepia* and *Aplysia*.

b. **Minor:**

5. C.S. of arm of Starfish.
6. General anatomy of Holothurians.
7. Aristotle's lantern of Sea urchin.

III. **Museum Specimens:** Identification, classification and distinguishing features of important representatives from various groups (Protozoa to Hemichordata).

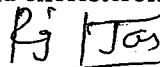
IV. **Study of Permanent Preparations (Protozoa to Hemichordata):**

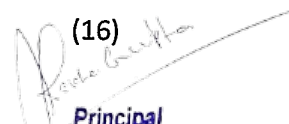
Amoeba, *Entamoeba*, *Polystomella*, *Actinophryx*, *Euglena*, *Noctiluca*, *Volvox* colony, *Trypanosoma*, *Giardia*, *Opalina*, *Nyciotherus*, *Balantidium*, *Vorticella*, *Monocystis*, *Plasmodium*, *Sycon* T.S. and L.S., Gemmule, *Obelia* colony, *Obelia* medusa, *Aurelia* tentaculocytes, T.S. *Fasciola hepatica* section through various regions of the body, *Hirundinaria* body sections through various regions, *Daphnia*, *Cypris*, *Cyclops*, T.S. *Peripatus*.

Larva: *Aurelia*-planula, *Redia*, *Cercaria*, *Metacercaria*, *Onchosphere*, *Cysticercus*, *Trochophore*, *Nauplius*, *Zoea*, *Mysis*, *Megalopa*, *Phyllosoma*, *Veliger*, *Glochidium*, *Bipinnaria*, *Ophiopluteus*, *Echinopluteus*, *Auricularia*, *Tornaria*.

V. **Biological Chemistry:**

- (i) Verification of Beer-Lambert's Law.
- (ii) Quantitative estimation of the following in various tissues:
 - a) Carbohydrates: Glycogen, glucose.
 - b) Proteins: Total proteins - Lowry *et al* method
 - c) Lipids: Phospholipids and cholesterol.


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- d) Nucleic acid: DNA and RNA.
e) Enzymes: Acid and alkaline phosphatases.


VI. Physiology:

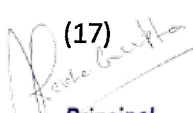
- (i) Study of the following with the help of Computer Assisted Learning (CAL) (please see E-pharm programme).
- A. The effect of K^+ , Ca^{++} acetylcholine and epinephrine on the isolated heart of frog* and conclude your data with the graphic representation Computer Assisted Learning (CAL) be included.
- B. The effect of various doses of acetylcholine and Nor-epinephrine on blood pressure, heart rate and respiratory rate of the rabbit.
- C. The effects of Atropine, Epinephrine, Ephedrine and Eserine on Rabbit's eyes. Other such exercises can be framed from the E-Pharm software.
- (ii) Determination of blood pressure, pulse rate, heart beat and respiration rate.
- (iii) Photometric determination of hemoglobin in blood sample.
- (iv) Determine of MCV, MCH, MCHC and colour index of the given sample of blood.
- (v) Demonstration of the following in blood: Clotting time, erythrocyte sedimentation rate, haemolysis and crenation.
- (vi) Determination of the urea in urine/blood.
- (vii) Determination of the glucose in urine.
- (viii) Tests of digestive enzymes in different parts of the alimentary canal.

Note : * indicates use of Computer soft wares.

VII. Cell & Molecular Biology & Biotechnology:

- (i) Squash and smear preparations of testis of cockroach and grasshopper using aceto-orcein, Fuelgen and Giemsa stains.
- (ii) Study of mitosis in onion root tip.
- (iii) Study of giant chromosomes in the salivary gland of Chironomus or Drosophila larva.
- (iv) Vital and supravital staining (with Neutral Red and Janus Green B) of cells of the testis of any insect or mammal to study the mitochondria.
- (v) Chromosome study in cells of the testis of an insect / mammal / cells of the bone marrow of a mammal.
- (vi) Paper chromatography: Unidimensional chromatography, using amino acids from purified samples and biological materials (Ascending and Descending).
- (vii) Electrophoresis: Paper/Horizontal/Vertical –Proteins/DNA/RNA.
- (viii) Study of prepared microscopic slides, including those showing various cell types, mitosis, meiosis and giant chromosomes.


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Note: It is compulsory to submit prepared slides from each exercise for examination.

VIII. Population Genetics:

- (i) Numerical problem based on Hardy Weimberg's law, calculation of allelic frequencies, inbreeding genotypic frequencies and estimation of heritability,
- (ii) Problems based on syllabus.

IX. Biostatistics:

- (i) Preparation of frequency tables and graphs/line diagrams/bardiagrams/histogram/Pie charts.
- (ii) Exercises on Arithmetic mean, Harmonic mean Geometric mean, Median, Mode (Direct, short-cut and step-deviation).
- (iii) Calculation of standard deviation, variance and standard error of mean.
- (iv) Calculation of probability and significance between means using Students t-test and Chi-square test.
- (v) Plotting the slope of a line on a graph; calculations of the slope of a line, coefficient correlation and regression.

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PRACTICALS

Scheme of Practical Examination

Total Marks-200

Total Duration: 2 days

(5 hrs. per day)

I Day (I, II & III Papers)

Time: 5 hrs.

Max Marks: 100 Marks

1. Biosystematics & Taxonomy	10
2. Anatomy	
a. Major	16
b. Minor	8
3. Cell & Molecular Biology and Biotechnology	12
4. Spotting No. 1 – 8	24
5. Record	10
6. Viva-voce	10

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7. Seminar & Submission of slides/ Tour Report

5+5

Total = 100

II Day (IV, V & VI Papers)

Time: 5 hrs.

Max Marks: 100

Marks

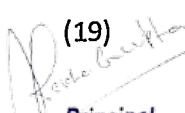
1. Gen. Physiology	20
2. Biochemistry	20
3. Biostatistics	10
4. Population Genetics	5
5. Spotting (1 to 5)	15
6. Record	10
7. Viva-voce	10
8. Seminar	10

Total = 100

Note:

1. With reference to anatomy (dissection, black papering and labelling) and type study candidates must be well versed in the study of various systems.
2. With reference to permanent preparations and microscopic slides, the exercise may be substituted with diagrams/photographs/models/charts etc.
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparations would be as per the syllabus as well as available through collection and culture methods.
6. It should be ensured that animals used in the practical exercise are not covered under the Wildlife Act 1972 and amendments made subsequently.
7. There are unlimited amounts of alternative practicals that can be carried out using observational and other works in the field. Field work also may be encouraged for the students to recognize their social and environmental responsibility. Non-invasive and non-harmful practical exercises for the study of anatomy, Physiology, Ethology, Epidemiology and Ecology may be designed.


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SYLLABUS

M.Sc.

ZOOLOGY

(ANNUAL SCHEME)

M.Sc. (Final) Examination 2022-2023

Rg Jain

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UNIVERSITY OF RAJASTHAN
UGC CURRICULUM FOR POSTGRADUATES

M.Sc. Zoology Final (Annual Scheme)

3 Hours Duration		100 Marks
Paper I	Biology of Chordates	(each paper)
Paper II	Environmental Biology and Ethology	
Paper III	Genes and Differentiation	
Paper IV	Tools and techniques in Biology	
Paper V	Special Paper	
Paper VI	Special Paper	
	Laboratory Exercises	
	Demonstration and Tutorials	

SEMINAR

Note: The theory paper of M.Sc. Final (Zoology) will have the following pattern.

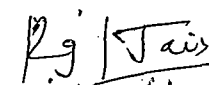
Question paper will have 5 (five) questions in all having equal marks.

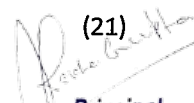
- (i) Question number 1 will be compulsory and will have 10 very short answer question of 2 mark each.
- (ii) Question numbers 2 and 3 will consist of only short answer type questions with 4 subdivisions of 5 marks each. There will be internal choice, in these questions.
- (iii) Question numbers 4 and 5 will be long answer type questions with internal choice.

PAPER I: BIOLOGY OF CHORDATES

Duration: 3 Hours **Max. Marks – 100** **Periods: 70**

1. Origin and outline classification of the chordates. 3
2. Interrelationships of Hemichordata, Urochordata and Cephalochordata and their relations with other deuterostomes. 5
3. Life histories of sessile and pelagic tunicates, *Ascidia*, *Herdmania*, *Pyrosoma*, *Salpa*, *Doliolum* and *Oikopleura*. 8
4. Neoteny 4
5. Origin, evolution and adaptive radiation of Chordates. 20
- 5.1 Geological time-scale and fossils.



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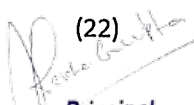
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- 5.2 Origin, evolution and general characters of Agnatha (Ostracoderm and Cyclostomes).
- 5.3 The early Gnathostomes (Placoderms).
- 5.4 A general account of the Elasmobranchii, Holocephali, Dipnoi and Crosspterygii.
- 5.5 Adaptive radiation in bony fishes.
- 5.6 Origin, evolution and adaptive radiation of Amphibia.
- 5.7 Origin and evolution of Reptiles. The conquest of land; Seymouria and related forms; Cotylosauria, basic types and outline classification of reptiles.
- 5.8 Dinosaurs.
- 5.9 Living Reptiles: a brief account of Rhynchocephalia. Chelonia, Crocodilia and Squamata.
- 5.10 Origin and evolution of Birds.
- 5.11 Origin of flight: Flight adaptations.
- 5.12 Origin of Mammals.
- 5.13 Primitive Mammals (Prototheria and Metatheria).
- 5.14 A general survey of the main radiations in eutherian, excluding detailed reference to individual orders.
- 5.15 Evolution of man: Relationship of man with other primates, fossil record of man's ancestry.
6. Organogenesis 10
- 6.1 Morphogenetic processes in epithelia and mesenchyme, organ formation.
- 6.2 Morphogenesis of the brain; neural crest cells and their accessory organs.
- 6.3 Development of the eye, heart and alimentary canal with accessory organs.
7. Embryonic adaptations 10
- 7.1 Evolution of the cleidoic egg, its structural and physiological adaptations.
- 7.2 Development and physiology of extra-embryonic membranes in amniotes.
- 7.3 Evolution of viviparity.
- 7.4 Development, types and physiology of the mammalian placenta.
8. Metamorphosis in Amphibia 5
- 8.1 Structural and physiological changes during metamorphosis.
- 8.2 Endocrine control of metamorphosis.
9. Regeneration 5
- 9.1 Types of regeneration (physiological, reparative and compensatory hypertrophy) regenerative ability in chordates.
- 9.2 Morphological and histological process in amphibian limb regeneration.
- 9.3 Origin of cells for regenerations and differentiation.

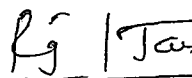
Recommended Books

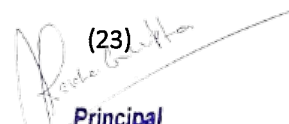
1. Alexander, R.M. : The chordata, Cambridge University Press, London.


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2. Andrevos, S.M., Miles, R.S., Walker, A.D. : Problems in Vertebrate Evolution, academic Press, New York.
3. Andrew, S.M. : Problems in. Vertebrate Evolution, Academic Press, New York.
4. Barbiur T. Hongton : Reptiles and Amphibians : Their Habitats and Adaptations, Miffin Co, New York.
5. Barrington, E.J.W. ; The Biology of Hemichordata and Protochordata, Olter and Boyd, Edinbrough.
6. Bourne, G.H. : The Structure Functions of Nervous Tissues Academic Press; New York.
7. Carter, G.S.: Structure and Habit in Vertebrate Evolution Sedwick and Jackron, London.
8. Clark, W.K., History of Primates, University of Chicago Press, Chicago.
9. Colbert, E.H. : Evolution of the Vertebrates, John Wiley & Sons, Inc., New York.
10. DeVeer, S.G. : Embryos and Ancestors, Claredon Press, Oxford.
11. Eccles, J.C.: The understanding of the Brain, McGraw Hill Company, New York.
12. Joysey, K.A. and Kemp, T.S. : Evolution, Oliver and Boyd, Edinbrough.
13. Kent, C.G. Comparative Anatomy of Vertebrates.
14. Kingsley, J.S.: Outlines of Comparative Anatomy of Vertebrates Central Book Depot, Allahabad.
15. Lovtrup, S. : The Phylogeny of Vertibrate, John Wiley & Sons, London.
16. Malcom Jollie: Chordata Morphology, East-West Press Pvt. Ltd., New Delhi.
17. Messers H.M An Inrductin of Vertebrate Anatomy.
18. Milton, H. : Analysis of Vertebrate Structure, John Wiley and Sons Inc., New York.
19. Monielli, A.R.: The chordates, Cambridge University Press, London.
20. Montagna, W. : Comparative Anatomy, John Wiley & Sons, Inc., New York.
21. Romer, A.S. : Vertebrate Body, W.B. Saunders Company, Philadelphia.
22. Romer, A.S. : Vertebrate Palentology, University of Chicago Press, Chicago.
23. Sedgwick, A.A.: Text Book of Zoology, Vol.-II.
24. Smith, H.S.: Evolution of Chordata Structure, Hold Rinehart and Winstoin, Inc., New York.
25. Tansley, K.: Vision in Vertebrate, Chapman and Hall Ltd., London.
26. Torrey, T.W.: Morphogenesis of Vertebrates, John Wiley & Sons, New York.
27. Walters, H.E. and Sayles, L.D.: Biology of Vertebrates, Macmillan and Co., New York.
28. Waterman, A.J. : Chordata Structure and Function, MacMillan Co., New York.


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29. Weichert, C.K. and Presch, W. Elements of Cordate Anatomy, MacGraw Hill Book Company, New York.
30. Young J.Z. : Life of Vertebrates, The Oxford University Press, London.

M.Sc. FINAL (ZOOLOGY)

PAPER II : ENVIRONMENTAL BIOLOGY AND ETHOLOGY

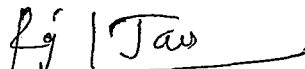
Duration : 3 Hours

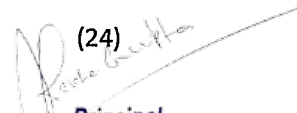
Max. Marks – 100

Periods : 70

Unit I - Environmental Biology

1. Interactions between environment and biota 5
 - 1.1 Concept of habitat and ecological niches
 - 1.2 Limiting factors.
 - 1.3 Energy flow, food chain, food web and trophic levels, ecological pyramids.
 - 1.4 Biotic community: Concept, structure, dominance, fluctuation and succession.
 - 1.5 Various nutrient cycles in nature.
2. Ecosystem dynamics and management 6
 - 2.1 Complexity, stability and homeostasis of ecosystems.
 - 2.2 Functional aspects and productivity concept.
 - 2.3 Niche, ecotone and overlapping of niches.
 - 2.4 Character displacement, speciation and extinction.
3. Environmental impact assessment 5
 - 3.1 Environmental pollution.
 - 3.2 Population and impact of urbanization.
4. Principles of conservation: Conservation strategies 5
 - 4.1 Various natural resources.
 - 4.2 Present status and future needs.
 - 4.3 Management.
 - 4.4 Biodiversity of India and Rajasthan and their management.
5. Prospects and strategies for sustainable communities. 2
6. Organisation and dynamics of ecological communities 7
 - 6.1 The habitat approach.
 - 6.2 A detailed knowledge of communities of fresh water, marine, terrestrial and estuarine areas with respect to
 - 6.2.1 Extent
 - 6.2.2 Zonation


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6.2.3 Environment

6.2.4 Biota

6.2.5 Adaptations

7. The ecological outlook

5

7.1 Applied human ecology

7.2 Radiation (electromagnetic and ionizing) and environment

7.3 Climatic changes (*El Nino* and *La Nina*)

7.4 Space ecology

7.5 Human future

Unit II: Ethology

1. Introduction to Ethology

1.1 Branches and significance of Ethology: Ethophysiology, Ethoendocrinology, Neuroethology, Human ethology, Behavioural genetics, sociobiology.

1.2 Milestones of Ethology: Konrad Lorenz, Niko Tinbergen, Karl Von Frisch, BF Skinner, HF Harlow.

1.3 Proximate and ultimate mechanisms of ethology.

2. Concepts of Ethology:

2.1 Motivation and Innate behaviour (Fixed action pattern).

2.2 Sign stimulus, super normal stimulus.

2.3 Action specific energy and Innate releasing mechanism.

2.4 Difference between learned and Innate behaviours.

3. Nervous system and Behaviour

3.1 Mammalian brain structure and behaviour.

3.2 Hypothalamus and Innate behaviour.

3.3 Behavioural endocrinology including effect of drugs.

3.4 Orientation - taxis and kinesis, bird migration and navigation

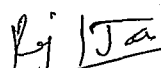
3.5 Biological clocks, Chronobiology.

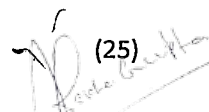
4. Learning and Imprinting

4.1 Introduction and definitions.

4.2 Habituation; Conditioning.

4.3 Trial and error; Imprinting.


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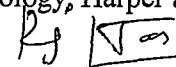

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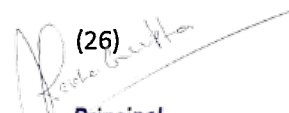


- 4.4 Neural mechanism of learning .
- 4.5 Birds song learning behavior in the context of Tinbergen's 4 aims.
- 5. Sociobiology**
 - 5.1 Introduction- definition, WO Wilson, Richard Dawkins, WD Hamilton.
 - 5.2 Units of sociobiology,
 - 5.3 Hamilton's theory and Altruism, cooperation, reciprocation and Eusociality,
 - 5.4 Properties, advantages of a social group, Social organisation in primates.
- 6. Social Behaviour**
 - 6.1 Parental care- Types , Parent offspring conflict.
 - 6.2 Courtship and mating.
 - 6.3 Aggression and territory
 - 6.4 Evolution of social systems.
- 7. Communication in animals**
 - 7.1 Auditory, Echolocation, Infra- and ultra- sounds.
 - 7.2 Tactile, Visual ,
 - 7.3 Pheromones- vertebrates and invertebrates
 - 7.4 Language of honey bees-circle and waggle dance.
- 8. Human Behaviour-**
 - 8.1 Desmond Morris, Sarah Hrdy.
 - 8.2 Sign stimulus, Imprinting.
 - 8.3 Kinship , Aggression.
 - 8.4 Pheromones.

Recommended Books (Environmental Biology)

1. Begon, M. Harper, J.I. and Townsend, C.R.: Ecology, Individuals, Populations and Communities. Blackwell Science, Oxford University Press, Oxford.
2. Cherrett, J.M.: Ecological Concepts, Blackwell Scientific Publication, Oxford, U.K.
3. Elseth, B.D. and Baumgartner, K.M.: Population Biology, Van Nostrand Col, New York.
4. Iorgenson, S.E.: Fundamentals of Ecological Modeling, Elsevies.
5. Krebs, C.J.: Ecological Methodology, Harper and Row, New York.


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6. Krebs, C.J.: Ecology, Harper and Row, New York.
7. Ludwig, J .A. and Reynolds, J.F.: Statistical Ecology, John Wiley & Sons, New York.
8. Pianka, E.R. : Evolutionary Ecology, Harper and Row, New York.
9. Recklefs, R.E. and Miller, G. Ecology, W.H. Freeman and Company, New York.
10. Swartzmen, G.L. and Kaluzny, S.P.: Ecological Stimulation Primer, Macmillan, New York.

Ethology

1. Alcock, J. : Animal Behaviour: An Evolutionary Approach, Sinauer Assoc. Sunderland Mass, USA.
2. Bradbury, J.W. and Vehren camp. S.L.: Principles of Animal communications, Sinauer Assoc., Sunderland Mass, USA.
3. Clutton-Brock, T.H.: The Evolution of Parental Care Princeton Univ. Press, Princeton, USA.
4. Eobi-Eibesfeldt, Holt, I: Ethology, the Biology of Behaviour, Rinehart and Winston, New York.
5. Gould. J.L. : Mechanism of Evolution of Behaviour.
6. Hauser, M. : The Evolution of Communication, MIT Press, Cambridge, Mass, USA.
7. Hinde R.A. : Animal Behaviour: A Synthesis of Ethology and Comparative Psychology, McGraw Hill Company, New York.
8. Krebs, J.R. and Davis, N.N. : Behavioural Ecology, Blackwell Oxford, U.K.
9. Rof, D.A. : The Evolution of Life Histories, Chapman and Hall, London, U.K.
10. Wilson, E.O. : Sociobiology : The New Synthesis, Harward University Press, Cambridge, Mass, USA.

PAPER III: GENES AND DIFFERENTIATION

Duration : 3 Hours

Max. Marks – 100

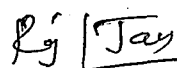
Periods : 70

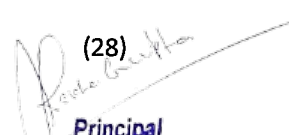
- | | | |
|----|--|---|
| 1. | Introduction to animal development. | 7 |
| | 1.1 Problems of developmental biology. | |
| | 1.2 Developmental patterns in metazoans. | |
| | 1.3 Development in unicellular eukaryotes. | |
| 2. | Creating multicellularity | 5 |
| | 2.1 Cleavage types. | |
| | 2.2 Comparative account of gastrulation. | |
| 3. | Early Vertebrate development | 6 |
| | 3.1 Neurulation and ectoderm. | |
| | 3.2 Mesoderm and endoderm. | |
| 4. | Cytoplasmic determinants and autonomous cell specification | 8 |

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4.1	Cell commitment and differentiation.	
4.2	Cell specifications, in nematodes.	
4.3	Germ cell determinants.	
4.4	Germ cell migration.	
4.5	Progressive cell-cell interaction and cell specification fate.	
5.	Body Axes	5
5.1	Establishment of body axes in mammals and birds.	
5.2	Proximate tissue interactions.	
5.3	Genetics of axis specifications in drosophila.	
6.	Homeobox concept in different phylogenetic groups.	4
7.	Tetrapod limb development.	3
8.	Hormones as mediators of development.	6
8.1	Amphibian metamorphosis.	
8.2	Insect metamorphosis.	
8.3	Ovarian luteinization and mammary gland differentiation.	
9.	Environmental evolution and animal development	8
9.1	Environmental cues and effects.	
9.2	Malformations and disruptions.	
9.3	Changing evolution through development modularity.	
9.4	Developmental constraints.	
9.5	Creating new cell types-basic evolutionary mystery.	
10.	Biology of sex determination	6
10.1	Chromosomal sex determination - Mammals and Drosophila.	
10.2	Testis determination genes.	
10.3	Ovarian development.	
10.4	Secondary sex determination in mammals.	
10.5	Environmental sex determination.	
11.	Cell diversification in early embryo	6
11.1	<i>Xenopus</i> blastomeres.	
11.2	Morphogen gradients.	
11.3	Totipotency & Pleuripotency.	
11.4	Embryonic stem cells.	
11.5	Renewal by stem cells-epiderms.	
11.6	Skeletal muscle regeneration.	
11.7	Connective tissue cell family.	
12.	Hemopoietic stem cells	6


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- 12.1 Stern cell disorders.
- 12.2 Blood cell formation.
- 12.3 Bone marrow transplants.
- 12.4 Gene therapy.

Recommended Books

- 1. Development Biology S.F. Gilbert, Sinauer Associates Inc., Massachusetts.
- 2. Ethyan Bier, The Cold Spring: Cold Spring Harbour Laboratory Press, New York.

PAPER IV : TOOLS AND TECHNIQUES IN BIOLOGY


Duration : 3 Hours

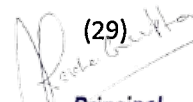
Max. Marks – 100

Periods : 70

Section A : Tools

- 1. Principles and application of 10
 - 1.1 Light Microscopy and micrometry.
 - 1.2 Phase contrast microscopy.
 - 1.3 Interference microscopy.
 - 1.4 Polarized microscopy.
 - 1.5 Fluorescence & epifluorescence microscopy.
 - 1.6 Transmission electron microscopy.
 - 1.7 Scanning electron microscopy.
 - 1.8 Confocal scanning and deconvolution microscopy.
 - 1.9 Atomic Force Microscopy.
- 2. Principles and application of 10
 - 2.1 Ultracentrifugation: Differential and density gradient.
 - 2.2 Electrophoresis: Various media for electrophoresis and various types such as paper, agarose, PAGE, submerged DNA electrophoresis, Pulse Chase electrophoresis, iso-electrofocussing points and capillary electrophoresis.
 - 2.3 Chromatography: Various types such as paper, TLC, GLC, HPLC, Ion-exchange and Affinity chromatography.
 - 2.4 Freeze techniques; freeze-drying, freeze substitution, freeze fracture and freeze itch.
 - 2.5 X-Diffraction.
 - 2.6 Lambert-Beers Law and colorimeter & spectrophotometer -fluorescence, U.V., N.M.R., O.R.D./CD, ESR, IR, Atomic absorption and plasma emission.
 - 2.7 Flow cytometer / Fluorescence activated cell sorter.
- 3. Principles and application of radiation techniques in Biology 10
 - 3.1 Radiation dosimetry.
 - 3.2 Radioisotopes and half life of isotopes.



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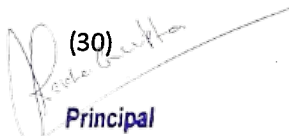
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- 3.3 Tracer techniques in biology.
 3.4 Cerenkov radiation.
 3.5 Liquid scintillation counter.
 3.6 G.M. Counter
 3.7 Autoradiography.

Section B : Techniques

- | | |
|---|---|
| 1. Assay | 2 |
| 1.1 Definition and criteria of reliability. | |
| 1.2 Chemical assays. | |
| 1.3 Biological assays <i>in vivo</i> and <i>in vitro</i> assays. | |
| 2. Principles of cytological and cytochemical techniques | 5 |
| 2.1 Fixation, chemical basis of fixation by formaldehyde, gluteraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone. | |
| 2.2 Chemical basis of staining of carbohydrates, proteins, lipids and nucleic acids. | |
| 3. Principles and techniques of | 8 |
| 3.1 Nucleic acid hybridization and cot curve. | |
| 3.2 Sequencing of proteins and nucleic acids. | |
| 3.3 Blotting techniques (Southern, Northern and Western). | |
| 3.4 Dot and Slot blots. | |
| 3.5 Biotinylated DNA probe. | |
| 3.6 Polymerase chain reaction (PCR). | |
| 3.7 Screening of genomic and cDNA libraries. | |
| 4. Principles and techniques of genetic engineering. | 8 |
| 4.1 Basic techniques. | |
| 4.2 Cutting and joining of DNA molecules. | |
| 4.3 Changing genes: Site directed mutagenesis. | |
| 4.4 Analysis of DNA sequences. | |
| 4.5 Cloning strategies gene library and cDNA | |
| 4.6 DNA transformation techniques and their application in agriculture, health, medicine and industry. | |
| 4.7 Introducing genes in animal cells. | |
| 4.8 Application of recombinant DNA technology. | |
| (a) Recombination, selection and screening. | |
| (b) Nucleic acid probes and their application. | |
| (c) Impact of recombinant technology. | |
| 4.9 Hybridoma technology. | |
| 5. Cell Culture techniques | 4 |


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- 5.1 Design and functioning of tissue culture laboratory.
 5.2 Cell proliferation measurements.
 5.3 Cell viability testing.
 5.4 Culture media preparation and cell harvesting methods.

6. Cryotechniques

3

- 6.1 Cryopreservations for microscopy.
 6.2 Cryotechniques for microscopy.

Recommended Books

1. Johns, R.W. Masters : Animal Cell Culture. A Practical Approach. IRL, Press.
2. Robert Brown : Introduction to Instrumental Analysis, McGraw Hill, International Education.
3. Wilson, K., Goulding, K.H. : A Biology Guide to Principles and Techniques of Practical Biochemistry, ELBS Edition.

M.Sc. (Final) Zoology General Papers

PRACTICALS

General Papers:

I. Anatomy

(a) Major

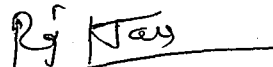
- (i) Cranial nerves of *Wallago attu*.
 (ii) Cervical nerves of Rat.
 (iii) Reproductive organs of Rat.

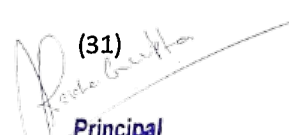
(b) Minor

- (i) Accessory respiratory organs of *Heteropneustes fossilis*.
 (ii) Labrinth organs of *Anabas testudens*.

II. Study of Museum Specimens/Models/Charts/Digital media

- Lower Chordates : Salpa: asexual and sexual stages, *Doliolum*-oozoid, *Botrylus*, *Herdmania*, *Amphioxus*.
 Pisces : *Petromyzon*, *Myxine*, *Rhinobatus*, *Pristis*, *Trygon*, *Chimaera*, *Polydon*, *Acipenser*, *Amia*, *Lepidosteus*, *Protopterus*, *Lepidosiren*, *Neoceratodus*, *Notopterus*, *Exocoetus*, *Echeneis*, *Pleuronectes*, *Mestacembelus*, *Diodon*, *Tetradon*, *Ostracion*, *Lophis*, *Syngnathus*, *Hippocampus*, *Anguilla*, *Labeo*, *Ophiocephalus*.
 Amphibia : *Ichthyophis*, *Necturus*, *Proteus*, *Ambystoma*, *Axolotal*, *Salamender*, *Siren*, *Alytes*, *Pipa*, *Bufo*, *Hyla*, *Rhacophorus*, *Rana*.


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- Reptilia : *Testudo, Chelone, Sphenodon, Calotes, Hemidactylus, Phrynosoma, Draco, Varanus, Chameleon, Cobra, Hydrophis, Rattle snake, Viper, Pit, Viper, Krait, Eryx, Gavialis.*
- Aves : *Archaeopteryx. Tailor Bird, Indian Koel, Jungle fowl, Peacock, Columba, Parrot, Wood Pecker, Owl, Flamingo, Great Indian Bustard.*
- Mammals : *Ornithorhynchus, Echidna, Marcropus, Hedgehog, Manis, Loris, Bat, Mongoose, Hystrix, Otter.*

III. Study of Microscopic slides

- Lower Chordates : *Herdmania* spicules, *Herdmania* tadpole larva, *Amphioxus*- T.S. passing through oral hood, pharynx, testes and ovary, intestine and caudal regions. Ammocoete larva (whole mount).
- Pisces : Placoid scale, cycloid scale, ctenoid scale.
- Amphibia : V.S. skin of frog. T.S. passing through stomach, duodenum, intestine, liver, pancreas, lung, kidney, testis, ovary, spinal cord, bone.
- Reptilia : V.S. skin of lizard.
- Aves : V.S. skin of bird, contour feather, down feather.
- Mammals : V.S. skin of mammal. T. S. passing through stomach, intestine, liver, pancreas, kidney, testes, ovary, thyroid gland, adrenal gland, lung, bone and spinal cords L.S./T.S. of pituitary gland, T. S. of simple cuboidal epithelium, simple columnar epithelium, simple squamous epithelium, adipose tissue and reticular tissues, Blood smear – identification of various cell types.

IV. Comparative Osteology (Models/Charts/Diagrams):

Comparative account of axial and appendicular skeletons of Frog, Varanus, Fowl and Rabbit (both articulated and disarticulated with the help of models, artificial skeleton and bones).

V. Tools and Techniques

- (i) Operations of various types of microscopes.
- (ii) Use of Phase-contrast microscope.
- (iii) Use of Fluorescence microscope and demonstration of nucleic acid by acridine orange or ethidium bromide.
- (iv) Preparation of tissue for TEM.
- (v) Tissue homogenization and fractionation by differential centrifugation for isolation of mitochondria, nucleic acids and cytosol and use of marker enzymes for assessment of the purity of the components.
- (vi) Demonstration of GLC, atomic absorption spectrophotometer, CASA etc.
- (vii) Standardisation of oculometer and measurements of tubular diameter cell heights, nuclear diameters, etc.

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VI. Environment Biology

- (i) Analysis of pond / stagnant water for : pH, Acidity, Alkalinity, Dissolved oxygen, CO₂, Salinity, Phosphates, COD and BOD.
- (ii) Map (World/India/Rajasthan) to localize biodiversity, Major rivers, estuaries, oceans.
- (iii) Collection, isolation and identification of Planktons. (Phyto- and Zoo- planktons).

VII. Ethology

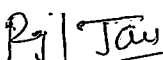
- (iv) Study of the food preference in Tribolium or any other grain/ pulse pest).
- (v) Study of communication in Earthworm by Pheromones .
- (vi) Effect of toxicants on movement of Fish .
- (vii) Study Learning by Trial and Error in Rat using Hebb- William Maze .
- (viii) Imprinting study using Chick.
- (ix) Listing of all the animals and recording of behaviour in Zoo/ Sanctuary/National Park.

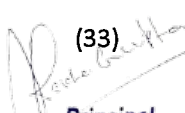
VIII Development Biology

- (i) Frog : Egg, Cleavage (2-, 4-, & 8-celled), Morula, Blastula (including Yolk Plug stage) and neurala stages (Slides as well as preserved materials)
- (ii) Chick: 16 hrs, 21hrs, 24 hrs, 28hrs, 33hrs, 38 hrs, 48hrs, 70hrs and 96 hrs.
- (iii) Chick development: Appearance of eyes, hair, beak and limbs.
- (iv) Window making: To study development of chick and blastoderm mounting.

Notes:

1. With reference to anatomy (dissections) and type study candidates must be well versed in the study of various systems with the help of charts/models/CD-ROMs, multimedia computer based simulations including computer assisted learning (CAL) and other software.
2. With reference to permanent preparations and microscopic slides, in case of non-availability, **the exercise should be substituted with diagrams / photographs / models / charts etc.**
3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
6. **Slides to be submitted in the exercises during the examination.**
7. **It should be ensured that animals used in the practical exercise are not covered under the Wildlife Act 1972 and amendments made subsequently.**


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Scheme of Practical Examination

Duration: 5 hrs.

Max. Marks: 100

Exercise

Marks

1. Anatomy	
a. Major	12
b. Minor	8
2. Ethology	6
3. Environmental Biology	10
4. Tools and Techniques	10
5. Development Biology	10
6. Spotting (No. 1-8)	24
7. Record + Submission of slides	5+ 5
8. Viva-voce	10

Total = 100

Special Paper for M.Sc. Zoology (Final)

Candidate can opt any one special paper out of the following:

1. Cancer Biology
2. Cell and Molecular Biology
3. Developmental Biology
4. Endocrinology
5. Entomology
6. Environmental Biology
7. Fish Biology
8. Radiation Biology
9. Reproductive Biology

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1. CANCER BIOLOGY


PAPER-V: NATURE OF CANCER

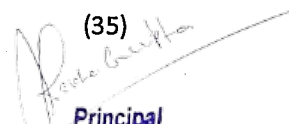
Duration : 3 Hours

Max. Marks – 100

Periods : 90

1. Introduction: Cancer as a cellular disease.
 - 1.1 Historical perspectives.
 - 1.2 Cancer causation.
 - 1.3 Cancer treatment.
 - 1.4 Death due to cancer.
2. Occurrence of cancer
 - 2.1 Present day status of cancer in India.
 - 2.2 Status of cancer occurrence in different parts of the world.
 - 2.3 Cancer of different sex and age group.
3. Tumor classification.
 - 3.1 Benign and malignant tumors.
 - 3.2 Sarcoma and carcinoma.
 - 3.3 Leukemia and lymphoma.
 - 3.4 Ascites tumors.
 - 3.5 Teratocarcinoma.
4. Etiology of cancer
 - 4.1 Staging and grading of cancer.
 - 4.2 *In vitro* cell transformation.
 - 4.3 Apoptosis.
5. Cancer cell
 - 5.1 Structural and ultrastructural profiles.
 - 5.2 Biochemical properties.
 - 5.3 Behavioural properties.
6. Genetic basis of cancer
 - 6.1 Basic concepts of cancer genetics.
 - 6.2 Relationship between cancer incidence and age.
 - 6.3 Cellular and genetic basis of cancer.
 - 6.4 Types of genetic risk factors for cancer.
 - 6.5 Chromosomal abnormalities in tumor.
 - 6.6 Heritable cancer and tumor suppressors.


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7. Cancer cell growth patterns and cell kinetics
 - 7.1 Tumor growth.
 - 7.2 Cell cycle.
 - 7.3 Cell proliferation in tumor tissue.
 - 7.4 Experimental tumors.
 - 7.5 Human tumors.
 - 7.6 Cell proliferation, prognosis and therapies.
8. Metastasis
 - 8.1 Introduction.
 - 8.2 Metastatic process.
 - 8.3 Metastatic ability of tumor cell population.
 - 8.4 Properties of metastatic cells.
 - 8.5 Genetic basis of metastasis.

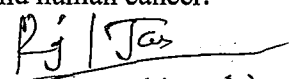
PAPER-VI: CAUSATION, PREVENTION AND CURE OF CANCER

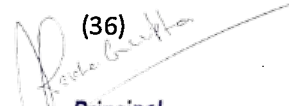
Duration : 3 Hours

Max. Marks – 100

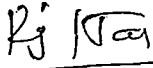
Periods : 90

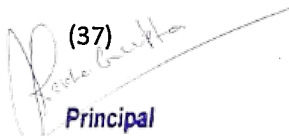
1. Introduction:
 - 1.1 Historical aspects.
 - 1.2 Environmental factors and cancer.
 - 1.2.1 Tobacco, Alcohol, diets, occupational exposures, hormones and other exposure.
 - 1.3 Specific types of cancer: Hepatocellular carcinoma, Melanoma, Breast cancer, lung cancer, gynaecological cancers, Prostate cancers, Oral cancers.
2. Causation of cancer
 - 2.1 Hereditary cancer.
 - 2.1.1 Introduction.
 - 2.1.2 Xeroderma pigmentosum.
 - 2.1.3 Fanconis anaemia.
 - 2.1.4 Bloom syndrome.
 - 2.1.5 Ataxia telangiectasia.
 - 2.1.6 Retinoblastoma.
 - 2.2 Virus and cancer.
 - 2.2.1 Introduction.
 - 2.2.2 Viruses and oncogenes.
 - 2.2.3 Historical perspectives.
 - 2.2.4 Tumor virus and human cancer.


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- 2.2.5 Retrovirus.
- 2.2.6 DNA tumor viruses.
- 2.3 Chemical carcinogenesis.
 - 2.3.1 Introduction.
 - 2.3.2 Biological characteristics of chemical carcinogenesis.
 - 2.3.3 Initiation, promotion and progression of carcinogenesis.
 - 2.3.4 Assay methods for chemical carcinogens.
 - 2.3.5 Chemical carcinogens in human cancer causation.
- 2.4 Radiation carcinogenesis
 - 2.4.1 Cell transformation.
 - 2.4.2 Mechanism of radiation cell transformation.
 - 2.4.3 Radiation carcinogenesis in animals.
 - 2.4.4 Human data on radiation carcinogenesis.
- 2.5 Hormones and cancer.
 - 2.5.1 Introduction.
 - 2.5.2 Hormone production by tumors.
 - 2.5.3 Hormone and cancer causation.
 - 2.5.4 Hormones and cancer treatment.
- 3. Nutrition and Cancer
 - 3.1 Cancer risks form naturally occurring carcinogens in food, food contaminants, additives.
 - 3.2 Micronutrients in diet: Protein, carbohydrate, fat, fibers.
 - 3.3 Micronutrients in diet: Mineral, salts, green yellow vegetables, fruits.
- 4. Therapy of cancer
 - 4.1 Surgical removal.
 - 4.2 Chemotherapy
 - 4.3 Radiotherapy.
 - 4.4 Immunotherapy.
 - 4.5 Hyperthermia.
 - 4.6 Management of therapies of cancer.
- 5. Prevention of cancer.
 - 5.1 Primary prevention: Education, motivation and legislation.
 - 5.2 Secondary prevention.
 - 5.2.1 Detection of precancerous and early cancerous lesions in body.
 - 5.2.2 Chemoprevention.
- 6. Oncogenes
 - 6.1 Introduction


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- 6.2 Detection of oncogenes in human cancer cells.
- 6.3 Activation of oncogenes.
- 6.4 Antioncogenes.

CANCER BIOLOGY

Duration: 5 Hours

Max. Marks – 100


Scheme of practical Examination and Distribution of the marks:

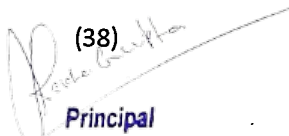
1. Preparation and comments on chromosomal aberrations, induced by caroinogenes.	15
2. Preparation and comments on micronuclei induced by carcinogens.	15
3. Microtomy and Pathological study	20
4. Identification and comments on spots (10)	20
5. Viva-Voice	10
6. Project work on Tumor induction in Laboratory mice /rat.	20
+ one project, seminar	
Grand Total	100

Note: It should be ensured that animals used in the practical exercises are not covered under the Wildlife Act 1972 and amendments made subsequently.

Recommended Books

1. Advanced Medical Radiation Dosimetry. Rajan O. Prentice-Hall of India Pvt. Ltd. New Delhi, 1992.
2. Applied Radiobiology of Radiation Protection. Granien, R., Prentice Hall, 1990.
3. Basic Radiation Biology. Pizzarello D.J., Witcofsli Lea R. L. and Febiger: Philadelphia, 1970 or Later.
4. Biological Aspects of Human Irradiation Eds. Pant, G. S. and Basu, AK. Himalaya Publishing House, Delhi, 1992.
5. Biological Assessment of occupational Exposure to Actinides. G. B. Gendes, H. Metives and J. Stathes: Nuclear Tech. Pub. Kent, 1989.
6. Biological Effects of Radiation. Coggle. J.E. : Taylor and francis Ltd., London, 1988 or Later Edition.
7. Biological Effects of Radiations. Grosel, D. S. and Hop Zvood, L.E. Academic Press, New York, 2nd Edition, 1979 or Later Edition.
8. Biological Radiation effects. Kiefer, J. Springer-Venlag, Berlin, 1989.
9. Cellular Radiobiology. Lawrence c.w. Arnold, London, 1971 or Later Edition.
10. Developmental Effects of Prenatal Irradiation. Kriegel, H.. VCH,. 1982.
11. Elements of Radiobiology, Seiwan J. Thomas, C. C. 1983.
12. Environment and Human Risks of Tritium, Gesben, G., C. M. Menaene and H. Smilts: Nuclear Tech. Pub. Kent, 1986.
13. Essential of Radiation Biology and Protection, Steve Forshie: Publisher: Delmar Cengage Learning.
14. Frontiers of Radiation Biology. Riklin, E. ed. VCH, 1990.
15. Health Effects of Low Level Radiation, Hendec. w. R. : Prentice Hall. 1984.


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16. Human Radiation Biology. Prasad, K. N., CRC Press, inc. Cleveland, Ohio, USA, 1984.
17. Introductory Biostatistics for the Health Sciences. Duncan R. C., Knapp., R. G., and Miller III, M.C., :John Wiley and Sons. Inc., New York, 1977 or Later Edition.
18. Ionizing Radiation and Life. Mosby, Avena, V: S1. Lonis. 1971 or Later Edition.
19. Low Dose Radiation Biological Bases of Risk Assessment. Baverstock, K. of Staltar, J. Taylor of Francis, 1989.
20. Low level Radiation and Living State. Huilgol. N. G. et al.: Naraza Publishing House, Community Center Panchsheel Park, New Delhi, 1993.
21. Low level Radiation Effects. Broil. AB. A fact Book: Society of Nuclear Medicine, USA, 1982.
22. Medical Radiation Biology. Dalrymple, G. V, Ganldev, M.E., Kollmorgen, G. M. and Vogel, H. J. Saunders. Philadelphia, 1973 or Later Edition.
23. Radiation and Life. Hall. E. I. : Pergamon Press, Oxford, U. K. 2nd Edition, 1987.
24. Radiation Biophysics. Prentice -Hall Engel-Wood Cliffs. Andrews, H. L.: New Jersey. 1974 or Later Edition.
25. Radiation Carcinogenesis. Upton, A. C. Ehsevices, 1986.
26. Radiation Exposure and Occupational Risks. Scheres, E., c. Streffer, K. R. Trott.: Eds. Berlin, 1990.
27. Radiobiological Consequences of Nuclear Accidents -Contamination Radioecology, Bulokav EB., V Naitel and J. B. Reitan: Radiobiology and Health.
28. Radiobiology for the Radiologist. 3rd Edition, Hall. E. L. : Harper and Row, 1990 or Later Edition.
29. Radiobiology. Fobrikant. J. I. : Year book med., Chicago, 1972 or Later Edition.
30. Radioisotope Methodology. Chase, GD. and Robinowitz, J. L. Burgess Publishing Co. Minneapolis, Minn, USA. 3rd Edition, 1967 or Later.

2. CELL AND MOLECULAR BIOLOGY

Paper - V

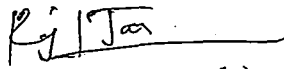
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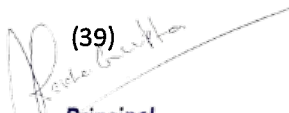
Max. Marks – 100

Periods : 90

1. Biomembranes

- 1.1 Phospholipids; as main lipid constituents.
- 1.2 Cytosolic and exoplasmic face of biomembranes.
- 1.3 Universality of biomembranes.
 - 1.3.1 Difference in phospholipid composition in two membrane leaflets.
 - 1.3.2 Intrinsic and extrinsic proteins.
 - 1.3.3 Integral and glycolipids.
 - 1.3.4 Mobility of lipids and integral proteins in biomembrane.
 - 1.3.5 Fluidity of biomembranes.
 - 1.3.6 Cell Junctions (Gap, tight and demosomes etc.)


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2. **Transport across cell membrane**

- 2.1 Diffusion of small molecules.
- 2.2 Osmosis and water channels.
- 2.3 Uniporter-catalyzed transport, Difference between uniport catalyzed transport and passive diffusion. GLUT-1 transport and its kinetics.
- 2.4 Intracellular ion environment and membrane electric potential.
- 2.5 Active transport. P-class ion pumps. F-class and V-class ion pumps and ABC super family. Plasma membrane Ca_2^+ ATPase pump. Muscle Ca_2^+ ATPase pump and Na^+/K^+ ATPase pump.
- 2.6 Cotransport by symporters and antiporters.
- 2.7 Transport across epithelia.

3. **Cytoskeleton**

3.1 Microfilaments

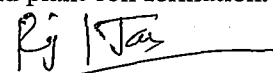
- 3.1.1 Actin cytoskeleton, G-actin and F-actin and structural and functional polarity, Cortical actin network, erythrocytic cytoskeleton and platelet cytoskeleton.
- 3.1.2 Actin bundle support projecting fingers of membrane.
- 3.1.3 Dynamics of actin assembly, Actin polymerization, Toxins effect on actin monomer, polymer equilibrium stabilization of actin filaments by actin capping protein, Movement by actin polymerization.
 - (a) Intracellular bacterial and viral movements.
 - (b) Actin polymerization at the leading edge of moving cells.
- 3.1.4 Myosin
 - (a) Structure and mechanism of movement with actin
 - (b) Conformational changes in myosin during movement.

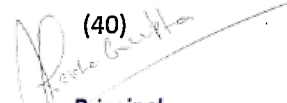
3.2 Microtubules

- 3.2.1 Microtubules structure and microtubule assembly from organizing centers.
- 3.2.2 Microtubule dynamics.
- 3.2.3 Microtubule associated proteins (MAPs) and cross-linking of microtubules.

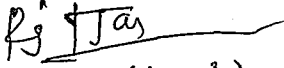
3.3 Microtubules and mitosis

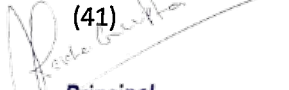
- (a) Centrosome duplication.
- (b) Kinetochores and force for poleward chromosome movement.
- (c) Organization of spindle pole and orientation of assembly.
- (d) Formation of poles and capture of chromosomes.
- (e) Kinetochores and force of poleward chromosome movement.
- (f) Astral microtubules and cytokinesis.
- (g) Microtubules and plant cell formation.


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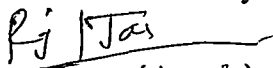
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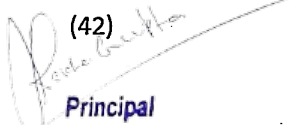
- 3.4 Kinesin and Dynein.
- 3.5 Cell movements:
- (a) Intracellular transport: Role of kinesin and dynein, microtubule tracks and intracellular membrane vesicles.
 - (b) Amoeboid movements.
 - (c) Second messengers and signal transduction pathway for coordination of migration of cells.
4. **Cilia and Flagella**
- 4.1 Structure and movements
- (a) Sliding of outer doublet.
 - (b) Dynein sliding forces in axonemes.
 - (c) Dynein and axonemal bending.
 - (d) Dynein regulatory complex.
5. **Cell-Cell Signalling**
- 5.1 Endocrine, paracrine and autocrine signaling.
- 5.2 Receptor proteins: Cell surface receptors and intracellular receptors.
- 5.3 Cell surface receptors: G-protein coupled receptors, ion channel receptors, tyrosine kinase-linked receptors and receptors with intrinsic enzymatic activity.
- 5.4 Second messenger System - cAMP and IP₃DAG.
- 5.5 MAP kinase pathways.
- 5.6 Signaling from plasma membrane to nucleus (a) CREB links cAMP signals to transcription (b) MAP kinase.
6. **Signal - Mediated transport through Nuclear Pore**
- 6.1 Nuclear pore complex
- 6.2 Nuclear exports signals and transport of cargo proteins from nucleus to cytosol.
- 6.3 Nuclear localization signals and transport of cargo proteins from cytoplasm to nucleus.
- 6.3 Nuclear localization signals and transport of cargo proteins from cytoplasm to nucleus.
7. **Cell-Cell adhesion and communication**
- 7.1 Cadherin mediated Ca₂⁺ dependent homophilic cell-cell adhesion.
- 7.2 N-CAMs mediate Ca₂⁺ independent homophilic cell-cell adhesion.
- 7.3 Cadherin containing junctions connect cells.
- 7.4 Gap junctions and connexion.
8. **Cell matrix adhesion**
- 8.1 Integrins : in cell matrix and cell-cell interaction.
- 8.2 Integrin and cell to substratum attachment.
- 8.3 Collagen basic structure and assembly.


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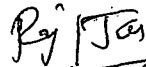
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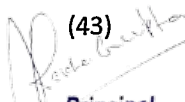
- 8.4 Non-collagen components of extracellular matrix (Laminin, fibronectin and cell surface proteoglycans)
- 8.5 Plant cell wall.
- 8.6 Auxin and cell expansion.
- 8.7 Cellulose fibril synthesis and orientation.
- 8.8 Plasmodesmata.
9. **Cell Cycle**
 - 9.1 Bacterial cell cycle (Helmstetier – Cooper or I+C+D model).
 - 9.2 Partition and cytokinesis.
 - 9.3 Eukaryotic cell cycle – G₁, S, G₂ and M phases.
 - 9.4 Cell cycle and check points.
 - 9.5 Molecular basis of cell cycle regulation.
 - (a) Cyclins and cyclin – dependent kinases.
 - (b) Regulation of CDK cyclin activity.
10. **Cancer**
 - 10.1 Tumor cells and onset of cancer.
 - 10.2 Proto-oncogenesis and tumor suppressor genes.
 - 10.3 Mutation causing loss of cell cycle.
 - 10.4 Mutations affecting genome stability.
11. **Aging: The biology of senescence**
 - 11.1 Maximum life span and life expectancy.
 - 11.2 Causes of aging
 - (a) General wear and tear and genetic instability.
 - (b) Free radicals, oxidative damage and antioxidants.
 - (c) Telomerases and aging.
12. **Cell Death**
 - 12.1 Apoptosis and necrosis.
 - 12.2 Apoptosis-its characteristics.
 - 12.3 Genes involved in apoptosis.
 - 12.4 Identification of apoptosis.
13. **Molecular structure of genes and chromosomes**
 - 13.1 Molecular definition of gene.
 - 13.2 Chromosomal organization of genes and non-coding DNA.
 - 13.3 Mobile DNA.
 - 13.4 Functional rearrangements in chromosomal DNA.
 - 13.5 Organizing cellular DNA into chromosomes.
 - 13.6 Morphological and functional elements of eukaryotic chromosomes.


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14. **Genetic analysis in cell biology**
 - 14.1 Mutation: Type and causes.
 - 14.2 Isolation and analysis of mutants.
 - 14.3 Genetic mapping of mutations.
 - 14.4 Molecular cloning of genes defined by mutations.
 - 14.5 Gene replacement and transgenic animals.
15. **Regulation of Gene Expression**
 - 15.1 Operon concept.
 - 15.2 Catabolic repression.
 - 15.3 Positive and Negative regulation.
 - 15.4 Inducers and corepressors.
 - 15.5 Regulation by attenuation: his and trp operons.
16. **DNA binding proteins and gene regulation**
 - 16.1 DNA binding domains.
 - 16.2 Homeodomain proteins.
 - 16.3 Zinc finger proteins.
 - 16.4 Winged-helix (Forked head) proteins.
 - 16.5 Leucine-Zipper proteins.
 - 16.6 Helix Loop-helix proteins.
17. **Protein sorting: Organelle biogenesis and protein synthesis.**
 - 17.1 Synthesis and targeting of mitochondrial and chloroplast proteins.
 - 17.2 Synthesis and targeting of peroxisomal proteins.
 - 17.3 Secretory pathways.
 - 17.4 Translocation of secretory proteins across the ER membrane.
 - 17.5 Insertion of membrane proteins in the ER membrane.
 - 17.6 Post-translation modifications in rER.
 - 17.7 Protein glycosylation in ER and Golgi complex.
 - 17.8 Golgi and Post-Golgi protein sorting and proteolytic processing.
 - 17.9 Receptor-mediated endocytosis and sorting of internalized proteins.
 - 17.10 Molecular mechanisms of vesicular traffic.


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CELL AND MOLECULAR BIOLOGY


Paper - VI

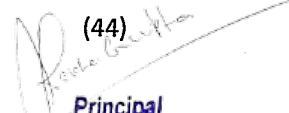
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Max. Marks – 100

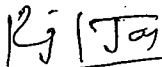
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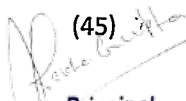
- 1.1 Discovery of humoral and cellular immunity.
- 1.2 Early theory of immunity.
- 1.3 Components of immunity.
- 1.4. Innate (nonspecific) immunity.
 - 1.4.1 Anatomic barrier.
 - 1.4.2 Physiologic barriers
 - 1.4.3 Phagocytic barriers.
 - 1.4.4 Inflammatory barriers.
 - 1.4.5 Collaboratin between innate and adaptive immunity.
- 1.5 Adaptive (specific) immunity.
 - 1.5.1 Cell of the immune system (B-lymphocytes, T-lymphocytes and Antigen presenting cells.).
 - 1.5.2 Functions of humoral and cell-mediated immune responses.
 - 1.5.3 Recognition of antigen by B-and T-lymphocytes.
 - 1.5.4 Generation of lymphocyte specificity and diversities.
 - 1.5.5 Role of MHC.
 - 1.5.6 Processing and presentation of antigen.
 - 1.5.7 Clonal selection of lymphocytes.
 - 1.5.8 Cellular interactions required for generatin of immune responses:
 - a. Activation and proliferation of T-Helper cells
 - b. Generation of Humoral immune response
 - c. Generation of CMI
2. Cells and organs of immune system
 - 2.1 Hematopeisis
 - 2.1.1 B-Lymphocytes, T-lymphocytes, Null cells.
 - 2.1.2 Mononuclear cells phagocytes (antimicrobial and cytotoxic activities: antigen processing and presentation, secretion of factors).
 - 2.1.3 Granulocytic cells (Neutrophils, Eosinophils and Basophils).
 - 2.1.4 Mast cells.
 - 2.1.5 Dendritic cells.
 - 2.2 Organs of immune system.
 - 2.2.1 Primary lymphoid organs (Thymus, bone marrow).


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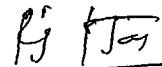
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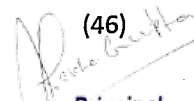
- 2.2.2 Secondary lymphoid organs (Lymph nodes, spleen, mucosal associated lymphoid tissue, cutaneous associated lymphoid tissue)..
- 2.2.3 Lymphatic system
- 3. Antigens
 - 3.1 Immunogenicity versus antigenicity.
 - 3.2 Factors that influence immunogenicity.
 - 3.2.1 Contribution of the immunogens (foreignness, molecular size, chemical composition and heterogeneity, susceptibility to antigen processing and presentation).
 - 3.2.2 Contribution of biological system. (genotype of the recipient animal, immunogen dosage and route of administration, adjuvant).
 - 3.2.3 Haptens.
- 4. Immunoglobulins: Structure and function
 - 4.1 Molecular structure of Ig, Light chain and Heavy chain.
 - 4.2 Immunoglobulin domains.
 - 4.2.1 Variable region domains (CDRs and antigen binding, conformational changes included by antigen binding)
 - 4.2.2 Constant region (CH and CL domains, hinge region and other constant region domains).
 - 4.3 Immunoglobulin classes: IgG, IgM, IgA, IgE and IgD and their biological activities.
 - 4.4 Immunoglobulin mediated effectors functions (Opsonization activation of complement, antibody dependent cell mediated cytotoxicity).
 - 4.5 Antigenetic determinants on immunoglobulin (isotype, allotype and idiotype).
 - 4.6 Monoclonal antibodies.
 - 4.6.1 Formation and selection of hybrid cells.
 - 4.6.2 Production of monoclonal antibodies.
 - 4.6.3 Clinical uses of monoclonal antibodies.
 - 4.6.4 Catalytic monoclonal antibodies (enzymes).
- 5. Organization and expression of Ig genes
 - 5.1 Genetic model compatible with Ig structure.
 - 5.1.1 Germ line and somatic variation models.
 - 5.1.2 Two gene model of Dryer and Bennett.
 - 5.1.3 Verification of Dryer and Bennett hypothesis.
 - 5.2 Multigene organization of Ig genes.
 - 5.2.1 I-chain multigene family
 - 5.2.2 K-chain multigene family.
 - 5.2.3 Heavy chain multigene family.
 - 5.3 Variable region gene rearrangement.


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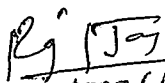
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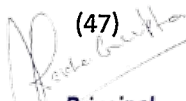
- 5.3.1 V-J rearrangements in light chain DNA.
- 5.3.2 V-D-J rearrangements in heavy chain DNA.
- 5.4 Mechanism of variable region DNA rearrangement.
 - 5.4.1 Recombination signal sequences.
 - 5.4.2 Enzymatic joining of gene segments.
 - 5.4.3 Identification of Raf-1 and Raf-2 genes.
 - 5.4.4 Defects in Ig gene rearrangements.
 - 5.4.5 Productive and non-productive arrangement.
 - 5.4.6 Allelic exclusions.
- 5.5 Generation and antibody diversity.
 - 5.5.1 Multiple germ line V,D and J gene segments.
 - 5.5.2 Combinatorial V-J and V-D-J joining.
 - 5.5.3 Junctional flexibility.
 - 5.5.4 P-addition and N-addition.
 - 5.5.5 Association of heavy and light chain.
- 5.6 Class switching among constant region genes.
 - 5.6.1 Expression of Ig genes.
 - a. Differential RNA processing of heavy chain primary transcripts.
 - b. Expression of membrane of secreted Ig.
 - c. Simultaneous, assembly and secretion of IgM and IgD.
 - d. Synthesis, assembly and secretion of Ig.
 - 5.6.2 Regulation of Ig gene transcription.
 - a. Effect of DNA rearrangement of transcription
 - b. Inhibition of Ig-gene expression in T-cells.
 - 5.6.3 Antibody genes and antibody engineering.
 - a. Chimeric and hybrid monoclonal antibodies.
 - b. Monoclonal antibodies constituted from Ig gene libraries.
- 6. Antigen-Antibody Interaction
 - 6.1 Antibody affinity and avidity
 - 6.2 Cross reactivity.
 - 6.3 Agglutination reactions.
 - 6.4 Precipitation reaction.
 - 6.5 Complement pathways (Classical, Alternative and Lectin) and complement fixation test.
- 7. Major histocompatibility complex.
 - 7.1 General organization and inheritance of MHC.
 - 7.1.1 Location and function of MHC regions.


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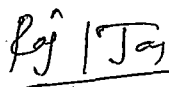
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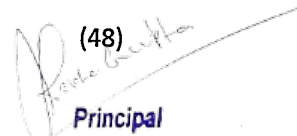
- 7.1.2 MHC haplotypes.
- 7.1.3 Congenic MHC mouse strains.
- 7.2 MHC molecules and genes.
 - 7.2.1 Structure of class I molecules.
 - 7.2.2 Structure of class II molecules.
 - 7.2.3 Organization of class I and Li genes.
 - 7.2.4 Peptide binding by MHC molecules.
 - 7.2.5 Class III molecules.
- 7.3 Genomic maps of MHC genes.
 - 7.3.1 Maps of class I MHC.
 - 7.3.2 Maps of class II MHC.
 - 7.3.3 Maps of class III MHC.
- 7.4 Cellular distribution of MHC molecules.
- 7.5 Regulation of MHC expression.
- 7.6 MHC and immune responsiveness.
- 7.7 MHC and diseases susceptibility.
- 8. Antigen Processing and Presentation
 - 8.1 Role of antigen presenting cell.
 - 8.1.1 Early evidence for the necessity of antigen processing.
 - 8.1.2 Cells that function in antigen presentation
 - 8.2 Evidence for two processing and presentation pathways.
 - 8.2.1 Endogenous antigens. The cytosolic pathways.
 - a. Peptide generation by proteosomes.
 - b. Peptide transport from the cytosol to RER.
 - c. Assembly of peptide with class I MHC molecules.
 - 8.2.2 Exogenous antigens: The endocytic pathway.
 - a. Peptide generation in endocytic vesicles.
 - b. Transport of class II MHC molecules to endocytic vesicles.
 - c. Assembly of peptide with class II MHC molecules.
 - 8.3 Presentation of non-peptide bacterial antigens.
- 9. Cytokines
 - 9.1 Properties of cytokines.
 - 9.2 General structure of cytokines.
 - 9.3 Function of cytokines.
 - 9.4 Cytokines related diseases.
 - 9.4.1 Bacterial septic shock.


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- 9.4.2 Bacterial toxic shock and similar diseases.
- 9.4.3 Lymphoid and myeloid cancers.
- 9.4.4 Chagas diseases.
- 10 Immune system in health and diseases
 - 10.1 Immune response to infectious diseases.
 - 10.1.1 Viral infections.
 - a. Viral neutralization by humoral antibody.
 - b. Cell mediated antiviral mechanism.
 - c. Viral evasion of host defence mechanisms.
 - 10.1.2 Bacterial infections.
 - a. Immune responses to extra-cellular and intracellular bacteria.
 - b. Bacterial evasion of host defense mechanism.
 - 10.1.3 Protozoa and diseases.
 - 10.1.4 Diseases caused by helminthes.
- 11. Vaccine
 - 11.1 Active and passive immunization.
 - 11.2 Designing vaccines for active immunization.
 - 11.3 Whole organism vaccine.
 - 11.3.1 Attenuated viral or bacterial vaccines.
 - 11.3.2 Inactivated viral or bacterial vaccines.
 - 11.4 Polysaccharide vaccines.
 - 11.5 Recombinant vector vaccines.
 - 11.6 DNA vaccines.
 - 11.7 Synthetic peptide vaccines.
 - 11.8 Multivalent peptide vaccines.
- 12. AIDS and other immune-deficiencies.
- 13. Autoimmunity
 - 13.1 Organ specific autoimmune diseases.
 - 13.2 Systemic autoimmune diseases.
 - 13.3 Proposed mechanisms for induction of autoimmunity.
- 14. Cancer and immune system
- 15. Transplantation immunology
- 16. Cellular energetics
 - 16.1 Electron transport and oxidative phosphorylation.
 - 16.1.1 Proton motive force.
 - 16.1.2 Electron flow.


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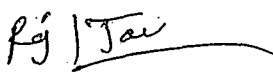
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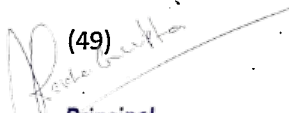
- 16.1.3 Shutting of electrons between ETC.
- 16.1.4 Reduction potentials of electron carriers.
- 16.1.5 Pumping protons out of the mitochondrial matrix.
- 16.1.6 ATP syntheses.
 - a. $F_0 F_1$ complex and proton motive force.
 - b. Inner mitochondrial membrane transporters and proton motive force.
 - c. Regulation of mitochondrial oxidation rate.
- 16.1.7 Chemiosmotic mechanism of ATP formation and related experiments.
- 16.2 Photosynthesis.
 - 16.2.1 Photosynthesis and thylakoid membrane.
 - 16.2.2 Stages of Photosynthesis.
 - 16.2.3 Light absorption and charge separation across thylakoid membrane.
 - 16.2.4 Molecular analysis of photosynthesis.
 - 16.2.5 CO_2 metabolism during photosynthesis

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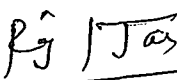
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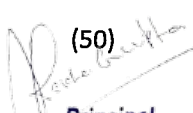
1. Operation of various microscopes
 - 1.1 Use of phase contrast.
 - 1.2 Use of fluorescence microscope - nucleic acid by Acridine orange/ Ethidium bromide.
 - 1.3 Use of transmission electron microscope.
 - 1.4 Use of oculometer: Standardization and measurements of cell height, nuclear diameters and tabular diameters.
 - 1.5 Use of ocular grid-standardization and counting of cells or nuclei in cross section or epithelium.
2. Preparation of biological tissues and sectioning for:
 - 2.1 Paraffin wax histology by microtome.
 - 2.2 Fresh frozen sections by cryostat.
 - 2.3 Ultrathin sections by ultratome.
3. Cytochemistry
 - 3.1 Carbohydrate (a) PAS method (b) Alcian blue method.
 - 3.2 Proteins (a) Mercury bromophenol blue method (b) Ninhydrin method.
 - 3.3 Lipids (a) Phosphomolybic acid method (b) Copper phthalocynin method.
 - 3.4 Nucleic acid (a) Feulgen method (b) Methyl green- Pyronil method.
4. Biochemical methods
 - 4.1 Determination of pK value of buffer.
 - 4.2 Determination of absorption maximum of a solution.


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- 4.3 Determination of relationship between. absorption and various concentration of a solution using a colorimeter spectro colorimter/spectrophotometr.
- 4.4 Preparation of standard curve for proteins, lipids, carbohydrates and enzymes.
- 4.5 Determination of optimum concentration of enzyme for kinetic studies.
- 4.6 Determination of Michaelis - Menten (KM)and Vmax for an enzyme by. Thumer's method.
- 4.7 Quantification of enzymes
 - 4.7.1 By end point techniques as exemplified by alkaline and acid phosphatase.
 - 4.7.2 By substrate – left over technique as exemplified by LDH.
 - 4.7.3 By turn over number as exemplified by GST.
5. Fractionation
 - 5.1 Tissue homogenization and fractionation by differential centrifugation for isolation of mitochondria, nuclei and cystol and use of marker enzymes for assessment of the components.
 - 5.2 Fractionation of protein, RNA and DNA and their Quantification.
6. Separation techniques
 - 6.1 Separation of proteins and DNA by agarose electrophoresis.
 - 6.2 Separation of proteins and iso-enzymes, on SDS-PAGE and PAGE.
 - 6.3 Electro-eluting of proteins DNA/RNA from electrophoretic gels.
 - 6.4 Separation of amino acids by paper chromatography.
 - 6.5 Separation of phospholipids by TLC.
 - 6.6 Separation of haemoglobin by column chromatography.
7. Chromosomal techniques
 - 7.1 Preparation of salivary gland chromosomes from Drosophilax and Chironomous larva and stain with acetocarmine/aceto-orcein / Feulgen.
 - 7.2 Preparation of mammalian chromosomes from bone marrow/ testis and stain with Giemsa stain.
8. Immunization techniques
 - 8.1 Emulsification with Freund's reagent.
 - 8.1.1 Preparation of emulsions with syringe method.
 - 8.1.2 Preparation of emulsion with double- hubbed needle method.
 - 8.2 Testing type of emulsion.
 - 8.3 Absorption of soluble proteins on insoluble colloidal carrier.
 - 8.3.1 Alum precipitates.
 - 8.3.2 Alum hydroxide adjuvants.
9. Immunization route.
 - 9.1 Intradermal
 - 9.2 Subcutaneous.

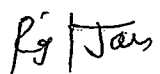

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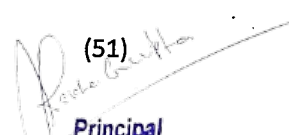
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- 9.3 Intramuscular.
- 9.4 Intraperitoneal.
- 9.5 Intravenous.
- 9.6 Foot pad.
- 10. Bleeding schedules and collection of blood
 - 10.1 Bleeding from ear.
 - 10.2 Retro-orbital.
 - 10.3 Cardiac puncture.
 - 10.4 Branchial vein.
 - 10.5 From external jugular vein.
- 11. Separation and preservation of serum
 - 11.1 Liquid storage.
 - 11.1.1 Using preservative.
 - 11.1.2 Sterilization.
 - 11.2 By freezing.
 - 11.3 By lyophilisation.
- 12. Isolation of T and B cells from sensitized animals
 - 12.1 From spleen.
 - 12.2 From lymph nodes.
 - 12.3 From human blood-rosette formation with sheep RBC.
- 13. Purification of antibodies and antigens
 - 13.1 Insolubilization of antibodies and antigenic proteins using glutaraldehydes.
 - 13.2 Immuno-adsorption.
 - 13.3 Dissociation of absorbed material from immune-adsorbents.
- 14. Quantitation of antibodies
 - 14.1 Precipitation techniques.
 - 14.2 Immuno-diffusion method.
 - 14.3 Immuno-electrophoresis method.
- 15. Immunoassays: RIA, ELISA
- 16. Permanent slides (for spotting): Thymus, lymph nodes, spleen, bone marrow, types of cells (squamous, cuboidal, columnar epithelial cells, blood cells, nerve cells, muscle cells, connective tissues of various types, adipose tissues, mitotic & meiotic chromosomes and their different phases cancer cells of various types etc.)

Note : 1. Slides to be submitted from each exercise .

- 2. It should be ensured that animals used in the practical exercises are not covered under the Wildlife Act 1972 and amendments made subsequently.**


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SCHEME OF PRACTICAL EXAMINATION

Duration: 5 Hours

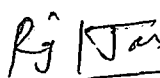
Max. Marks – 100

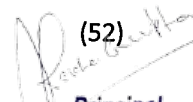
1. Exercise on Microtomy Sectioning	10
2. Exercise on Cytochemistry	12
3. Exercise on biochemical estimation	12
4. Exercise on Differential centrifugation/chromatography/electrophoresis	10
5. Exercise on immunology	10
6. Exercise on chromosomal preparation	10
7. Identification and comments (Spots-Eight, 2 marks each)	16
8. Viva-voce	10
9. Record+ submission of slides prepared	(7+3)=10
	Total = 100

CELL & MOLECULAR BIOLOGY


Recommended Books:

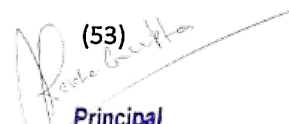
1. Abbas. A.K. Lichtman, A.R. and Pakes, J.S. Molecular Immunology, W.B. Saunders & Col, London
2. Adams RLP, Knowler J.T. and Leader D.P. The Biochemistry of the Nucleic Acids. Chapman and Hall, London, 1986.
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4. Bolrover S.R. Hyams J.S., Jones S. Shephard E.A. and White H.A. from genes to cells. Wiley-liss, new York, 1997.
5. Cooper, G.M. The cell A molecular approach. ASM Press, Washington DC, 2000.
6. Cruse, J.M. and Lewis, R.E., Atlas of Immunology, CRC Press, New York.
7. Dabre, D.D. Introduction to Practical Molecular Biology, John Wiley & Sons Inc, New York.
8. Darnell, J.L. Lodish, H. and Baltimore, D. Molecular Cell Biology, Scientific American Books Inc. New York.
9. De Robertis E.D.P. and De Robertis Jr., E.M.F., Cell and Molecular Biology. K.. Varghese Cop. Bombay, 1998.
10. Fireerg E.C. Walker G.C. and Siede, W. DNA Repair and Mutagenesis ASM Press Wadlington DC, 1995.
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13. Gasque, C.E.A. Manual of laboratory experiences in Cell Biology Universal Book Stall, New Delhi.
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16. Goldsby, R.A. Kindt, T.J. and Osborne, B.A. Kuby Immunology, W.H. Freeman & Co. New York.
17. Grese A.C. Cell Physiology, W.B. Saunders Co., Philadelphia, 1979.
18. Karp G. Cell and Molecular Biology. Concepts and experiments. John Wiley and Sons. Inc. New York, 1999.
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22. Meyers R.A. Molecular Biology and Biotechnology, A comprehensive desk reference. VCH Publishers, Inc., New York, 1995.
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3. DEVELOPMENTAL BIOLOGY

PAPER-V: CONCEPTS OF EMBRYOLOGY

Duration: 3 Hours

Max. Marks – 100


Periods: 90

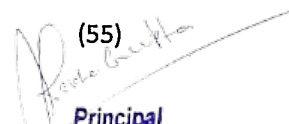
1. History/Discoveries
 - 1.1 Theories of development.
 - 1.2 Fundamental Problems of Developmental Biology.
 - 1.3 Scope and application of Developmental Biology.
2. Patterns of reproduction.
 - 2.1 Asexual; Sexual; Reproductive habits and breeding cycles in Vertebrates.
 - 2.2 Types of reproductive cycles in mammals.
3. Ovulation and its control.
 - 3.1 Induced breeding in fish and frog.
4. Cogenesis
 - 4.1 Differentiation and growth of oocytes.
 - 4.2 Organization of egg.
 - 4.3 Cytoplasm and egg cortex.
 - 4.4 Origin of polarity and symmetry in eggs.
 - 4.5 Vitellogenesis.
5. Spermatogenesis.
 - 5.1 Differentiation.
 - 5.2 Ultrastructure, biochemistry and types of sperms.
 - 5.3 Capacitation.
6. Fertilization.
 - 6.1 Biological role of fertilization.
 - 6.2 Basic requirements of fertilization.
 - 6.3 Recognition between male and female gametes.
 - 6.4 Acrosome reaction of sperm.
 - 6.5 Cortical reaction of egg.
 - 6.6 Sperm penetration into egg.
 - 6.7 Prevention of polyspermy.
 - 6.8 Activation of egg metabolism.
 - 6.9 Biochemistry of fertilization.
 - 6.10 Biology and viability of sperms and ova.
 - 6.11 Activation of gamete metabolism-early and late responses.

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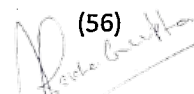
- 6.12 Parthenogenesis.
- 6.13 Artificial insemination.
- 6.14 Fusion of genetic material in mammals.
- 6.15 Fertilization *in vitro*.
- 6.16 Cultivation and re-implantation and significance of this technique.
- 6.17 Control of human fertility.
- 6.18 Birth control.
- 6.19 Contraception
 - 6.19.1 Natural.
 - 6.19.2 Barrier or mechanical contraceptives.
 - 6.19.3 Method of contraception in human beings.
- 6.20 Artificial insemination in cattle.
- 6.21 Test tube baby, its advantages and disadvantages.
- 6.22 Cryopreservation of human embryos.
- 6.23 Gamete intra-fallopian transfer (GIFT).
7. Cleavage:
 - 7.1 Role of nucleus.
 - 7.2 Problem of DNA synthesis; energy requirements; biochemical changes; distribution of morphogenetic substances of egg and their role during cleavages.
 - 7.3 Characteristics and mechanism of cleavages.
8. Early embryonic development in selected non-chordates and chordates (with particular reference to the type of eggs; pattern of cleavages; blastulation; gastrulation; establishment of three germ layers and the basic body plan).
 - 8.1.1 Coelenterata
 - 8.1.2 Ctenophora
 - 8.1.3 Platyhelminthes
 - 8.1.4 Annelida
 - 8.1.5 Mollusca
 - 8.1.6 Echinodermata
 - 8.1.7 Insecta
- 8.2 Chordates (frog, chick and mammals).
- 8.3 Determination of embryonic axes and cell lineage in mammalian development.
9. Morphogenetic cell movements.
 - 9.1 Dissociation and re-aggregation of cells.
 - 9.2 Selective affinities of cells during development.


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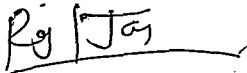
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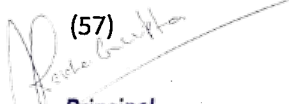
10. Fate maps
 - 10.1 Methods of their constructions, utility, comparative topographical relationship of the presumptive areas in early embryos of Amphioxus, Fishes, Amphibian and Birds.
11. Neurulation in Vertebrates
 - 11.1 Mechanism of neural tubes formation.
 - 11.2 Segregation of mesodermal and endodermal organ rudiments.
12. Determination
 - 12.1 Concepts of prospective fates, potencies; progressive determination and differentiation mosaic and regulative eggs-a problem of determination.
13. Restriction of potencies in the germinal layers of amphibians and birds; cytoplasmic determination of germ cells in nematodes, Drosophila and frog.
14. Cell and tissue interactions in development
 - 14.1 Primary embryonic induction.
 - 14.2 Nature and regional specificity of induction.
 - 14.3 Methods of study and analysis of the phenomenon of neural induction.
 - 14.4 Heterogenous inductors
 - 14.5 Chemistry and properties of inducing substances
 - 14.6 Competence
 - 14.7 Mechanism and theories of induction
 - 14.8 Secondary and tertiary inductors
 - 14.8.1 Concept of organizer.
 - 14.8.2 Evocation and individuation.
 - 14.8.3 Trans- determination in insect germinal discs.
 - 14.8.4 Ectodermal and mesodermal interactions in the morphogenesis of limbs in vertebrates.
 - 14.9 The role of apical ridge.
15. Productive interactions in the morphogenesis and differentiation
16. Origin and development of nerve cells and nerve fibres, computer analysis of cellular interactions.
17. Gradients:
 - 17.1 The concepts; Child's hypothesis.
 - 17.2 Metabolic differences in embryonic cell.
 - 17.3 Biochemical gradients in sea-urchin eggs and their morphogenetic importance.
18. Morphogenetic fields
 - 18.1 The concepts; Nature and temporal character of fields.
 - 18.2 Progressive determination within a field.
19. Segmentation of vertebrate embryo.


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20. Development of ectodermal organs
 - 20.1 Brain
 - 20.2 Neural crest and its derivatives
 - 20.3 Skin
 - 20.4 Scale and feather
21. Development of mesodermal organs
 - 21.1 Heart
 - 21.2 Kidney
 - 21.3 Gonads
 - 21.4 Reproductive ducts
22. Development of endodermal organs
 - 22.1 Liver
 - 22.2 Pancreas
 - 22.3 Thymus
23. Differentiation
 - 23.1 Definition and biochemical basis of differentiation
 - 23.2 Structural and biochemical changes during differentiation of Muscle Cartilage, Pigment cells, Lens, Fibres, Mammalian erythroid cells, Epidermis
 - 23.3 Concept of stem cells and establishment of tissue specific cell lines
 - 23.4 Cell division and cyto-differentiation
 - 23.5 Stability of differentiated state of cells.
 - 23.6 Chemical control of differentiation.
 - 23.7 Influence of animalizing and vegetalizing agents on sea urchin.
 - 23.8 De-differentiation; modulation and metaplasia.
 - 23.9 Trans-differentiation, influence of hormones on differentiation of tissues and organs.
24. Development of the immune system.
25. Cell, tissue and organ culture
 - 25.1 Basic requirements.
 - 25.2 Design of the laboratory.
 - 25.3 Balanced salt solution.
 - 25.4 Use of antibiotics.
 - 25.5 Culture media.
 - 25.6 Methods of preparation of cell, tissue and organ for cultivation in vitro.
 - 25.7 Contribution of culture studies in developmental biology.


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3. DEVELOPMENTAL BIOLOGY

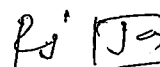
PAPER-VI: GENES AND DEVELOPMENT

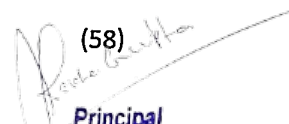
Duration: 3 Hours

Max. Marks – 100

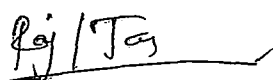
Periods: 90

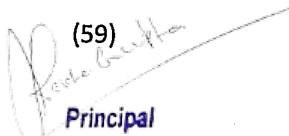
1. Role of cell surface in morphogenesis.
2. Pattern formation.
 - 2.1.1 General and theoretical aspects of pattern formation.
 - 2.1.2 Polarity.
 - 2.1.3 Apical dominance.
 - 2.1.4 Positional information.
 - 2.1.5 Pattern formation in limb development in vertebrates.
 - 2.1.6 Feather pattern in birds and wing pattern in insects.
 - 2.1.7 Importance of retinoic acid in pattern formation in amphibia and birds.
3.
 - 3.1 Nuclear transplantation in amphibians and mammals.
 - 3.2 Cloning.
 - 3.3 Pluripotency of somatic cells.
4. Role of nucleus and cytoplasm in development.
 - 4.1 Molecular exchange between, cytoplasm and nucleus.
 - 4.2 Nuclear control of morphogenesis.
 - 4.3 Nuclear transplantation between species.
 - 4.4 Prevention of chromosomal diminution in the germ cells of *Ascaris* by cytoplasmic determinants.
5. Genetic interaction in cell differentiation.
6. Genetic control of development.
 - 6.1 At transcriptional level.
 - 6.2 At translational level.
 - 6.3 Post-translational control.
 - 6.4 Epigenetic modification of proteins.
 - 6.5 Determination of embryonic axis.
 - 6.6 Segmentation of larval body.
 - 6.7 Homeotic genes.
7. Function of genes during development transgenic cells and organisms.
8. Gene interactions in development: Gene action, Homeobox.
9. Differential gene function during development.
 - 9.1 Changing patterns of tissue specificity of protein synthesis.


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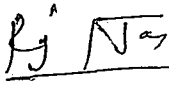
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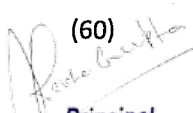
- 9.2 Embryonic, fetal and adult hemoglobin's.
- 9.3 Differential RNA synthesis.
10. Gene mutations affecting programmed cell death.
11. Homeotic mutations
 - 11.1 Bombyx mori.
 - 11.2 Bithorax locus in Drosophila.
 - 11.3 Antepnapedia locus in Drosophila.
 - 11.4 Relationship of developmental biology with genetics and evolution.
 - 11.5 Ontogeny and phylogeny.
 - 11.6 Morphological recapitulation of phylogeny ontogeny.
 - 11.7 Molecular recapitulation in ontogeny.
 - 11.8 Urea cycle in vertebrate phylogeny and ontogeny.
 - 11.9 Arboreal salamanders and frogs without tadpoles heterochrony and morphological adaption.
 - 11.10 Diversity of modes of reproduction in frogs of temperate and tropical regions.
 - 11.11 Mechanism of amphibian hetro-chrony.
12. Ectodermal mesodermal interactions in the morphogenesis of limb in vertebrate
 - 12.1 The role of apical ridge.
 - 12.2 Specification of the anterior-posterior limb axis.
 - 12.3 Hox genes.
 - 12.4 Polarizing zones.
13. Route of cell death in morphogenesis
 - 13.1 Development of the terapod limb.
 - 13.2 Cell death in formation of digits and joints.
14. Growth
 - 14.1 Dynamics of population growth.
 - 14.2 Isometric and allometric.
 - 14.3 Differential growth.
 - 14.4 Physiological mechanism of growth.
15. Ageing (Senescence)
 - 15.1 Cellular basis of ageing.
 - 15.2 Maximum life span and life expectancy.
 - 15.3 Oxidative damage.
 - 15.4 Mitochondrial genome damage.
 - 15.5 Genetic basis of ageing.
 - 15.6 Telomere shortening.
 - 15.7 Theories of ageing.


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- 15.8 Ageing of cells *in vitro*.
16. Environmental regulation of animal development
- 16.1 Abnormal growth (teratomas).
 - 16.2 Teratology-types of abnormalities.
 - 16.3 Genetic effects (pleiotropism, phenocopies, canalization and inborn errors in metabolism).
 - 16.4 Environmental effects.
 - 16.5 Teratogenic agents (drugs, nutritional deficiencies, injections, ionizing radiation).
 - 16.6 Retinoic acid as a teratogen.
 - 16.7 Alcohol as a teratogen.
 - 16.8 General mechanisms and mode of action of teratogen agents.
17. Embryological considerations in teratology.
18. Twinning.
19. Malignancy
- 19.1 General characteristics and properties of cancer cells including structural and metabolic alterations in these cells.
 - 19.2 Metaplasia and carcinogenic agents.
20. Embryonic adaptations
- 20.1 Cleidoic eggs.
 - 20.2 Development, structure and physiology of extra-embryonic membranes in amniotes.
 - 20.3 Development, structure and physiology of placenta in Eutherian mammals.
21. Embryonic nutrition
- 21.1 Yolk utilization by embryos of invertebrates and vertebrates.
 - 21.2 Fetal nutrition in mammals.
 - 21.3 Placental physiology.
22. Metamorphosis
- 22.1 Larval forms of non-chordates and chordates and their morphological transformation to adult form.
 - 22.2 Morphogenetic changes during metamorphosis in insect and their hormonal control.
 - 22.3 Morphological, biochemical and physiological changes during metamorphosis in amphibians and their hormonal control.
23. Regeneration
- 23.1 Definition; characteristic of regeneration and its comparison with ontogenetic development.
 - 23.2 Distribution of regenerative ability in animal kingdom.
 - 23.3 Forms and patterns of regeneration.
 - 23.4 Morphollaxis.


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- 23.5 Epimorphosis.
- 23.6 Regeneration in Hydra.
- 23.7 Regeneration in Planaria.
- 23.8 Appendage regeneration in arthropods and its relation with moulting and metamorphosis.
- 23.9 Heteromorphosis.
- 23.10 Autotomy.
- 23.11 Regeneration in vertebrates with special reference to morphological and histological study of this phenomenon on.
- 23.11.1 Tail regeneration.
- 23.11.2 Limb regeneration.
- 23.11.3 Wolffian lens regeneration.
- 23.12 Sources of cells for regeneration.
- 23.13 Dedifferentiation.
- 23.14 Wound healing.
- 23.15 Role of wound epidermis and the epidermal cap.
- 23.16 Blastula morphogenesis.
- 23.17 Distal transformation.
- 23.18 Role of nerves and hormones.
- 23.19 Pattern formation in blastula by retinoic acid proximalization.
- 23.20 Homeotic transformation of tails into limbs.
- 23.21 Loss of regenerative ability in anuran larvae and adults and experimental attempts to restore it.
24. Liver regeneration in mammals.
25. Methods of preparation and utility of normal tables of embryonic and larval developmental stages.

PRACTICALS: DEVELOPMENTAL BIOLOGY

1. Detailed study of early embryonic development of a fish, an amphibian, chick and a mammal through preserved materials; whole mounts and serial sections.
2. Study of morphogenesis and histogenesis of some selected organs such as limb, heart, eye, brain, etc. during embryonic and/or larval development of vertebrates through preserved materials whole mounts and sections.
3. Study of morphological and histological developments during tail and limb regeneration in any amphibian.
4. Study of metamorphosis and its endocrine control in an insect and an amphibian.
5. Hypophysectomy in a living frog* or toad*.
6. Microscopic study of sperms and ova of frog* after appropriate staining.

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7. Simple experiments on frog* or toad* embryos such as cultivation of parts of embryos *in vitro*, parabiosis transplantation, implantation, etc.
8. Microtomy of vertebrate embryos and larvae.
9. Alizarine and Victoria blue preparation of a late chick embryo mammalian foetus/a frog* or toad* tadpole.
10. Study of oestrous cycles in a rodent.
11. Simple experiments on chick embryos such as cultivation early embryos *in vitro* by ring technique, intrablastodemic and chorio-allantoic grafting, demonstration of morphogenetic movement and metabolic gradients, study of cell-death in limbs of chick embryos, influence of teratogenic agents(s) on embryonic development, etc.
12. Simple exercise on preparation of glass instruments; fine agar film stained with vital dyes; culture media such as embryo extract, Plasma clot, etc.
13. Identification and separation of free amino acids in embryonic and larval tissues and organs by paper chromatography.
14. Simple exercises on *in vitro* cultivation of embryonic tissue and organs by suitable techniques.

Note:

1. * indicates use of softwares.
2. With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

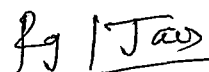
**SCHEME OF PRACTICAL EXAMINATION
AND DISTRIBUTION OF MARKS**

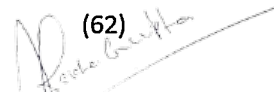
Duration: 5 Hours

Max. Marks – 100

- | | |
|---|----------|
| 1. Dissection or surgical procedure. | 12 |
| 2. Exercise on Alizarine and Victoria blue preparation of a late chick embryo/
or mammalian foetus/a frog* or toad* tadpole. | 10 |
| 3. Identification and separation of free amino acids in embryonic and larval tissues
and organs by paper chromatography | 12 |
| 4. Exercise on sperm count/vaginal cycle in rodent. | 8 |
| 5. Microtomy + submission of prepared slides | (8+6) 14 |
| 6. Identification and comments on the spots (1 to 8) | 24 |
| 7. Viva-voce | 10 |
| 8. Class record | 10 |

Total = 100


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4. ENDOCRINOLOGY

PAPER-V: ENDOCRINE GLANDS

Duration: 3 Hours

Max. Marks – 100

Periods: 90

1. Historical background, scope and status of endocrinology 2
2. Endocrine glands: an overview 1
3. Biochemical nature of hormones 2
4. Mechanism of action of hormones 4
5. **Study of the following major endocrine glands of vertebrates:**
 - a) **Pituitary:** General, developmental and comparative anatomy; functional cytology of the pituitary gland of mammalian and sub-mammalian vertebrates; adenohypophyseal hormones, their chemistry and physiology, chromatophore regulation among vertebrates; neurohormonal peptides; their chemistry and phyletic distribution; formation, storage, release and transport of neurohypophyseal principles; effects of hypophysectomy. 8
 - b) **Thyroid:** General, developmental and comparative anatomy, evolution of thyroidal function, biochemistry, biological action of thyroid hormones and their inter-relationship with other endocrine secretions; effects of thyroidectomy; calcitonin: its chemistry and physiology .
 - c) **Parathyroid:** General, developmental and comparative anatomy, biochemistry and physiology of the parathyroid hormone; effects of para-thyroidectomy 5
 - d) **Pancreas islets:** General, developmental and comparative anatomy; biochemistry and physiology of insulin and glucagon; effects of pancreatotomy. 4
 - e) **Adrenal:** General, developmental and comparative anatomy; chromaffin tissue, biochemistry and physiology to catecholamines; the sympathetic-chromaffin complex; steroidogenic tissue: structure and nomenclature of steroid hormones; biochemistry and physiology of adrenal steroids; effects of adrenalectomy. 8
 - f) **Pineal:** General, developmental and comparative anatomy; biochemistry and physiology of the pineal principles. 4
6. **Female reproductive system:** Comparative anatomy and physiology of the mammalian and sub-mammalian ovary and sex accessory structures, ovarian hormones and their functions. 10
7. **The male reproductive system:** Comparative anatomy and physiology of the mammalian and sub-mammalian testis, secondary sex accessory structures, testicular hormones and their functions, semen and its biochemistry. 10
8. **The hypothalamo-hypophyseal-gonadal relationship.** 3
9. **Biology of spermatozoa and ovum:** Structure, development and function. 4
10. Endocrinology of fertilization, implantation, delayed implantation, parturition and lactation. 6
11. Placenta as an endocrine tissue; foeto-placental unit. 4

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- | | |
|---|---|
| 12. Hormonal control of sex differentiation and sex determination | 4 |
| 13. Assisted reproductive technology (ART). | 5 |

4. ENDOCRINOLOGY

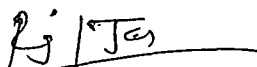
PAPER-VI: REGULATORY ASPECTS

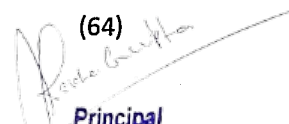
Duration: 3 Hours

Max. Marks – 100

Periods: 90

- | | |
|---|----|
| 1. Vertebrate neuroendocrinology : Ultrastructure and function of the neuro-secretory cell, hypothalamo-hypopyseal relationship, hypothalamus in relation to higher nervous centres, other neurosecretory systems in vertebrates, the urophysis, the subcommissural organ and the pineal complex. | 10 |
| 2. Invertebrate neuroendocrinology: Anatomy and physiology of the endocrine and neuro-endocrine systems of Annelida, Arthropoda and Mollusca. | 10 |
| 3. Endocrine integration: Diffuse effects of hormones: neoplastic growth; migration in birds and fishes; bird plumage; hibernation; osmoregulation; blood pressure regulation. | 10 |
| 4. Breeding seasons in vertebrates, evolution of viviparity, induced spawning in fish and frog. | 6 |
| 5. Hormones and reproductive behaviour. | 3 |
| 6. Functional aspects of chemical, mechanical and surgical and immunological control of male fertility in laboratory mammals and the human. | 12 |
| 7. Functional aspects of chemical, mechanical, surgical and immunological control of female fertility in laboratory mammals and human. | 12 |
| 8. Pheromones: Control of fertility in insects. | 3 |
| 9. Prostaglandins: Types, chemistry, mechanism of action and effects on mammalian reproduction. | 6 |
| 10. Hormonal imbalance and major endocrine diseases | 20 |
| (a) Gigantism. | |
| (b) Acromegaly. | |
| (c) Dwarfism. | |
| (d) Addison's disease. | |
| (e) Cushing's syndrome. | |
| (f) Goitre. | |
| (g) Cryptorchidism. | |
| (h) Hypogonadism. | |
| (i) Amenorrhoea. | |
| (j) <i>Diabetes mellitus</i> . | |
| (k) Tetany. | |


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List of Practicals:

1. Dissection and gross examination of various endocrine glands of representative vertebrates.
2. Microscopical study of various endocrine glands of representation vertebrates through microtechnical procedure.
3. Study of the estrous cycle in laboratory mouse or rat by the vaginal smear Technique.
4. Surgical procedures: Castration, ovariectomy, adrenalectomy, thyroidectomy and hypophysectomy.
5. Bioassays for estrogens, androgens and antiestrogens; the Ascheim Zondek pregnancy test.
6. Biochemical estimations of cholesterol and ascorbic acid content tissue; glycogen content in uterine tissue; fructose in male sex accessory glands.
7. Sperm count and motility.
8. Study of the sex chromatin.
9. Effects of epinephrine on chromatophores in fish.
10. Study of microscopic slides of endocrine and related structures.

Note:


1. Slides of exercises to be submitted during examination.
2. With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

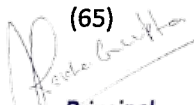
SCHEME OF PRACTICAL EXAMINATION AND DISTRIBUTION OF MARKS

Duration : 5 Hours

Max. Marks – 100

1. Dissection or surgical procedure.	12
2. Exercise on bioassay or hormone administration effects.	10
3. Quantitative estimation of glycogen/cholesterol/ascorbic acid/fructose in a given endocrine tissue	12
4. Exercise on sperm count/vaginal cycle/effect of epinephrine on fish chromatophres.	8
5. Microtomy + submission of prepared slides	(8+6) 14
6. Identification and comments on the spots (1 to 8)	24
7. Viva-voce	10
8. Class record	10
Total = 100	


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Recommended Books:

1. Desjardins, C. and Ewing L.L. Cell and Molecular Biology of the testis Oxford University Press, New York, 1993.
2. Gorbman, A. and Bern, H.A. A Text Book of Comparative Endocrinology, John Wiley and Sons Inc., New York, 1962 (Indian Edition- Wilel Eastern Pvt. Ltd., New Delhi, 1974.)
3. Hadley, M.E., Endocrinology. Prentice hall International, Inc. New Jersey, 2000.
4. Joy, K.P. Krishna A. and Haldar C: comparative Endocrinology and Reproduction. Narosa Publishing House, New Delhi, 1999.
5. Levy, A. and Lightman S. Endocrinology. Oxford University Press, Oxford, 1997.
6. Nalbandov, AS.: Reproductive Physiology. W.H. Freeman and Co., New York, 1964. Indian Edition Taraporevala & Sons Pvt. Ltd. Bombay, 1970).
7. Negro-Vilar, A. Isidori A, Paulson J. Abdelmassih R. and Castro, P.P Andrology and Human Reproduction; Raven Press, New York. 1988.
8. Nieschlag E. Habenicht UP. and Nieschlagss. Spermatogenesis Fertilization-Contraception Springer-Verlag, Berlin, 1992.
9. Nieschlag E. and Behre H.M. Testosterone Action-Deficiency Substitution. Springer-Verlag Berlin, 1996. Scientific Publishers Ltd., 2001.
10. Thomas J.A., Endocrine Methods. Academic Press, New York, 1996.
11. Turner CD.: General Endocrinology *fiW*, 13: Saunders and Co. Philadelphia, 1974. Toppan Co. Pvt. Ltd., Singapore, 1974.
12. Wilson J.D. and Foster D.W. Williams Text Book of Endocrinology W.B. Saunders Co., Philadelphia, 1992. Burger H. and Dkrester D. The testis. Raven Press, New York. 1989;

5. ENTOMOLOGY

PAPER-V: MORPHOLOGY AND PHYSIOLOGY

Duration: 3 Hours

Max. Marks – 100

Periods : 90

1. Integument: Structure, composition and functions, biochemistry of sclerotization.
2. Functional morphology of head, thorax and abdomen including head segmentation and appendages.
3. Muscular system.
4. Digestive system: Alimentary canal and physiology of digestion.
5. Circulatory system: Morphology and physiology including composition of haemolymph.
6. Respiratory system: Structure of respiratory organs and physiology. Adaptations for aquatic respiration.

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7. Excretory system: Structure of excretory organs and physiology of excretion.
8. Nervous system: Morphology and physiology.
9. Neuroendocrine system: Morphology and physiology.
10. Sense organs: Mechanoreceptors, Chemoreceptors auditory organs, sound and light producing organs, visual organs and physiology of vision.
11. Reproductive systems: Structure and physiology.
12. Embryology: Structure of egg, embryonic and postembryonic development, types of larvae, pupae and metamorphosis, role of endocrine in growth and development, diapause, viviparity and parthenogenesis.

5. ENTOMOLOGY

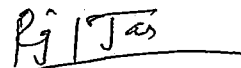
PAPER-VI: SYSTEMATICS, ECOLOGY AND APPLIED ENTOMOLOGY

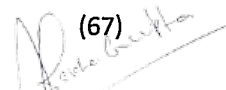
Duration : 3 Hours

Max. Marks – 100

Periods : 90

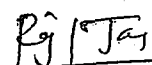
1. Classification of insects up to orders and suborders, basis and short history of classification. Introduction to primitive insects.
2. Detailed classification of important and selected super families, and families of the following orders- Orthoptera, Isoptera, Hemiptera, Coleoptera, Lepidoptera, Diptera and Hymenoptera.
3. Social life in Isoptera and Hymenoptera.
4. Life cycle of Locusts and Aphids.
5. Origin and Evolution of insects with special reference to fossil insects; causes of success of insects.
6. Ecology of insects
 - (a) Effect of physical factors.
 - (b) Intra and inter- specific relations.
 - (c) Population dynamics.
 - (d) Host-plant insect interactions.
 - (e) Biochemical adaptations of environmental stress (Metamorphosis; Diapause, Polymorphism etc.)
7. Concept of pest. How and why insects have become pests?
8. Life history, damage caused and control of major pests of
 - (a) Cash crop, e.g. sugarcane, tobacco, and mustard.
 - (b) Cereal crop e.g. wheat, paddy, millet, maize, sorghum, pulses.
 - (c) Pests of vegetables, fruits and oil seed crops.
 - (d) Cash fibre crops e.g. cotton, sun hemp etc.

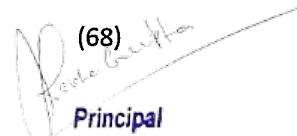

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- (e) Pests of medical and veterinary importance with reference to role of WHO and UNICEF. Insect borne diseases (A preliminary idea).
 - (f) Storage pests (Stored grains and milled products) with an elementary idea of different types of storage.
9. Inset Control: Basic idea.
10. Various methods of insect control
- (a) Prophylactic and cultural method, Quarantine regulation.
 - (b) Physical control.
 - (c) Chemical control.
 - (d) Biological control
 - (e) Insect pest management, its strategies and tools in IPM. Its relevance in insect pest control.
11. Chemistry and mode of action of insecticides
- (a) Inorganic insecticides.
 - (b) Organochlorine insecticides
 - (c) Organophosphorus compounds and carbonates.
 - (d) Insecticides of plant origin.
 - (e) Synthetic pyrethroids.
 - (f) Insect growth regulatory compounds.
 - (g) Microbial insecticides.
 - (h) Chemosterilant, repellents, antifeedants.
 - (i) Fumigants and fumigation.
12. Concept I, II and III generation of insecticides
- 12.1 A brief idea of appliances used for application of insecticides, hazards involved and safe handling of insecticides
 - 12.2 Development of resistance in insects to insecticides.
 - 12.3 Insecticide synergists and antagonists.
 - 12.4 Insecticide formulations and application technology.
 - 12.5 Dynamics of environmental pollution.
 - 12.6 Pesticides: Impact on wildlife and human health (bioaccumulation, biomagnification, biodegradation)
 - 12.7 Microbial and environmental degradation of pesticides.
13. Forensic entomology with special reference to man and wildlife.
14. Beneficial insects: Silk worm, honeybee and lac insect and industries related to them.
15. Role of genetics in vector control.
16. Social insects, social organization, caste differentiation.

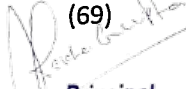
List of Practicals:-


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1. Field trips for collection and preservation of insects of various orders.
2. Museum study for identification of insects of different orders.
3. Dissection
 - (a) Cockroach: Digestive, nervous, circulatory, reproductive systems and neuroendocrine complex.
 - (b) Grasshopper
 - (c) Honeybee: Digestive and nervous system.
 - (d) White grubs: Nervous system.
 - (e) Housefly.
4. Permanent preparations
 - (a) Different types of mouthparts, antennae, legs and wings.
 - (b) Sting apparatus of honeybee.
 - (c) Pollen basket of honeybee.
 - (d) Tympanum and spiracle of grasshopper.
 - (e) Whole mounts (wm.) of various small insects.
5. Familiarity with techniques of appliances used for the application of insecticides
 - (a) Sprayers including hand sprayers.
 - (b) Dusters.
6. Knowledge of rearing insects and maintaining insectary
 - (a) *Tribolium* Sp.,
 - (b) *Rhizopertha* Sp.,
 - (c) *Heliothis* Sp.,
 - (d) *Corcyra* Sp.,
 - (e) *Callosobruchus* Sp.,
 - (f) *Lasioderme serricorne*, mosquito species.
7. Testing of insecticides: bioassay methods.
8. Study of prepared slides
 - (a) Whole mounts of insects.
 - (b) Histology.
 - (c) Leg types.
 - (d) Antennae types.
 - (e) Types of mouthparts.
 - (f) Wing types.
9. Microtomy (Internal organs of insects).
10. Study of seasonal abundance of crop-pest in nearby area.
11. Live demonstration of biological control using *Coccinella* or *Chrysopa*
12. Role of hormones in metamorphosis (ligature experiment with Housefly larvae).


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13. To study antennal grooming in cockroach.
14. To study the blood cells in insects.
15. To study meiosis and polytene chromosomes in insects.
16. To study the insects infestation in the grains.
17. To study the food preference of *Tribolium* or any other insect.

**SCHEME OF ENTOMOLOGY
PRACTICAL EXAMINATION**

Duration : 6 Hours

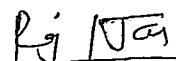
Max. Marks – 100

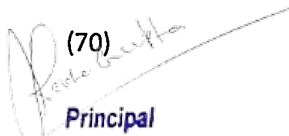
1. Major dissection.	15 (12+3)
2. Minor dissection / Permanent preparation.	5 (4+1)
3. Identification of four insects (A to D) using taxonomic keys	16
4. Exercise on Ecology/Physiology/Behaviour/Bioassay	10
5. Microtomy +submission of slides prepared	10 (7+3)
6. Comment on spots 1 to 8.	24
7. Viva	10
8. Record / Field work	10

Total = 100

Recommended Books:

1. Borror. D.J. and DeLong, D.M.: An Introduction to the Study of Insects. Constable and co. London/Holt. Rinehart and Winston. New York. 1954.
2. Chapman R.F. The Insects: Structure and Functions, Cambridge Low Price, Edition, 1998.
3. Dhaliwal, G.S. and Arora, Ramesh. Principles of insect. Pest management National Agricultural Technology Information, Ludhiana, 1976.
4. Essig. E.Q. College Entomology: MacMillan Co. New York, 1942.
5. Fox, R.M. and Fox, J.W.: Introduction to comparative Entomology, Reivehold Puse, Corp. New York, 1964 (Indian Reprint: Affiliated East West Press Pvt. Ltd., New Delhi).
6. Frost, S.W. Insect Life and Insect Natural History dover Puse. Inc. New York, 1969.
7. Imms. A.D. : Recent Advances in entomology. Churchill. London. 1931.
8. Imms. A.D.: A General Text book Entomology. Methuen and Co.: London. 1957 (Low priced reprint; English Language Book London, 1972.)
9. Kilgore, W.W.: and Dout, R.L.: Pest Control, biological, physics and selected chemical methods. Academic press, New York, London, 1967.
10. Kumar Ashok and Nigam, P.M.: Economic and applied Entomology Emkay Publication, Post Box NO. 9410, B-19, East Krishna Nagar, Delhi-110051.


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11. Lefroy, H.F.: Indian Insect life. Today and tomorrow printers and Publishers, New Delhi 1971.
12. Lefroy, H.F.: Indian Insect Pest. Today and Tomorrow Printers and Publishers, New Delhi 1971.
13. Little, V.A.: General and Applied entomology. Harper and Row. New York, 1960. (Indian Reprint: Oxford and IBH Publishing, New Delhi 1973).
14. Mani M.S.: Modern Classification of Insects. Satish Book Enterprise, Agra. 1974.
15. Mani. M.S.: General Entomology. Oxford and IBH. Publ. co., New Delhi. 1968.
16. Metcalf. C.L. and Flint. W.P.: Destructive and Useful Insects. Mcgraw Hill Book Co. New York. 1962 (Indian reprint: Tata McgrawHill Pubi. Co.: New Delhi).
17. Nayar, K.K., Anantkrishnan, T.N. and David, B.V.: General applied entomology. Tata McGraw-Hill Publishing Limited, Delhi, 1976.
18. Pruthi, H.S.: Text book of Agricultural entomology. Indian council of Agricultural Research, New Delhi. 1969.
19. Roeder. K.D.: Insect Physiology. John Wiley and Sons Inc. New York. 1953.
20. Ross, H.H.: A Text Book of entomology. John Wiley and Sons, New York. 1965.
21. Snodgrass, R.E. : Principles of Insect Morphology. McGraw-Hill Co. new York 1953 (Indian Reprint Tata McGraw-Hill Pul. Co. New Delhi. 1971)
22. The year book of Agriculture, U.S. Department of Agriculture, Washington, D.C.
23. Wiggsworth. V.B.: The Principles of Insect Physiology. Methuen and co. London. 1972 (Low Priced text reprint: English Language Book Society London. 1972)

ENVIRONMENTAL BIOLOGY

PAPER-V: ENVIRONMENTAL SCIENCE, ECOLOGICAL PRINCIPLE, WILDLIFE & CONSERVATION BIOLOGY

Duration : 3 Hours

Max. Marks – 100

Periods : 90

1. Biomes

1.1 A-Terrestrial Biomes

1.1.1 Desert

1.1.2 Grassland: Prairies & Plains

1.1.3 Tundra

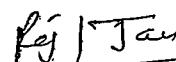
1.1.4 A temperate needle leaf forests

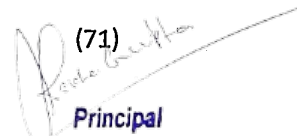
1.1.5 Deciduous and evergreen forests (Broad leaved)


1.1.6 Topical moist forest

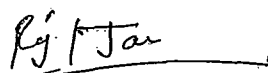
1.1.7 Tropical seasonal forest

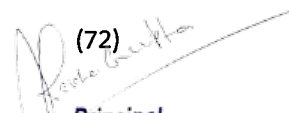
1.1.8 Biomes of India


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- 
- 1.2 Aquatic Ecosystem
 - 1.2.1 Fresh water and Brackish water ecosystem
 - 1.2.2 Estuaries and wetland: Transitional communities
 - 1.2.3 Shoreline and Barrier island
 - 1.2.4 Oceanic island arid reef
 2. Biological Communities
 - 2.1 Critical factors & Tolerance limits
 - 2.2 Natural selection, Adaptation and evolution
 - 2.3 Ecological niche
 3. Species interactions
 - 3.1 Predation
 - 3.2 Competition
 - 3.3 Symbiosis
 4. Community Dynamics
 - 4.1 Productivity
 - 4.2 Abundance and diversity
 - 4.3 Complexity & connectedness
 - 4.4 Resilience & diversity
 - 4.5 Community structure
 - 4.6 Edges and boundaries
 5. Communities in transition
 - 5.1 Ecological succession
 - 5.2 Introduced species and community change
 6. Restoration Ecology
 - 6.1 Natural
 - 6.2 Restoring keystone species and ecological process
 - 6.3 Mitigation and replacement
 - 6.4 Creating an artificial ecosystem
 7. Conservation of biodiversity
 - 7.1 Concept of biodiversity
 - 7.2 Causes of loss of biodiversity
 - 7.3 Productivity and diversity
 - 7.4 Conversion methods *In-situ* and *Ex-situ*
 - 7.5 Biodiversity conversion methods: Gene bank, intellectual property right and bio-safety protocol
 8. Population dynamics
 - 8.1 Dynamics of population growth



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- 8.1.1 Exponential growth & doubling times
- 8.1.2 Biotic potential
- 8.1.3 Catastrophic declines and population oscillation
- 8.1.4 Growth to a stable population
- 8.1.5 Strategies of population growth
- 8.2 Factors that increase or decrease population
 - 8.2.1 Natality, fecundity & fertility
 - 8.2.2 Immigration
 - 8.2.3 Mortality and survivorship
 - 8.2.4 Age structure
 - 8.2.5 Emigration
- 8.3 Factors: Regulate population growth
 - 8.3.1 Density independent factors
 - 8.2.3 Density dependent factors
- 9. Methods of population estimations of animal
 - 9.1 Census
 - 9.2 Sampling
 - 9.3 Indices, manipulation of indices
 - 9.4 Transect estimates
 - 9.5 Arial Survey
 - 9.6 Belt transect estimate
 - 9.7 Line Transect estimate
 - 9.8 Mark recapture estimates
- 10. Restoration of wildlife populations by reintroduction
 - 10.1 Captive breeding
 - 10.2 Soft and hard release
 - 10.3 Management of endangered species-reasons to preserve them
 - 10.4 Human factors leading to extermination/extinction of species, characteristics of endangered species.
- 11. Habitat analysis and evaluation
 - 11.1 Reconnaissance type evaluation of habitat
 - 11.2 Permanent condition trend transects vegetative analysis
 - 11.3 Forest range evaluation
 - 11.4 Wetland evaluation
 - 11.5 Wildlife evaluation
- 12. Environmental monitoring
 - 12.1 Physicochemical and biological monitoring

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- 
- 12.2 Biological indicators of environmental changes
 - 12.3 Physiological adaptations of animals to their environment, effects of temperature, current, pressure
 - 12.4 Osmoregulation, aestivation, mimicry, camouflage, bioluminescence, parasitism, eco-location, migration, pheromones
 13. Environmental degradation, role of men in changing the environment
 14. Environmental awareness and education regarding conservation of wildlife.
 - 14.1 Wildlife protection legislation acts and laws in India
 - 14.2 Environmental conservation ethics.
 15. Impact of tourism related activities on environment.
 - 15.1 Basic principles of ecotourism
 - 15.2 Ecological and conservation aspects of tourism
 - 15.3 Island ecology and tourism
 - 15.4 Effect of tourism related developments on ecology
 - 15.5 Pollution related to tourism
 - 15.6 Disposal of solid and liquid waste from tourist destination
 16. Wildlife techniques-radiometry, photographic identification of animals etc.
 17. Wildlife of India-reserves, management, diversity, special protection programmes.

6. ENVIRONMENTAL BIOLOGY

PAPER-VI: ECOTOXICOLOGY, ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY

Duration : 3 Hours

Max. Marks – 100

Periods : 90

1. Environmental Health and Toxicology
 - A. Types of Environmental Hazards
 1. Infectious organisms
 2. Chemicals (Pesticides, metals, solvents)
 3. Radiation
 - B. Movement, distribution and fate of toxins
 1. Bioaccumulation
 2. Biomagnifications
 3. Biotransformation (metabolic degradation and excretion)
 - C. Carcinogenesis, genetic toxicology, developmental toxicology and wildlife toxicology
2. Measuring toxicity

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- A. Animal testing:
- (a) Acute, sub chronic and
 - (b) Chronic
 - (c) GLP
- B. Environmental impact assessment with special reference to biotic environment
- C. Risk assessment
- D. Statistical analysis of data
3. Pollution
- A. Air
- Natural sources of air pollution
 - Human caused air pollution
 - Acid rain
 - Climate: Topography and atmospheric process
 - Global warming: The green house effect, green house gases, potential effect of global warming
 - Control of air pollution
 - Ozone depletion
- B. Water
- Types and effects of water pollution
 - Infectious agents
 - O₂ demanding waters
 - Plant nutrients and cultural eutrophication
 - Toxic inorganic and organic materials
 - Human waste disposal
 - Waste water treatment
4. Biogeochemical cycling
- Carbon cycle
 - Nitrogen cycle
 - Sulfur cycle
 - Phosphorus cycle
 - Iron & other element
5. Biodeterioration Control and Soil, Waste, and Water Management
- Control of biodeterioration
 - Management of agricultural soils
 - Treatment of solid waste
 - Treatment of liquid waste

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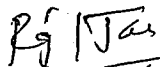
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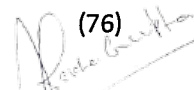
6. Microbial Interaction with Xenobiotic and Inorganic Pollutants
- Persistence and biomagnifications of xenobiotic molecules
 - Polychlorinated biphenyls and dioxins
 - Synthetic polymers
 - Microbial interaction interactions with some inorganic
 - Acid mine drainage
 - Microbial conversions of nitrate
 - Microbial methylations
 - Microbial accumulation of heavy metals and radio nuclides
7. Biodegradability testing and monitoring the bioremediation of xenobiotic pollutants.
- Biodegradability and ecological side effect testing
 - Biosensor detection of pollutants
 - Bioremediation
 - Environmental modification for bioremediation
 - Microbial seeding and bioengineering approaches to the bio remediation of pollutants
 - Bioremediation of marine oil pollutant
 - Bioremediation of air pollutants
8. Microorganisms in Mineral and Energy Recovery and Fuel and Biomass Production
- Recovery of metals
 - Recovery of petroleum
 - Production of fuels
 - Production of microbial biomass
 - Single-cell protein production
9. Microbial Control of Pests
- Controlling pest populations of plants and animals
 - Microbial controls of other animal pests
 - Microbial control of weeds and cyanobacterial blooms
 - Genetic engineering in biological control
 - Frost protection
 - *Bacillus thuringiensis* pesticides
 - Other applications

PRACTICAL EXERCISES

Paper-I

1. Visit to at least 3 biomes of India for the detail study: Student should submit the report on the study covering major fauna, flora and geography.


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2. Determination of population density
3. Collection of flora (herbarium) & fauna (insect).
4. Visit to some of the few following natural habitats and wildlife sanctuaries desert, mountain range, wetland, coastal habitat, forest wildlife sanctuaries of India and especially Rajasthan. (students are required to submit the joint report on the field visits undertaken by them).
5. Identification of mammalian species using hair imprinting, electrophoresis to identify the species of wildlife, collection of molts of birds.
6. Determination of population density of small mammals using transect method.
7. Collection and identification of insect fauna of wildlife habitats.
8. Collection of fecal matter samples of herbivore from wildlife habitat to study the parasitic load.
9. Determination of home range of birds/mammals.
10. Study of herd structure of herbivore population.
11. Study of hierarchy in monkey population.

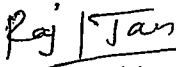
Paper-II

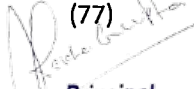
1. Water analysis for fresh and waste water for physicochemical properties and planktons.
2. Air quality monitoring.
3. Bioassay of polluted water using microbes or any other higher animal (fish).
4. Pesticide residue analysis using GC and TLC techniques
5. Water pollution detection (microbial).
6. Trips to natural habitat and manmade habitats to study the human impact on environment.
7. Project work.
8. Electrophoretic analysis of proteins.
9. Enumeration and isolation of soil microorganisms agar plate technique, bacteria, fungi and protozoa.
10. Bacterial examination of water for portability, microorganism, E-coli, staphylococci faecalis as indicators of pollution. MPN index- IMVIC test-Endo agar.
11. Testing of water/soil/sweage for physicochemical parameters including COD and BOD.
12. Field trip to ponds/coastal/other treatment (water or industrial water) plants. Report to be submitted.

Note:

1. Slides to be submitted from the exercises.
2. With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

PRACTICAL EXAMINATION SCHEME


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Duration: 6 Hours

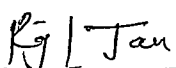
Max. Marks – 100

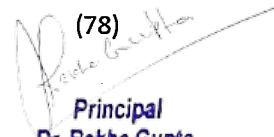
Exercise	Marks
1. Bioassay	5
2. TLC/ Paper chromatography: Pesticide/Toxicant residue analysis	10
3. Electrophoresis: Analysis of proteins	10
4. Bacterial examination of water (MPN index/IMVIC tests/Microbiological exercise agar plate technique)	10
5. Water/Waste water analysis for physiochemical properties	10
6. Identification of Zooplanktons	5
7. Determination of population density	5
8. Spotting (1-5)	15
9. Project/Seminar/Report	10
10. Record + submission of slides	5+5
11. Viva-voce	10


Total = 100

Recommended Books

1. An Advanced Textbook on Biodiversity: Principles and practice. Krishnamurthy, K.V. 2004. Oxford and IBH. Publ. Co. New Delhi.
2. Climate change: past, present and future. Mathur, U. B. Geological Society of Bangalore 2010.
3. Coastal Ecosystem Processes. Alongi, D. M. 1998. CRC Press, New York.
4. Conservation Biology. Pullin, A.S. 2002. Cambridge University Press, UK.
5. Conservation Biology. Soule, M.E. 1986. (Ed.). Sinauer Associates, New York.
6. Ecological Census Techniques-A Handbook (2nd Edition). William J. Sutherland. Edited by William J. Sutherland.
7. Ecological Concepts. Cherrett, J. M. Blackwell Sci. Publications. Oxford U. K.
8. Ecological Methodology. IInd Edition Charles J. Krebs.
9. Ecological Methods. IVth Edition, Southwood, T. R. E., Dr. Peter A. Henderson. Wiley-Blackwell.
10. Ecology, Environment, and Resource Conservation. Singh, J. S., Singh, S. P. and Gupta, S. R. 2006. Anamaya Publ., New Delhi.
11. Ecology, Individuals, Populations and Communities. Begon. M., J.I., Harper and C. R. Townsend. Science. Oxford.
12. Ecology: Principles and Applications. Chapman, J.L. and Reiss, M.J. 2005. Cambridge University Press, London.
13. Ecology: The Experimental Analysis of Distribution and Abundance. (6th edn.). Krebs, C.J. 2008. Benjamin Cummings Publ., USA.
14. Edward J. Concepts of Ecology. (4 Ed.). Kormondy.
15. Elements of Ecology. (6th edn.). Smith, T.M. and Smith, R.L. 2006. Pearson. New Delhi.
16. Encyclopedia of Biodiversity. Levin, S. A. 2000. (Ed.). Academic Press.


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17. Essentials of Conservation Biology: Primack, R.B. 1998. Sinauer Associates.
 18. Essentials of Ecology and Environmental Science. Rana, S.V.S. 2005. Prentice Hall of India, NewDelhi.
 19. Freshwater Ecology: Principles and Applications. Michael Jeffries and Derek Mills. John Wiley.
 20. Fundamentals of ecological modeling. Jorgensen, S. E., & Bendoricchio, G. (Vol. 21). Elsevier.
 21. Fundamentals of Ecology. Odum E.P. and Barrett, G. W. (2005). Thomson Asia Pvt. Ltd. Syngapore.
 22. Land Mosaics: The Ecology of Landscapes and Regions. Forman, R.T. 1995. Cambridge Univ. Press, Cambridge, UK.
 23. Landscape Ecology. Forman, R.T.T. and Godron, M. 1986. John Wiley & Sons, New York.
 24. Population Biology. Elseth. B. D. and K. M. Baumgartner. Van Nostrand Co., New York.
 25. The Atmosphere. Lutgens, F.K. and Tarbuek, J.E. 1992. Prentice Hall, New Jersey
 26. The Living Landscape: An Ecological Approach to Landscape Planning, 2nd Edition. Steiner, F. 1999. McGraw Hill, Inc., New York.

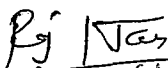
7. FISH BIOLOGY

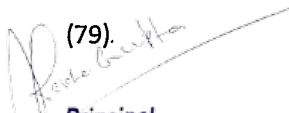
PAPER-V: FISH BIOLOGY

Duration : 3 Hours

Max. Marks – 100

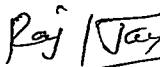
1. Classification of fishes with special reference to evolutionary trends and adaptations. 3
2. Integument and exoskeleton. 3
3. Fins: Types of fins structure, modifications and functions of fins 3
4. Locomotion: Locomotion muscle, the red (slow) and white (fast) muscle fiber types modes of swimming and hydromechanics of propulsion; role of fins in swimming; significance of swimbladder in swimming; non-swimming locomotion. 5
5. Food, feeding habits and feeding adaptations/behaviour, structure of the alimentary canal and physiology of digestion and absorption. 3
6. Planktons: Classification, common organisms and their importance; algal bloom, nutrient cycle, trophic levels and energy flow. 5
7. Blood vascular system: Structure of the heart; principal blood and circulation of blood (elasmobranch, teleost and Dipnoi) 5
8. Gills and aquatic respiration organization of gills in fishes; structure of a typical teleostean gill, physiology of gill respiration; gill ventilation, gill surface area, blood flow through gills, water blood barrier, gas exchange at the gill surface and gas exchange between blood and tissues. 5
9. Air breathing fishes; causative factors and structural adaptations. 3

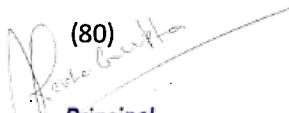

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10. Structure and functions of the kidney; nitrogenous products and pattern of their excretion. 3
11. Water and electrolyte regulation in marine, fresh water and euryhaline fishes. 2
12. Structure and functions of the swimbladder. 2
13. Study of feeding habits of fish through qualitative and quantitative analysis of gut contents of herbivorous carnivorous and omnivorous species. 4
14. Nervous system: Structure and functions of the central, peripheral and autonomic nervous systems; anatomy and function of the Mauthner neurons. 4
15. Structure and functions of the sense organs: 5
 - 15.1 Eye; visual pigments and vision
 - 15.2 Chemoreceptors: Olfactory and gustatory; biological significance of chemoreception.
 - 15.3 Labyrinth.
 - 15.4 Mechanoreceptors (lateral line organs)
16. Structure and physiology of the endocrine organs and tissues: 12
 - 16.1 Pituitary
 - 16.2 Thyroid
 - 16.3 Gonads.
 - 16.4 Adrenal.
 - 16.5 Endocrine pancreas.
 - 16.6 Ultimobranchial.
 - 16.7 Caudal neurosecretory cells and urophysis.
 - 16.8 Pineal.
17. Reproduction: Organs of reproduction; modes of reproduction; oviparity, viviparity hormonal and environmental regulation of reproduction. 5
18. Reproductive behaviour: Secondary sexual characters, nest building and parental care. 2
19. Development: Types of eggs; fertilization; hatching and metamorphosis 2
20. Adaptations: Coloration, sound production, electric, organs, luminescent organs (location, structure, physiology and biological significance). 2
21. Adaptations in deep sea, hill-stream and cave-dwelling fishes; freezing avoidance in arctic and antarctic fishes. 3
22. Migration; its types and causes. 2
23. Fish pathology: Symptoms, etiology, prophylaxis and treatment of common diseases and pathological condition in cultivable fish. 2
24. Setting-up and maintenance of an aquarium. 2
25. Fish products and by products: Liver oil, body oil, meal, fish manure, guano, glue, isinglass, roe (caviar), fins and leather. 2

Note:


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1. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

7. FISH BIOLOGY

PAPER-VI: AQUACULTURE AND FISHERIES

Duration : 3 Hours

Max. Marks – 100

Periods : 90

1. Definitions of (a) inland, (b) marine (c) capture (d) culture fisheries. 3
2. Riverine fisheries: Ecology and fisheries of the major river systems; effects of dams and barrages on riverien fisheries. 6
3. Reservoir fisheries: Location, ecology and fisheries of some important reservoirs; development, exploitation and management of reservoir freshwater fisheries. 6
4. Coldwater fisheries: Ecology of high altitude streams lakes and reservoirs; present status and scope for development of important coldwater fisheries. 6
5. Estuarine fisheries: Ecology and fishery resources of major estuaries; potential and management of estuarine fisheries. 6
6. Marine fisheries
 - 6.1 Ecology and general survey of marine capture fisheries with special reference to sardine, mackerel, Bombay duck and Pomfret. 6
 - 6.2 Offshore and deep sea fishery Potential in EEZ (Exclusive Economic Zone) 1
7. Estimation of fecundity and population dynamics and fishery catches. 3
8. Growth and age; environmental factors and methods. 3
9. Crustaceans and Molluscan fisheries (Marine water, Brackish water and Fresh water). 3
10. Methods of Fishing: Crafts (non-mechanised and mechanised) and gears used in India for fishing: in inland,marine water; recent advances in fishing methods, electrical fishing; light fishing, fish finders (Eco-sounder and sonar) and their use. 3
11. Transport and preservation of fish: Methods of transport, post mortem changes and rigor mortis in fish; spoilage (bacterial and chemical); fish preservation-handling and cleaning of fresh fish, ceiling, freezing, quick freezing, use of chemicals and antibiotics irradiation, salting, drying freeze-drying, smoking, canning and pickling. 5
12. Fishery management: Fish yield, effect of fishing on yield and optimum catch, concept of a rational fishery. 3
13. Ecology and Productivity of freshwater lake and perennial fish pond indices of productivity; physical and chemical characteristics of water, nature and fertility of the soil. 3
14. Environment and fish: Environmental factors (abiotic and biotic), interrelation to the life of fishes; pollution of ecosystems sources of pollution and nature of pollutants, effects of pollution on fisheries, legislative and other remedial measures to contain aquatic pollution. 3


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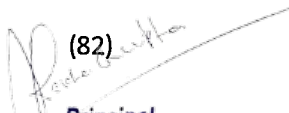
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15. Freshwater fish culture in India; Fish seed resources (riverine, bundh breeding, hypophysation) hatching of eggs, hatchlings, 'hapas' and different types of hatcheries, management of hatcheries; methods of transporting fish seed, fingerlings and breeders; causes of mortality during transportation and measures for reducing it. 7
16. Planning and management of freshwater ponds for fish culture (freshwater fish-farming); survey of site, layout, soil and water requirements; preparation of nursery, rearing and stocking ponds; control of predators and weed fishes; liming, and manuring control of aquatic insects and weeds procurement and segregation of fish seed; stocking rates; stocking ratios of different species for composite culture; artificial feed and supplement feeding, harvesting. 7
17. Culture of Indian major carps (Rohu, Catla and Mrigal), exotic carps, Common carp, grass carp, silver carp and tilapia; composite culture principle, techniques and significance: Wet and dry bundh technique, induced breeding, hypophysation, selective breeding and hybridization. 6
18. Cold-water culture of trout: Mahseer, culture method and management.
19. Larvivorous fishes and their importance. 2
20. Nutrition and physiological energetic: Nutritional requirement of fish with reference to proteins, lipids, carbohydrates, vitamins and minerals; essential amino acids and essential fatty acids; energy requirements; food conservation, efficient energy budgets. 2
21. Fish as food: Biochemical composition of raw fish, factors affecting biochemical composition of fish; nutritive value of raw and preserved fish; poisoning, toxicity and allergies from fish as food; quality control of fish as food. 2
22. Fisheries education, training and extension in India : Brief information about the objectives and functions of Central Institute of Fisheries Education (Bombay), Central Inland Capture Fisheries Research Institute (Barrackpore), Central Institute of Freshwater Aquaculture (Chennai), National Bureau of Fisheries Genetics Resources (Lucknow), Central Marine Fisheries Research Institute (Cochin), Central Institute of Fisheries Nautical and Engineering Training (Cochin), Central Institute of Fisheries Technology (Cochin) and National Institute of Oceanography (Goa). 2

List of Practicals Exercises

1. Study of distinguishing features, identification and classification of specimens of important species of fish available in the museum; Collection of local fish fauna and its identification upto the species level using taxonomic keys.
2. **Anatomy and Histology:**
 - (a) Study of anatomy of teleost represented by the catfish *Wallago attu*:
External anatomy and gills, viscera, alimentary canal and urinogential organs; musculature for gill ventilation, and feeding; eye muscles and their innervation, endoskelton (through dried and alizarin preparation), branchial blood vessels, brain and cranial nerves, swim bladder, Weberian ossicles, membranous labyrinth connections.
 - (b) Preparation and study of stained permanent mounts of Ampullae of Lorenzini (from *Dasyatis*), otolith, scales (Placoid, cycloid and ctenoid), gill filament and olfactory lamella.
 - (c) Dissection of air-breathing organs and their blood supply in *Anabas testudineus*, *Clarias batrachus*, *Heteropneustes fossilis* and *Channa* sp.


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(d) Study of fish anatomy and histology through available slides.

Preparation of microscopic slides of stained, sections of following organs/tissues structures from an adult teleost for their histological study of liver, intestine, kidney, testis, ovary, gill, pituitary, thyroid tissue, head kidney (for interrenal and chromaffin cells).

4. **Physiology and biochemistry.**

4.1 Study of the effect of epinephrine, NaCl and KCl on fish chromatophores.

4.2 Study of changes in chromatophores of fish kept against white (light) and black (dark) backgrounds for protracted periods.

4.3 Determination of the rate of oxygen consumption (Winkler method) in a water breathing fish at different temperatures.

4.4 Determination of the rate of ammonia and urea excretion in fish.

4.5 Estimation of protein, fat, ash and water contents in fish muscle.

4.6 Study of free amino-acid pool in fish muscle through paper chromatography.

5. **Basic Laboratory Techniques:**

Maintenance of fish in freshwater: Setting up to an aquarium, quality of water in the aquarium and its aeration: Introduction of fish in the aquarium; feeding of fish and management of aquarium.

Ecology: Physico-chemical analysis of water.

Age and growth.

Identification of maturity stages of fish; determination of gonosomatic index; estimation of fecundity; measurement of ova diameter.

Plankton, Benthos and Primary productivity: Collection of plankton and its qualitative and quantitative analysis; identification of common groups of freshwater plankton; collection and analysis of benthos from a freshwater fish pond, identification of common weeds, predatory fishes and harmful insects in a fresh water fish pond; estimation of primary productivity in a freshwater pond or lake by dark and light bottle method.

Identification of important cultivable species of fish, their eggs and principal stages in their life histories.

Induced breeding through hypophysation, dissection, collection and preservation of pituitary gland; preparation of pituitary gland extract; dosage and technique of injecting pituitary gland extract.

Water Analysis; determination of water temperature, light, turbidity, dissolved oxygen, dissolved carbon dioxide, ammonia, salinity, alkalinity, nitrates, phosphates, pH, particle size, available nitrogen and free calcium carbonate.


Fish anesthetics and anesthetization; simple surgical procedure (gonadectomy), fish saline.

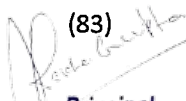
Fieldwork and study tour

1.1 A visit to a fish farm/fish seed production centre.

1.2 3 to 4 day tour to study various fisheries activities at selected centres/sites.

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1. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.
2. Slides from exercise to be submitted at the time of examination.

PRACTICAL EXAMINATION SCHEME

Duration : 6 Hours

Max. Marks – 100

1. Major dissection	10+5=15
2. Minor dissection/slide preparation/species identification	
3. Identification and comments on spots (1-8)	24
4. Microtomy procedure and preparation of slides	10
5. Plankton identification/primary productivity/water analysis	8
6. Physiology/biochemistry	10
7. Determination of age/growth/maturity stage/GSI	5
8. Record/Field work & Slide submission	5+5
9. Viva-voce	10

Total = 100

Note:

1. Submission of slides from the above exercises
2. With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

Recommended Books

1. Bond. B : Biology of Fishes, Saunders, Philadelphia.
2. Brown, M.E.: The Physiology of Fishes, Vol I & II.
3. Chandy, M. : Fishes, National Book Trust, India.
4. Day, F.: The Fishes of India, William Dawson and Sons, London.
5. Hoar, W.S., Randall, D.I. (eds) : Fish Physiology, Vol 1 to 11 Academic Press.
6. Jhingran, V.G. : Fish and Fisheries of India, Hindustan Publication Corp., India.
7. Langer, K.F. : Ichthyology, Wiley & Sons, New York.
8. Norman, I.R. : A History of Fishes.

8. RADIATION BIOLOGY

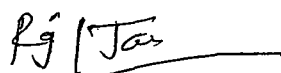
PAPER-V: BASIC OF RADIATION

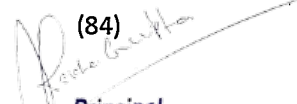
Duration: 3 Hours

Max. Marks – 100

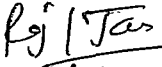
Periods : 90

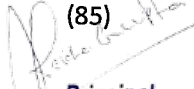
1. Atomic Structure


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- 1.1 Theories of atomic structure.
- 1.2 Isotopes, isomers and isobars.
- 1.3 Mass Number and Atomic mass.
- 1.4 Sub-atomic particles.
- 1.5 Excitation and ionization.
- 1.6 Nuclear forces and nuclear structure.
2. Types of Radiation.
 - 2.1 Nuclear Radiation.
 - 2.2 X-rays-characteristics, production and uses.
3. Radioactivity
 - 3.1 Natural radioactivity.
 - 3.2 Artificial radioactivity.
 - 3.3 Half-life.
 - 3.4 Natural decay series.
 - 3.5 Background radiation.
4. LET and RBE
5. Radiation Dosimetry
 - 5.1 Units of radiation and radioactivity.
 - 5.2 X-rays dosimetry
 - 5.3 Radiation weighting factors and equivalent dose.
 - 5.4 Tissue weighting factor and effective dose.
 - 5.5 Cumulative doses.
 - 5.6 External and internal dosimetry.
 - 5.7 Microdosimetry.
 - 5.8 Maximum Permissible Dose (MPD)
6. Detection and measurement of radiation
 - 6.1 Ionization chamber.
 - 6.2 Scintillation detectors.
 - 6.3 G.M. counter.
 - 6.4 Proportional counter.
 - 6.5 Gamma ray spectrophotometer.
 - 6.6 Autoradiography, RIA.
7. Radiation chemistry
 - 7.1 Radiolysis of water.
 - 7.2 Hydrogen peroxide formation.
 - 7.3 Reactions in aqueous organic solutions.


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- 7.4 Direct and indirect effects.
- 7.5 Oxygen effect.
8. Sources of Radiation Hazards
- 8.1 Natural sources.
- 8.2 Artificial sources.
- 8.3 Sealed and unsealed sources.
- 8.4 External radiation hazards.
- 8.5 Internal Radiation hazards.
9. Radiation Monitors
- 9.1 Personnel monitoring equipments.
- 9.2 Film badge.
- 9.3 Pocket dosimeter.
- 9.4 Thermo Luminescence Dosimetry (TLD)
- 9.5 Area monitoring.
10. Radioactive Contamination and Decontaminations
- 10.1 Source of contamination.
- 10.2 Control of contamination.
- 10.3 Contamination monitoring.
- 10.4 Decontamination.
11. Radioactive waste management
- 11.1 Characteristics of radioactive waste.
- 11.2 Management of nuclear waste.
- 11.3 Discharge of wastes.

PAPER-VI: RADIATION EFFECTS

Duration : 3 Hours

Max. Marks – 100

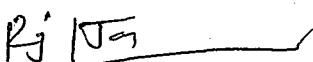
Periods : 90

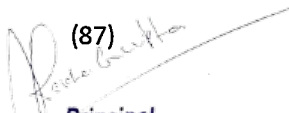
1. Interaction of radiation with matter.
- 1.1 Direct effects of ionizing radiation.
- 1.2 Indirect effect of ionizing radiation (photoelectric effect, Compton effect, pair production).
- 1.3 Bremsstrahlung effects.
- 1.4 Interaction of neutrons.
- 1.5 Nuclear fission and fusion (production of isotopes, nuclear reactors and accelerators).
2. Cellular radiobiology

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- 2.1 Apoptosis.
- 2.2 Reproductive cell death.
- 2.3 Survival curves.
- 2.4 Radiosensitivity of cell cycle phases.
- 2.5 Factors influencing radio sensitivity (oxygen effect & chemical modifiers).
- 2.6 Classification of mammalian cell sensitivity.
- 2.7 Effects of radiation on macromolecules including repair (Nucleic acids, Proteins).
3. Acute radiation effects
 - 3.1 Concept of LD₅₀
 - 3.2 Central nervous system syndrome.
 - 3.3 Gastro-intestinal syndrome.
 - 3.4 Bone marrow syndrome.
 - 3.5 Skin reactions.
4. Delayed effects of radiation
 - 4.1 Stochastic and deterministic effects.
 - 4.2 Radiologic aging.
 - 4.3 Life shortening.
 - 4.4 Radiation carcinogenesis.
5. Radiation effects on embryo and foetus
6. Radiation immunology
 - 6.1 Immunity response.
 - 6.2 Radiation as immunosuppressive agent.
 - 6.3 Long term changes in the immunological reactivity of the irradiated organisms.
7. Cytogenetic effects of radiations.
 - 7.1 Chromosomal aberrations.
 - 7.2 Micronuclei induction.
 - 7.3 Radiation mutations.
8. Radiation Hormesis.
 - 8.1 Evolution of current radiation paradigms.
 - 8.2 Epidemiological evidence.
 - 8.3 Experimental studies and adaptive response.
9. Radiation hazard evaluation and control
 - 9.1 Control of external hazards.
 - 9.2 Control of internal hazards.
 - 9.3 Exposure rate, constant.
10. Radiation Accidents (special reference to Rajasthan-Pokharan I & II)


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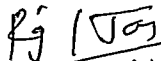
(87)

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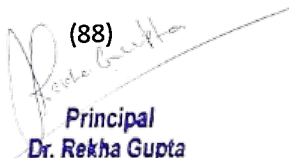
11. Radiation safety and regulatory aspects
- 11.1 Radiographic installations.
 - 11.2 Enclosed installations.
 - 11.3 Field installations.
 - 11.4 Personnel management.
 - 11.5 Source storage facilities.
 - 11.6 Safe work practice.
 - 11.7 Re-commendations of National/International statutory bodies.

LIST OF PRACTICAL EXERCISES

Radiation Biology

1. Knowledge and use of: Geiger-Muller counters. Decade Scalar, Scintillation counters (Crystal and Liquid), Survey meter, Single-channel gamma spectrometer, Actigraph system, Cobalt camera, Tere foil.
2. Finding out the operating voltage of the G. M. tube.
3. Calculation of Inverse Square Law.
4. Determination of the resolving time of the G.M. tube.
5. Absorption of beta and gamma rays.
6. Determination of self-absorption factor.
7. Determination of backscattering factors.
8. Finding out the physical half-life of a given isotope:
 - (a) Single isotope method.
 - (b) From a mixture of two isotopes.
9. Autoradiography
 - (a) Liquid-emulsion method.
 - (b) Stripping film method.
10. Histopathological, histochemical and biochemical studies of various tissues after external and Internal irradiation.
11. Personnel monitoring. Use of G.M. survey meter, Film badge, and Room Contamination monitor.
12. Study of permanently prepared histopathological slides.
13. Decontamination of contaminated material.
14. Visits to the Radiology Department, S.M.S. Medical College, Jaipur, Rajasthan; Atomic Power Project, Kota and Bhabha Atomic Research Centre, Mumbai.
15. Class Record & Seminar.
16. Viva-voce.


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Note:

1. **Submission of slides from the above exercises**
With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. **It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.**

SCHEME OF PRACTICAL EXAMINATION

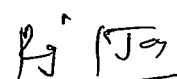
Duration : 6 Hours

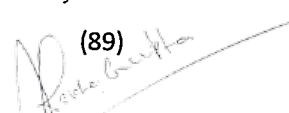
Max. Marks – 100

- | | |
|---|-----------|
| 1. Major exercise (1) | 24 marks |
| 2. Minor exercise (1) | 16 marks |
| 3. Preparation and study of a histopathological slides/histochemical/
biochemical estimation of various macromolecules in different
tissues (Proteins, Glycogen, Cholesterol, Nucleic acids etc.) | 16 marks |
| 4. Spotting (8) | 24 marks |
| 5. Record & Submission of slides | 5+5 marks |
| 6. Viva-voce | 10 marks |

Recommended Books

1. Advanced Medical Radiation Dosimetry. Rajan O. Prentice-Hall of India Pvt. Ltd. New Delhi, 1992.
2. Applied Radiobiology of Radiation Protection. Granien, R., Prentice Hall, 1990.
3. Basic Radiation Biology. Pizzarello D.J., Witcofsli Lea R. L. and Febiger: Philadelphia, 1970 or Later.
4. Biological Aspects of Human Irradiation Eds. Pant, G. S. and Basu, AK. Himalaya Publishing House, Delhi, 1992.
5. Biological Assessment of occupational Exposure to Actinides. G. B. Gendes, H. Metives and J. Stathes: Nuclear Tech. Pub. Kent, 1989.
6. Biological Effects of Radiation. Coggle. J.E. : Taylor and francis Ltd., London, 1988 or Later Edition.
7. Biological Effects of Radiations. Grosel, D. S. and Hop Zwood, L.E. Academic Press, New York, 2nd Edition, 1979 or Later Edition.
8. Biological Radiation effects. Kiefer, J. Springer-Venlag, Berlin, 1989.
9. Cellular Radiobiology. Lawrence c.w. Arnold, London, 1971 or Later Edition.
10. Developmental Effects of Prenatal Irradiation. Kriegel, H.. VCH, 1982.
11. Elements of Radiobiology, Seiwan J. Thomas, C. C. 1983.
12. Environment and Human Risks of Tritium, Gesben, G., C. M. Menaene and H. Smilts: Nuclear Tech. Pub. Kent, 1986.
13. Essential of Radiation Biology and Protection, Steve Forshie: Publisher: Delmar Cengage Learning.
14. Frontiers of Radiation Biology. Riklin, E. ed. VCH, 1990.
15. Health Effects of Low Level Radiation, Hendec. w. R. : Prentice Hall. 1984.
16. Human Radiation Biology. Prasad, K. N., CRC Press, inc. Cleveland, Ohio, USA, 1984.
17. Introductory Biostatistics for the Health Sciences. Duncan R. C., Knapp., R. G., and


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- Miller III, M.C., :John Wiley and Sons. Inc., New York, 1977 or Later Edition.
18. Ionizing Radiation and Life. Mosby, Avena, V: St. Louis. 1971 or Later Edition.
 19. Low Dose Radiation Biological Bases of Risk Assessment. Baverstock, K. of Staltar, J. Taylor of Francis, 1989.
 20. Low level Radiation and Living State. Huilgol. N. G. et al.: Naraza Publishing House, Community Center Panchsheel Park, New Delhi, 1993.
 21. Low level Radiation Effects. Broil. AB. A fact Book: Society of Nuclear Medicine, USA, 1982.
 22. Medical Radiation Biology. Dalrymple, G. V, Ganldev, M.E., Kollmorgen, G. M. and Vogel, H. J. Saunders. Philadelphia, 1973 or Later Edition.
 23. Radiation and Life. Hall. E. I. : Pergamon Press, Oxford, U. K. 2nd Edition, 1987.
 24. Radiation Biophysics. Prentice –Hall Engel-Wood Cliffs. Andrews, H. L.: New Jersey. 1974 or Later Edition.
 25. Radiation Carcinogenesis. Upton, A. C. Ehseviees, 1986.
 26. Radiation Exposure and Occupational Risks. Scheres, E., c. Streffer, K. R. Trott.: Eds. Berlin, 1990.
 27. Radiobiological Consequences of Nuclear Accidents –Contamination Radioecology, Bulokav EB., V Naiitel and J. B. Reitan: Radiobiology and Health.
 28. Radiobiology for the Radiologist. 3rd Edition, Hall. E. L. : Harper and Row, 1990 or Later Edition.
 29. Radiobiology. Fobrikant. J. I. : Year book med., Chicago, 1972 or Later Edition.
 30. Radioisotope Methodology. Chase, GD. and Robinowitz, J. L. Burgess Publishing Co. Minneapolis, Minn, USA. 3rd Edition, 1967 or Later.

9. REPRODUCTIVE BIOLOGY

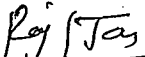
PAPER-V: ENDOCRINE GLANDS AND REGULATORY PROCESSES

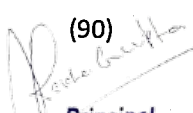
Duration : 3 Hours

Max. Marks – 100

Periods : 90

- | | |
|--|----|
| 1. Endocrine glands: An overview | 1 |
| 2. Biochemical nature of hormones. | 2 |
| 3. Mechanism of hormone actions. | 5 |
| 4. Structure and nomenclature of steroid hormones, steroidogenesis. | 5 |
| 5. The female reproductive system: Comparative anatomy and physiology of the mammalian and sub mammalian. ovary and ductal system. Follicular growth, kinetics and atresia, ovarian hormone two cell theory of estrogen biosynthesis. Autocrine, Paracrine and endocrine regulation of ovarian functions. | 12 |
| 6. The male reproductive system: Comparative anatomy and physiology of the mammalian and sub mammalian testis, epididymis and the sex accessory glands; Functional organization of testis, spermatogenic cycle. Testicular androgens, autocrine, paracrine and endocrine regulation of testicular functions. Semen and its biochemical nature. | 12 |


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7.	Regulation of reproduction	10
7.1	The pituitary gland: Functional cytology, adeno-hypophyseal hormones, their chemistry and physiology.	
7.2	The Hypothalamus and its neurosecretory centres: Structure of neurosecretory cells, the hypothalamic principles: synthesis, storage, release and chemistry.	
7.3	The phenomenon of neuroendocrine integration and the hypothalamo - hypophyseal gonadal axis.	
8.	Role of thyroid, pineal and adrenal glands in reproduction.	7
9.	Breeding seasons and reproductive cycles.	3
10.	Hormonal regulation of reproductive behaviour.	3
11.	Biology of Sex-determination and Sex-differentiation.	3
12.	Biology of spermatozoa and ovum: Structure, development and function.	4
13.	Fertilization: Pre-fertilization events, biochemistry of fertilization and post-fertilization events.	4
14.	Implantation and its hormonal regulation, delayed implantation.	3
15.	Placenta as an endocrine tissue: foeto-placental unit.	2
16.	Gestation and its hormonal regulation.	2
17.	Parturition and its hormonal regulation.	2
18.	The mammary gland : Endocrinology of lactation.	2
19.	Prostaglandins: Chemistry, mechanism of action and their role in reproduction.	4
20.	Miscellaneous factors affecting reproduction: nutrition, light, temperature, pheromones, environmental disruptors.	4

9. REPRODUCTIVE BIOLOGY

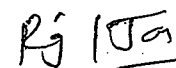
PAPER-VI: REPRODUCTIVE TECHNOLOGICS

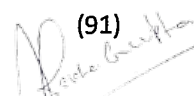
Duration : 3 Hours

Max. Marks – 100

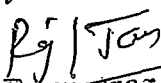
Periods : 90

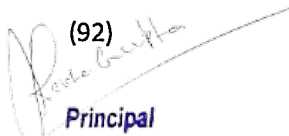
1.	Fundamental aspects of control of fertility in males:	12
1.1	Mechanical.	
1.2	Surgical.	
1.3	Chemical.	
1.4	Immunological methods	
2.	Fundamental aspects of control of fertility in females:	14
2.1	Natural.	
2.2	Mechanical.	


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2.3	Surgical.	
2.4	Chemical.	
2.5	Immunological.	
2.6	Emergency contraception.	
3.	Control of fertility in Insects.	3
4.	Induced spawning in Fishes.	2
5.	Techniques for improvement of breeding farm animals.	4
6.	Anatomy and physiology of the endocrine and neuroendocrine structures of annelids, arthropods and mollusca with special reference to their role in reproduction.	10
7.	Reproductive dysfunctions in males and females.	6
8.	Diagnosis of male infertility.	6
8.1	Semen analysis: Physical examinations, microscopic examinations, biochemical analysis, immunological tests.	
8.2	Sperm function tests: Sperm mitochondrial Hypo-osmotic swelling test, acrosome, reactin, Zona binding assays, Acrosome intactness test, and hamster-oocyte penetration test.	
8.3	Endocrinological diagnosis.	
9.	Diagnosis of female infertility.	6
9.1	Monitoring of ovarian and reproductive cycles.	
9.2	Endometrial biopsy.	
9.3	Ductal blockage.	
9.4	Endocrine diagnosis.	
10.	Assisted Reproductive Technology (ART).	8
10.1	Super ovulation, oocyte collection.	
10.2	Collection and preparation of sperm for assisted fertilization.	
10.3	Inseminatin.	
10.4	<i>In vitro</i> fertilization and related techniques (IVF, GIFT, ZIFT, TESE, ICSI).	
10.5	Assisted Zona hatching (AZH), Autologous endometrial co-culture , cytoplasmic transfer surgical sperm retrieval (SSR)	
11.	Cryopreservation of semen, oocytes and embryos.	2
12.	Cloning, transgenic animals.	2
13.	Teratological effects of xenobiotics.	2
14.	Pre-natal diagnosis.	1
15.	Impact of aging, hormone replacement therapy.	3
16.	Hormonal bioassay (FSH, LH, Testosterone, TSH & ACTH)	7
16.1	ELISA.	
16.2	Radio Immuno assay (RIA).	
16.3	Radioreceptor binding assay.	


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LIST OF PRACTICAL EXERCISES

Practicals:

1. Dissection of male and female reproductive systems in laboratory animals.
2. Histology of the genital organs in normal and pathological conditions (Microtomy).
3. Monitoring of the exocrine and endocrine functions of gonads. (Vaginal smear, sperm function tests)
4. Biochemical investigations of the reproductive glands with special reference to their markers.
5. Surgical procedures in reproduction.
6. Induction of super-ovulation and collection of oocytes.
7. Demonstration of *In vitro* fertilization (GIFT, ZIFT, TET, ICSI, etc.)
8. Hormonal bioassays.
9. Pregnancy test.
10. Study of permanent histological slides: Various endocrine glands, male and female reproductive systems.

Note:

1. Submission of slides from the above exercises.
2. With reference of whole mounts and museum specimens the animal types may be substituted with diagrams/photographs/models etc.
3. It should be ensured that animals used in the practical exercise are not covered under the wild life act 1972 and amendments made subsequently.

SCHEME OF PRACTICAL EXAMINATION

Duration : 6 Hrs.

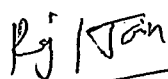
Max. Marks : 100

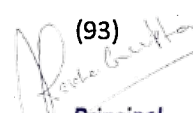
- | | |
|---|-----|
| 1. Dissection of male and female reproductive organs surgical procedures. | 12 |
| 2. Monitoring of exocrine and endocrine functions of gonads. | 10 |
| 3. Biochemical investigations of marker parameters. | 12 |
| 4. Microtomy | 12 |
| 5. Hormonal bioassay Pregnancy test, in vitro fertilization (GIFT, ZIFT, TET, ICSI) | 10 |
| 6. Spots (1-8) | 24 |
| 7. Record & submission of slides | 5+5 |
| 8. Viva-voce | 10 |

Total 100

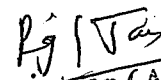
Recommended Books

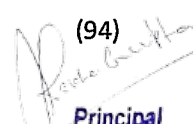
1. A Text Book of comparative Endocrinology. Gorbman, A and Bern, H. A. John Wiley and Sons Inc., New York, 1962. (Indian reprint, Wiley Eastern Pvt. Ltd., New Delhi, 1974).
2. An Introduction to General and Comparative Endocrinology by Barrington: E. J. W. Clarendon Press, Oxford, 1963


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3. Andrology Male Reproductive Health and Dysfunction. Nieschlag F. and Behre H.M Springer-Verlag, Berlin-2001
4. Biology of Gestation. Assali, N. S. (ed.) Vol. I and II Academic Press, New York.
5. Biology of Human Reproduction. Pinon, Jr. R. University Science Books, California, 2002.
6. Biology of ovarian follicles in Mammals. Guraya, S. S., Springer Verlag, Berlin.
7. Comparative Reproductive Biology Reviewed. Ali Honaramooz, Blackwell Publishing House, Ames, Iowa, USA, 2007.
8. Comparative Vertebrate Endocrinology, Bentley P.
9. Delayed Implantation Enders, N.C. University of Chicago Press, Chicago, 1963.
10. Encyclopedia of Reproduction. Vol. I to IV. Knobil E. and Neill J.D. Academic Press, New York, 1998.
11. Essential Reproduction. M. H. Johnson, Barry J. Everitt Blackwell publishing ,USA 2007.
12. General Endocrinology. Turner, C.D., W B. Saunders and Co., Philadelphia (Tappan International. Edition, Tappan Co. (Singapore) Pvt. Ltd., New Delhi, 1974).
13. Hormones. Norman A.W. and Litwack G. Academic Press, New-York, 1997.
14. Human Physiology (Vol. II), C.C. Chatterjee.
15. Knobil and Neill's physiology of reproduction, Vol. I and II, Ernst Knobil, Jimmy D. Neill Academic Press, 2006.
16. Marshall's Physiology of Reproduction Parkes. A. S. Vols. 1; Part 1 (1956) and 2 (1960) 3 (1952) and 4 (1966) Longmans, Green and Co., London. .
17. Molecular Mechanisms in spermatogenesis, Volume 636. C. Yan Cheng, Springer, USA 2008.
18. Reproductive Physiology. Nalbandov. A. S, W H. Freeman and Co., New York, 1964. (Indian Reprint), D. B. Taraporevala, Sons and Co. Ltd., Bombay, 1970.
19. Sex and Internal Secretions Vols. I and II., Young, W. C.: Baltimore, Williams & Wilkins, 1961.
20. The Mammary gland and its Secretion Vol. 1 and II by S. K. Kon and A. T. Cowie. Academic Press, New York.
21. Vertebrate Endocrinology, Norris D.O.
22. Williams Textbook of Endocrinology. Shlomo Melmed, Kenneth Polonsky and P. Reed Larsen ed., SAUNDERS,2007
23. Yen & Jaffe's Reproductive Endocrinology Jerome Strauss and Robert Barbieri Elsevier 2009.


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