R.K.
GROUP OF COLLEGE

Behind Kalwar Police Station, Kalwar, Jaipur (Raj.)

ASSIGNMENT

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ASSIGNMENT WORK / MIDTERM TEST

Session 20 २५.. - 20 २६.

Semester ...V th.....

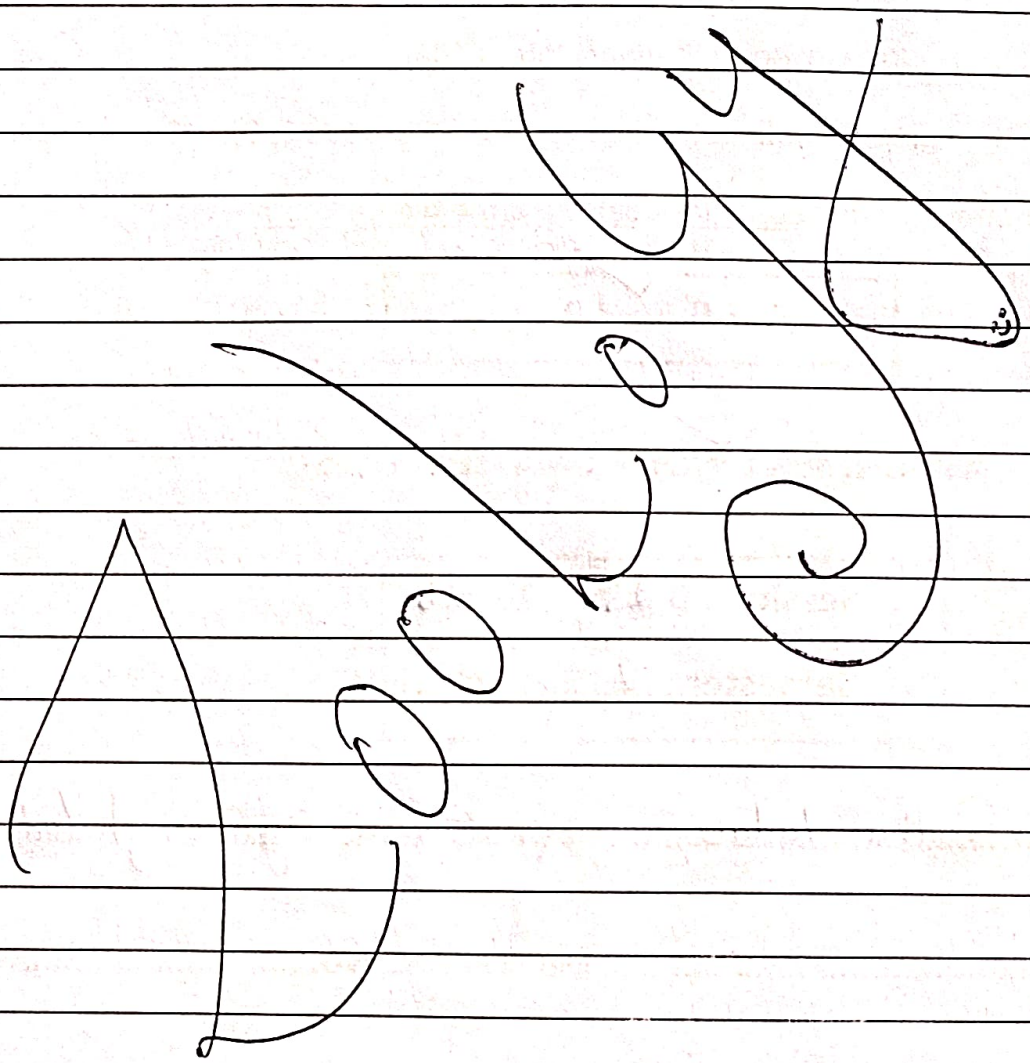
Name of Student Radha Yadav **Father's Name** Gyan Singh Yadav

Roll No. ..... **Enrollment No.** .....

Year ....3rd..... **Semester** ....V.....

PAGE NO. .....

DATE .....



Teacher's Signature.....

PAGE NO. .....

DATE .....

Unit-I

Q.1 Define digestion. Explain the process of various processes in the digestion of food items

Unit-II

Q.2 What is excretion? What are the important nitrogenous excretory end products? Explain the role of the liver in the formation of these end prodcts

Unit-III

Q.3 Describe the structure and function of the pituitary gland and explain the regulation of the hormones it secretes.

Unit-IV

Q.4 Write an essay on the various enzyme catalyzed reactions and energy production involved in glycolysis.

Teacher's Signature.....

PAGE NO. .....

DATE .....

Ans-1 Digestion is the process of breaking down food into smaller, soluble molecules that the body can absorb for nutrients and energy.

Mechanical and chemical processes of digestion.

- Mouth →

Digestion begins here with mechanical processes like chewing, which breaks food into smaller pieces.

Chemically, saliva containing the enzyme salivary amylase starts the breakdown of carbohydrates.

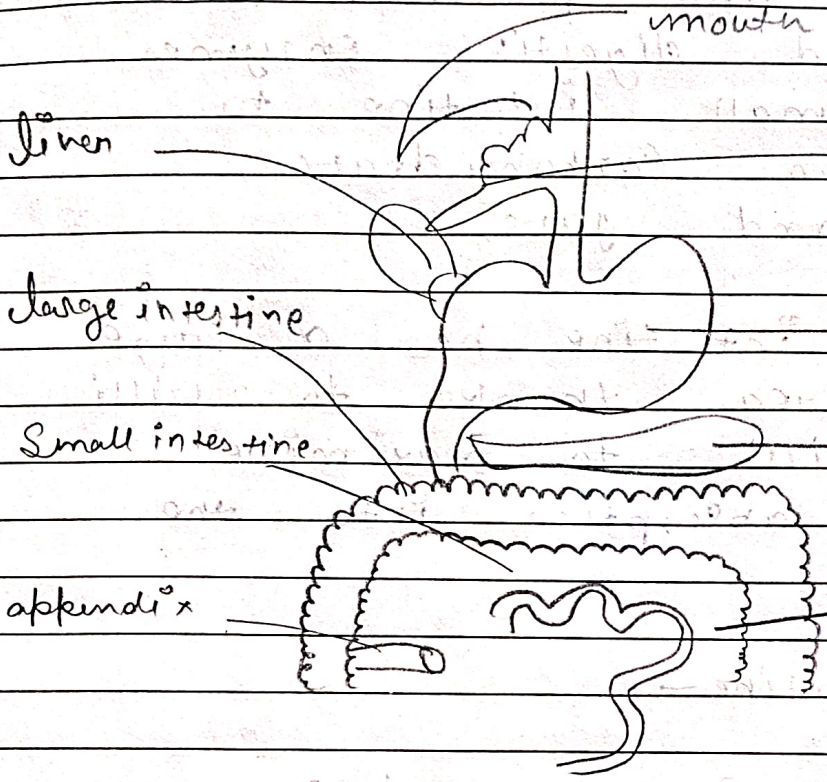
- Esophagus →

After swallowing, food travels down the esophagus via peristalsis.

PAGE NO. .....

DATE .....

Diagram of digestion



- Stomach →

Food is churned mechanically, chemically, the stomach secreted hydrochloric acid and enzymes like pepsin to break down proteins.

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- Small Intestine →

The liver and pancreas release bile and digestive enzymes into the small intestine to break down carbohydrates, proteins, and fats.

The small intestine has a huge surface area, thanks to villi and microvilli, to maximize nutrients absorption into the bloodstream.

- Large Intestine →

The large intestine's primary role is to absorb water and electrolysis from the remaining indigestible material before it is elimination from the body.

PAGE NO. .....

DATE .....

other process →

- Absorption →

This is the process of absorbing the small, soluble molecules that were created during digestion into the bloodstream.

- Elimination →

The remaining waste that was not absorbed is eliminated from the body as feces.

Teacher's Signature.....

PAGE NO. .....

DATE .....

Ans-2

Excretion is the process of removal metabolic waste products from the body, which is essential for maintaining homeostasis.

Importance of nitrogen excretion →

- Detoxification → Nitrogenous waste are toxic; if they accumulate, they can poison cells and disrupt bodily functions.

- Homeostasis → excretion helps regulate the body's internal environment by removing excess water and waste, maintaining a stable internal chemical composition.

- Nutrient balance → Excretion ensures that excess nitrogen, from the breakdown of amino acids for energy or fat synthesis, is safely removed.

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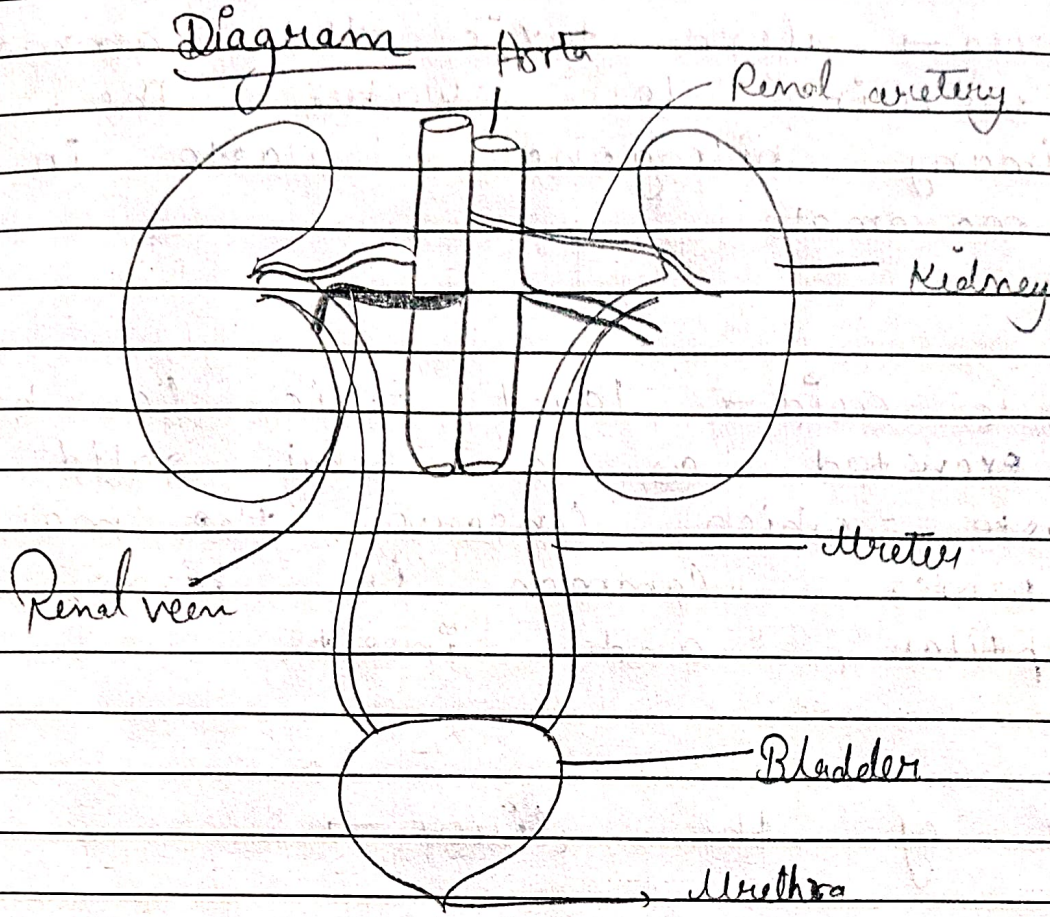
PAGE NO. ..... DATE .....

Diagram



Nitrogen excretory products →

- Ammonia → Highly toxic, requires large amount of water to excrete, found in aquatic animals.

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- Urea → less toxic than ammonia, requires less water. The primary nitrogenous waste in mammals

- Uric acid → least toxic, can be excreted as a semi-solid paste, which conserves the most water. Common in birds, reptiles, and insects.

Role of the liver →

- Conversion of ammonia to urea → The liver takes excess ammonia, produced from the breakdown of amino acids, and converts it into urea through a process called the urea cycle.

- Break down of red blood cells → The liver processes haemoglobin from old red blood cells, converting it into bilirubin, a pigment that it then excreted in bile.

- Detoxification →
The lives filter blood from the digestive system and breaks down other toxins and waste products, preparing them for elimination.

Ans-3 The pituitary gland is a pea-sized gland at the base of the brain, connected to the hypothalamus, that regulates body functions by secreting hormones.

Structure →

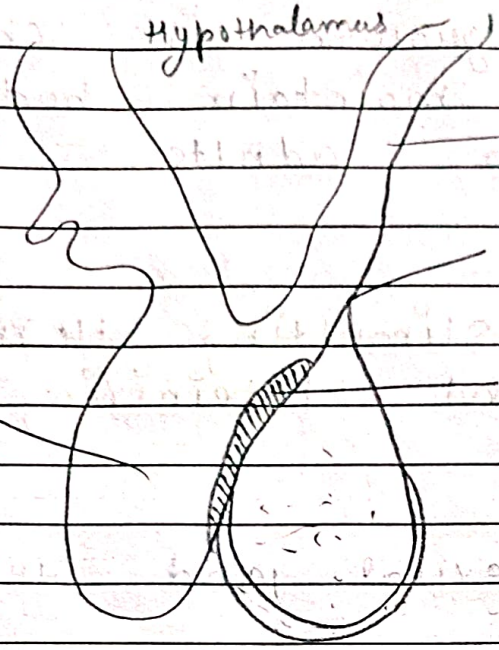
Location → At the base of the brain, below the hypothalamus, in a bony hollow called the sella turcica.

Lobes → It has two parts → anterior lobe and posterior lobe.

Connections → The anterior lobe by a system of blood vessels called the hypophyseal portal system.

PAGE NO. ..... DATE .....

Diagram



(1) Adrenocorticotropic Hormone (ACTH) → stimulates the adrenal glands to releases Cortisol.

(2) Thyroid-stimulting Homon (TSH) → stimulates the thyroid gland to release thyroid hormone.

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(3) Growth Hormone (GH) →

Promotes growth in children and maintain body tissues in adults.

(4) Follicle - stimulting Hormone (FSH) and Luteinizing Hormone (LH) →

Control sexual and reproductive functions.

(5) Prolactin →

Stimulates milk production in females after children.

(6) Antidiuretic Hormone (ADH) / Vasopressin →

Acts on the kidneys to conserve water and regulate water balance.

(7) Oxytocin →

Stimulates uterine contractions during childbirth, milk ejection during breastfeeding, and plays a role in social bonding.

- The anterior lobe produces and releases hormones like ACTH, TSH, FSH, and GH in response to signals from the hypothalamus via a portal blood system.

Ans-4

Glycolysis is the foundational metabolic pathway through which is single molecule of glucose is broken down to produce energy in the form of adenosine triphosphate (ATP) and reduced nicotinamide adenine dinucleotide (NADH).

This ancient, ten step process occurs in the cytoplasm of virtually all living cells and functions under both aerobic and anaerobic conditions.

The intricate conversion is made possible by a series of precisely orchestrated enzyme-catalyzed reactions.

PAGE NO. ..... DATE .....

The energy investmest phase →

(1) Hexokinase (or Glucokinase in liver traps glucose) →

The process begins when the enzymes hexokinase phosphorylates glucose, using one ATP molecule to add a phosphate group and form glucose-6-phosphate.

(2) Phosphoglucose isomerase rearranges the molecule →

Glucose-6-phosphate is than converted into the isomer, fructose-6-phosphate, by the enzyme phosphoglucose isomerase.

(3) Phosphofructokinase-1 Commits to glycolysis →

Another ATP molecule is invested when phosphofructokinase-1 adds a second phosphate group,

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Creating fructose-1,6 bisphosphate.

(4) Aldolase splits the six-carbon ring →

The six-carbon fructose 1,6-bisphosphate molecule is cleaved into two distinct three-carbon sugars by the enzyme aldolase.
Glyceraldehyde-3-phosphate and dihydroxyacetone phosphate.

(5) Triose phosphate isomerase unifies the pathway →

To ensure both three-carbon molecule can continue through the second half of the pathway, the enzyme triose phosphate isomerase rapidly and reversibly converted DHAP into G3P.

The energy pay off phase →

(6) Glyceraldehyde - 3 - phosphate dehydrogenase produce NADH →

The enzyme glyceraldehyde - 3 - phosphate dehydrogenase (GAPDH) catalyzes two simultaneous events for each molecule.

(7) Phosphoglycerate kinase yield the first ATP.

The two 1, 3 - bisphosphoglycerate molecule, the enzyme phospho-glycerate kinase transfers a phosphate group to a molecule of ADP, producing ATP.

(8) Phosphoglycerate mutase moves the phosphate →

Phosphoglycerate mutase relocates the remaining phosphate group from the third to the second carbon of the molecule, converting 3 - phosphoglycerate into 2 - phosphoglycerate.