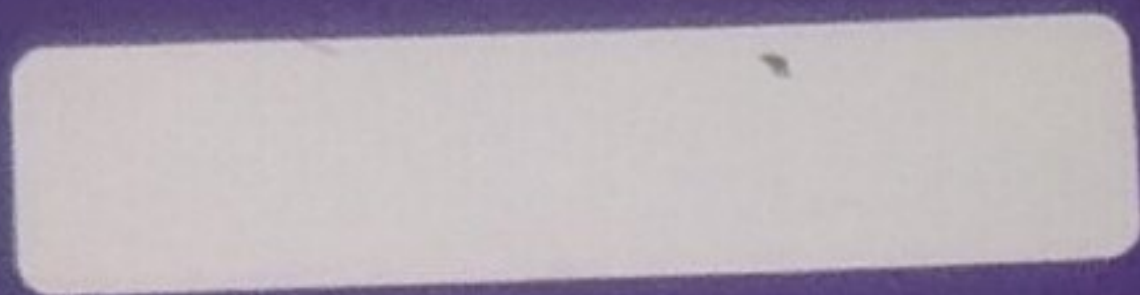




R. K. GROUP OF COLLEGE

BEHIND KALWAR POLICE STATION, KALWAR, JAIPUR (RAJ.)



CERTIFICATE

Name: Pooja Yogi

Roll No.:

Class: BSc 1st sem maths

Exam No.:

Institution

This is certified to be the bonafide work of the student in the

Laboratory during the academic

year 20 25 /20 26

No of practicals certified out of in the
subject of

Teacher in-charge

Examiner's Signature

Principal

Date :

institution Rubber stamp

university of rajasthan

Chemistry practical Exam

B.Sc. Semester-1 (chemistry)Practical-(a)

duration _4hrs

Max Marks-10*40.

Min marks 4*+16

Ex1 Estimation of ferrous/ferric ions by dichromate/permanganate method. (10)

Or

Estimation of copper using thiosulphate by iodometric method (10)

Ex2 Identify the melting point of given organic compound Nephthalene.

Ex3 detection of element and detection of functional group in given organic compound. (7)

(-CONH₂)

Ex4 To determine the viscosity of a pure liquid compound at room temperature using the ostwald viscometer. (10)

5. viva-voice 5

6.Record. 5

university of rajasthan

Chemistry practical Exam

B.Sc. Semester-1 (chemistry)Practical-(B)

duration _4hrs

Max Marks-10*40.

Min marks 4*+16

Ex1 Determination of quantity of acetic acid in commercial vinegar using standard NaOH solution. (10)

Ex2 Identify the Boiling point of given organic compound. (Ethanol).

Ex3 detection of element and detection of functional group in given organic compound. (7)

(R-CO-R)

Ex4 determination the surface tension of a pure liquid compound at room temperature by using stalagometre. (10)

Ex5 viva-voice. (5)

Ex6 Record. (5)



university of rajasthan

Chemistry practical Exam

B.Sc. Semester-1 (chemistry)Practical-(C)

duration _4hrs

Max Marks-10*40.

Min marks 4*+16

Ex1 Determination of alkali content in antacid tablet using standard I solution. (10)

Ex2 crystallization of benzoic acid. (3)

Ex3 detection of element and detection of functional group in given organic compound. (7)

(-COOR)

Ex4 To determine the viscocity of pure liquid compound at room temperature using the ostwald icommitted. (10)

Ex5 viva-voice. (5)

Ex6. Record. (5)



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Experiment - 1Object:

To determine the Concentration and Percentage purity of Commercial vinegar using NaOH.

Principle: The available Commercial vinegar has 10-15% of acetic acid. The estimation is done by acid - base titration method using phenolphthalein as indicator.

Required apparatus:

Conical flask, Burette, Burette stand, pipette, reagent, beaker etc.

Required Solution:

- 1) Solution of Commercial vinegar
- 2) Standard Solution of Oxalic acid
- 3) Solution of NaOH (N/10)
- 4) Phenolphthalein.

Method: Standardise NaOH solution with standard oxalic acid solution weight exactly 10 gm of vinegar in a weighing bottle and transfer it to a volumetric flask. Now add distilled water up to the mark of the volumetric of flask. Take 10 ml of vinegar and add 2-4 drops of phenolphthalein. Titrate the vinegar solution with standard NaOH solution (N/20) till pink colour is obtained.

Teacher's Signature.....

Calculation:

Normality of Commercial vinegar and NaOH Solution $N_1 V_1 = N_2 V_2$
 $N_2 = \frac{N_1 V_1}{V_2}$

Where,

N_1 = Normality of NaOH Solution = $N/20$

V_1 = Relative Volume of NaOH Solution = 6.8 ml.

N_2 = Normality of Commercial vinegar = ?

V_2 = Volume of Solution of vinegar = 10 ml.

$$N_2 = \frac{N/20 \times 6.8}{10} = \frac{1}{10} \times \frac{6.8}{10} N$$
$$= \boxed{0.68 N}$$

Concentration of acetic acid in gm/lit

Normality $\times$ molecular mass

$$= 0.68 \times 60$$

$$= 4.08 \text{ gm/lit}$$

% of acetic acid in Commercial Vinegar

$$= \frac{4.08}{20} \times 100$$

$$= \boxed{20.4\%}$$

Titration of Commercial vinegar and Standard solution of NaOH :-

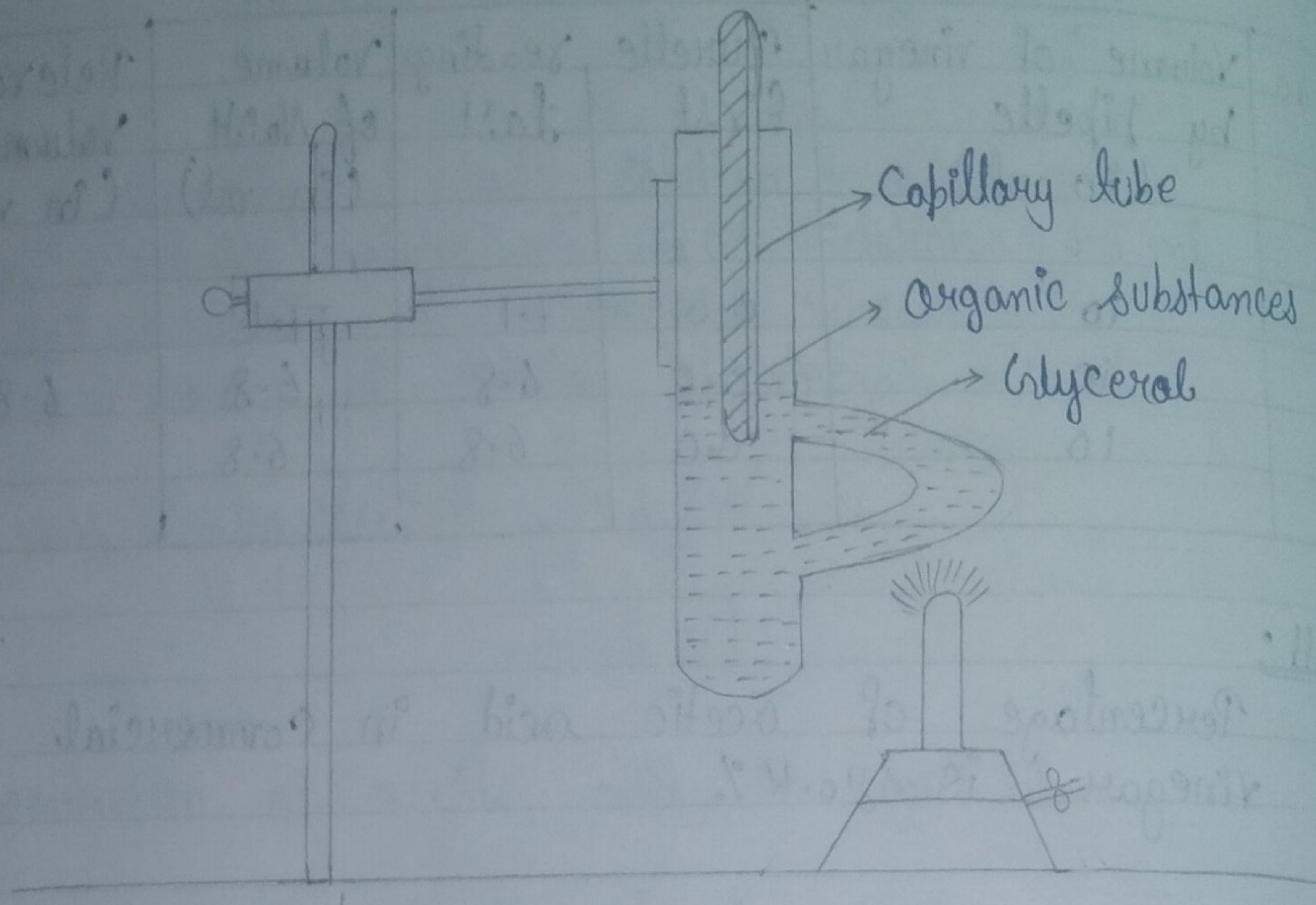
S.No	Volume of vinegar by pipette (in ml)	Burette reading		Volume of NaOH (in ml)	Relevant Volume (in ml)
		First	Last		
1	10	0.0	7.1	7.1	
2	10	0.0	6.8	6.8	6.8
3	10	0.0	6.8	6.8	

Result:

Percentage of acetic acid in commercial vinegar is 20.4%

Teacher's Signature.....

Diagram:



Experiment - 2Object:

Identify the melting Point of given organic Compound naphthalene.

Apparatus and Chemical Required:

Naphthalene, Thiele 'S' tube, thermometer, Capillary tube stand, glycerol etc.

Method:

- (1.) Thiele 'S' tube filled $2/3$ with glycerol.
- (2.) The one end of tube seal by heating of in flame of burners fill $2/3$ with Powder of naphthalene.
- (3.) The Capillary tube bands with lower ends of thermometer by rubber bands, it adjusted in thiele 'S' tube in such a manner that the bulb of thermometer. Half of Capillary tube dipped in glycerol.
- (4.) Now heat thiele 'S' tube gently. After sometimes the Solid Compound just start to melt & form thermometer noted at which Subs start to melt.
- (5.) It is melting Point of Solid.

Result:

80.5°C of melting Point of Naphthalene is obtained.

Teacher's Signature.....

Experiment - 3Object:

Identification of functional group in given organic compound and also observe element test.

Primary test:

State - Solid

Colour - White

Odour - Odourless

Solubility - Insoluble

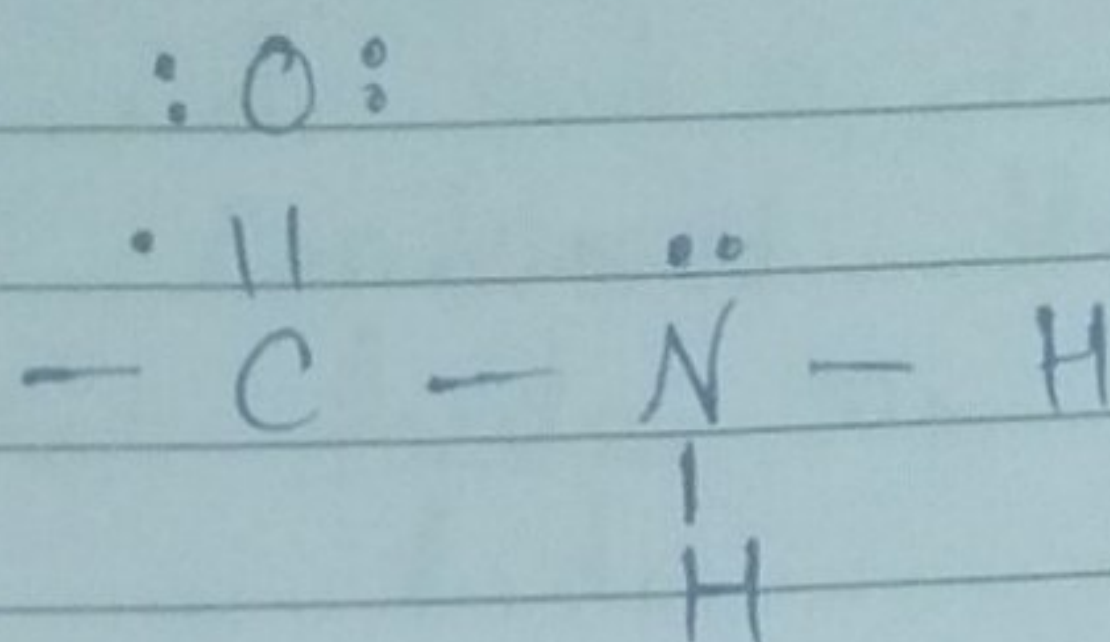
S.No	Experiment	Observation	Inference
1.	Flame test: Take a organic compound & burn it with help of burnex.	Black fumes	Aromatic Compound
2.	Litmus test: Take a red litmus paper into Carbon Compound Solution	Turns Red to blue	Basic
3.	Nitrogen test: Organic Compound + Fresh FeSO_4 + Concentrate H_2SO_4	Gives blue Colour Ppt	Nitrogen present.
4.	Functional group test		

Teacher's Signature.....

(i) Organic Compound + NaOH Solution + heat	Smell like ammonium	-CONH ₂ may be
(ii) Organic Compound + dil HCl + NaNO ₂	No gas liberate No gas	-CONH ₂ is Present

Result:

In given organic compound - [CONH₂] Amide group is present



Teacher's Signature.....

Experiment - 4Object :

Calculating the viscosity of given Carbonic Compound / liquid using Ostwald viscometer.

Apparatus :

Ostwald viscometer, Stop watch, Beaker.

Principle :

$$\frac{\eta_1}{\eta_2} = \frac{t_1 d_1}{t_2 d_2}$$

where η_1 , t_1 , d_1 and η_2 , t_2 , d_2 are the viscosity defined volume consumed time and density respectively.

$$\eta_2 = \frac{t_2 d_2}{t_1 d_1} \eta_1$$

Method :

1. Viscometer is firstly washed with NaOH, then in Chromic acid and then with dist. water, it is soaked in oven.

2. Now this is directly tied in stand.

Now the amount of dist. water is filled in viscometer through the end with a wide tube, up to which the viscometer 'S' lower bulb B is filled approximate half.

Calculation:

Calculating expected density.
Weight of empty picometer.

Picometer x weight of water
Picometer + weight of liquid.

Expected density of liquid

$$n_1 = \frac{d_1 \times t_1}{d_2} \times n_2$$

$$d_1 = 1$$

$$d_2 = 0.79$$

$$n_1 = 8$$

$$n_2 = \frac{d_2 \times t_2}{d_1 \times t_1}$$

$$n = \frac{0.79 \times 93}{1 \times 79} \times 8$$

$$= \frac{587.76}{79}$$

$$= \boxed{7.44 \text{ mt quaine.}}$$

4. The water in tube is pulled through or the rubber tube attached on the thin tube of the viscometer, in bulb A. When water comes above M, then it is allowed to flow downwards in the capillary tube.
5. When the water level rises till M stop watch is started and when it comes till P it is stopped and the time difference is noted.
6. Now empty the viscometer and fill it with experimental liquid after drying in oven and calculate the time consumed for the flow of liquid (+2) using suitable method. Calculate +2 by repeating the experiment twice or thrice.
7. For calculating the density use expected density bottle or pycnometer. Firstly measure a pure, dry and empty then fill with water, measure and then fill it with liquid and measure again.

Observation table:

S.No	Liquid	Expected density on t taken in flow					Expected viscosity
		(i)	(ii)	(iii)	(iv)	(v)	
1.	water	78	78	80	80	1	7.44 ml.
2.	Liquid	93	93	93	93	0.79	

Teacher's Signature.....

Result:

The viscosity of given liquid at 90°C temperature is 7.44 ml .

Precautions:

(i) Viscometer must be done

(ii) The volume of water and experimental liquid should be clean.

(iii) The volume of liquid should be as much as if we pull is above E , then it should not come in mouth.

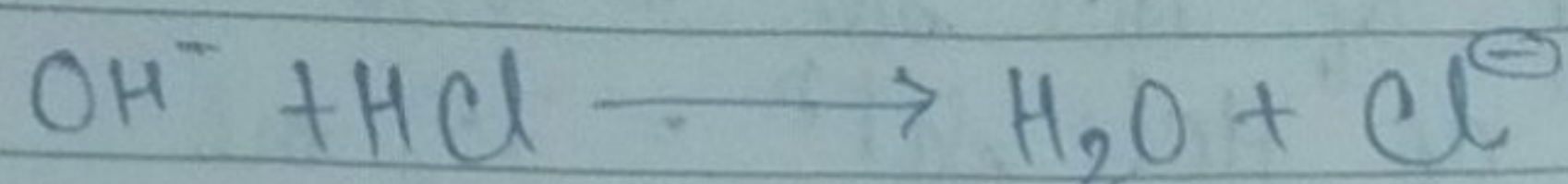
Teacher's Signature.....

Experiment - 5Object:

To determine the alkali content in an antacid tablet using HCl.

Principle: Alkali or OH^- ions are present in antacid tablet. The estimation done with the help of HCl.

Reading is taken where yellow convert into red colour



Required Equipment: Burette, Burette stand, Conical flask, Funnel, beaker etc.

Required Solution: (1) Standard solution of $N/10$
(2) Solution of 1 antacid in 100 ml water.
(3) Methyl orange as an indicator.

Method: Make a fine powder of antacid with the help of pestle and mortar to a fine powder. Take exact amount of antacid powder within range of 0.5-0.7 gm (x gm) and transfer in into a beaker of 250 ml. Wash weighing bottle with hot water transfer the solution of volumetric flask (100 ml). Now, take 10 ml of the solution of antacid in a conical flask and add methyl orange. Titrate this solution with $N/50$ HCl and note volume of HCl when yellow colour to Red.

Teacher's Signature.....

Calculation:

(A) Normality of antacid

$$N_1 V_1 = N_2 V_2$$

HCl solⁿ = Antacid tablet solⁿ

$$N_2 = \frac{N_1 V_1}{V_2}$$

where,

N_1 = Normality of HCl solⁿ = $N/10$

V_1 = Volume of HCl solⁿ = 7.9 ml

N_2 = Normality of H. Antacid = ?

$$N_2 = \frac{N/10 \times 7.9}{10} = \frac{1}{10} \times \frac{7.9}{10} N$$

V_2 = Volume of antacid solⁿ = 10 ml

(B) Alkali Content in gm

= Normality $\times$ Equivalent weight

$$= 0.079 \times 17$$

$$= 1.343 \text{ gm}$$

(C) Ability of Alkali in antacid

$$\frac{w \times 17}{10 \times 10} \times \frac{1}{10} = \frac{2.32 \times 17}{10 \times 10 \times 10}$$

$$= 0.03944 \text{ gm}$$

Observation: Weight of antacid = 2.32 gm

Observation table:

Titration of antacid tablet Solⁿ and HCl Solution.

S. No	Volume of antacid Sol ⁿ by pipette	Burette Reading		Relevant Volume
		First	Last	
1.	10 ml	0.0	8.2	7.9
2.	10 ml	0.0	7.9	
3.	10 ml	0.0	7.9	

Result:

Alkaline Content in antacid tablet is 0.3944 gm

Teacher's Signature.....

Experiment - 6Object:

To determine the boiling point of organic liquid.

Apparatus and chemical required:

Ethanol, thele 'S' tube thermometer, stand, glycerol etc.

Method:

- 1) Thele 'S' tube filled $\frac{2}{3}$ with glycerol.
- 2) The one end of tube seal by heating in the flame of burner and filled $\frac{2}{3}$ with ethanol.
- 3) The tube binds with lower end of thermometer by rubber band and it adjusted in thele 'S' tube, such a manner that bulb of thermometer and half of capillary disappear from glycerol.
- 4) Now heat the thele 'S' tube gently after sometime air bubbles comes out from end of tube the temperature of thermometer noted.
- 5) The temperature of thermometer also noted at which bubble stopped from capillary on cooling. The Boiling Point of liquid is mean of both temperature.

Result:

The 78.6 Boiling Point is obtained of Ethanol.

Teacher's Signature.....

Experiment - 7Object:

Identification of function group in organic compound and also observe element test.

Primary Test:

State = Solid

Colour = light yellow

Odour = Pungent smell

Solubility = insoluble

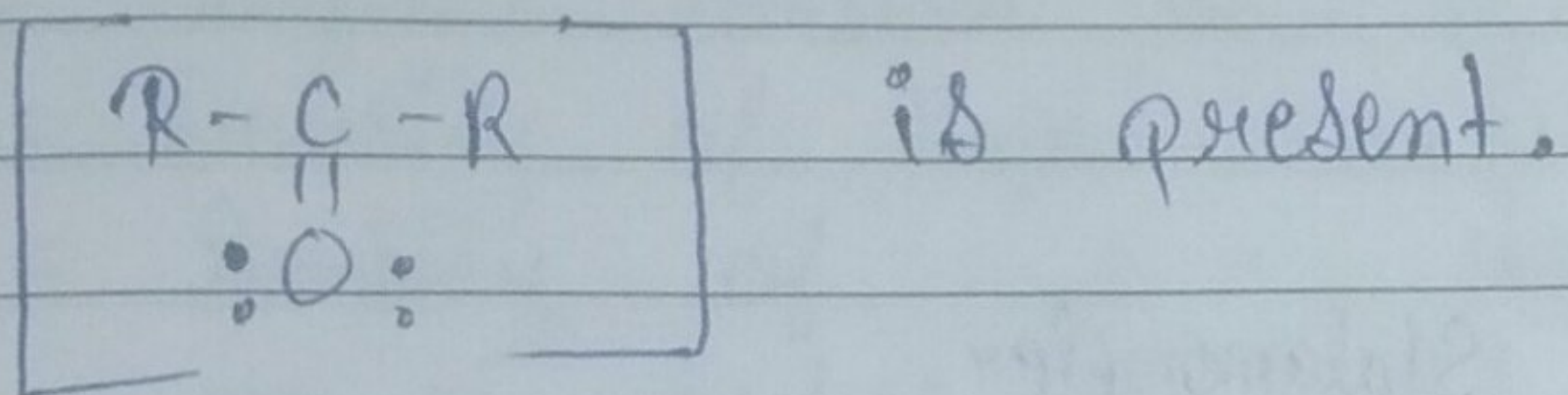
S.No	Experiment	Observation	Inference
1.	Flame test: Take a colour Carbon Compound spot on a watch glass and burn it with the help of burner	Gives black fumes	Aromatic Compound.
2.	Litmus test: Take litmus paper into Carbon Compound solution.	No change in litmus paper	Neutral
3.	Nitrogen test: Carbon Compound + Fresh FeSO_4 + Concentrate H_2SO_4	Blue or green ppt absent	N- absent
4.	Functional group:-		
(i)	2,4, dinitrophenyl	Yellow orange	Presence of Carbonyl

Teacher's Signature.....

hydrazine Test: Carbon compound + 2, 4 Di phenyl hydrazine	ppt formed	group
(ii) Sodium nitroprusside Test: Given compound + Sodium + nitroprusside + distilled water + Shake it + NaOH solution.	Red Colouration	Ketonic group is present

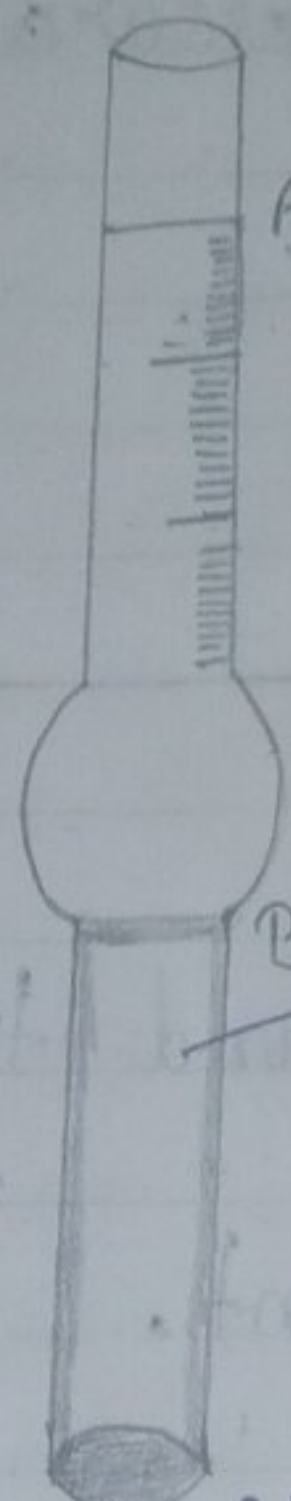
Result:

The given Carbon Compound the ketone group



Teacher's Signature.....

Diagram:



Capillary tube

Stalpmometer

Experiment - 8Object:

To determine surface tension of given organic liquid by stalagmometer.

Apparatus and Chemical Required:

Stalagmometer, beaker,
 H_2O , organic liquid, etc.

Principle:

$$\gamma_2 = \frac{n_1}{n_2} \cdot \frac{d_2}{d_1} \cdot \gamma_1 \quad \text{--- (1)}$$

γ_2 = Surface tension of organic liquid.

γ_1 = Surface tension of H_2O = 41.16 dyne/cm

d_2 = Density of liquid = 0.78 g/ml

d_1 = Density of H_2O = 1.0 g/ml

n_2 = no. of drops of liquid.

n_1 = no. of drops of H_2O .

Observation:

Room temperature = 30°C

Density of water = 1 gm/cm³

Surface tension of H_2O = 71.8

Density of liquid = 1.5

Teacher's Signature.....

Calculation I

$$V_2 = \frac{d_2 n_1 V_1}{d_1 n_2}$$

$$d_2 = 1.05 \text{ gm/cm}^3$$

$$d_1 = 1 \text{ gm/cm}^3$$

$$n_1 = 63$$

$$n_2 = 105$$

$$V_2 = \frac{1.05 \times 63 \times 7.8}{1 \times 105}$$

$$V_2 = 64.6200 \text{ dyne/cm}$$

Calculation II

$$V_2 = \frac{d_2 \cdot n_1 \cdot V_1}{d_1 \cdot n_2}$$

$$d_2 = 1.063 \text{ gm/cm}^3$$

$$d_1 = 1 \text{ gm/cm}^3$$

$$n_1 = 63$$

$$n_2 = 72$$

$$V_1 = 71.8$$

$$V_2 = \frac{1.063 \times 63 \times 71.8}{1 \times 72}$$

$$V_2 = 66.7829 \text{ dyne/cm}$$

Observation table I:

No. of drops of water (n_1)	no. of drops of liquid (n_2)
60	105
64	113
65	102
63	100
$n_1 = 63$	$n_2 = 105$

Observation: Surface tension of liquid = 64.6200 dyne/cm .

Observation Table II:

no. of drops of water (n_1)	no. of drops of liquid (n_2)
60	42
64	72
65	65
63	78
$n_1 = 63$	$n_2 = 72$

Observation:

Surface tension of liquid = 66.7829 dyne/cm

Calculation III

$$V_2 = \frac{d_2 \cdot n_2 \cdot V_1}{d_1 \cdot n_1}$$

$$d_2 = 1.075 \text{ gm/cm}^2$$

$$d_1 = 1.0 \text{ gm/cm}^2$$

$$n_2 = 72$$

$$n_1 = 63$$

$$V_1 = 71.8 \text{ Dyne/cm}$$

$$V_2 = \frac{1.075}{1} \times \frac{63}{72} \times 71.8$$

$$V_2 = 67.5368 \text{ dyne/cm}$$

Observation table III

no. of drops of water (n_1)	no. of drops of liquid (n_2)
64	70
64	71
65	73
63	74
$n_1 = 63$	$n_2 = 72$

Result:

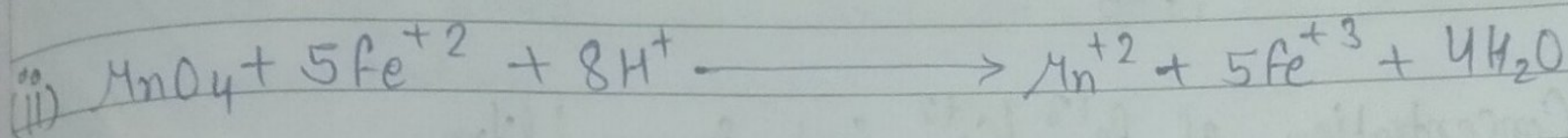
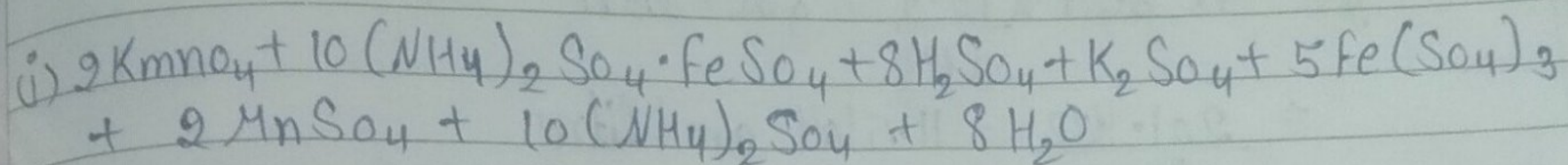
Surface tension of liquid = 67.5368 dyne/cm.

Teacher's Signature

Experiment - 9Object:

To find concentration of Fe^{+2} ions in given ferrous ammonium sulphate by KMnO_4

Principle: It is a redox reaction phenomenon in which KMnO_4 acts as oxidising agent and ferrous ammonia sulphate as reducing agent. KMnO_4 reduced in Mn^{+2} .

Required equipments:

Burette, pipette, burette stand, funnel, conical flask, reagent bottle etc.

Required chemicals:

1. KMnO_4 solution
2. N/30 normality ferrous sulphate
3. FAS solution of unknown concentration.
4. Dilute H_2SO_4
5. Solution of 3.27 gm FAS and 250 ml water.

Teacher's Signature.....

Calculation:

$$\text{FAS of unknown concentration (gm/l)} \\ = 4W \times \frac{V_4}{V_2} = y \text{ (assume)}$$

$$W = \text{FAS}$$

$$V_2 = \text{Volume} = 17.5 \text{ gm}$$

$$V_4 = 15.4 \text{ gm}$$

$$y = 4 \times 3.27 \times \frac{15.4}{17.5} \text{ gm/litre}$$

$$= \frac{201.432}{17.5} = 11.5104 \text{ gm/litre}$$

Concentration of Fe^{+3} / Fe^{+2} ions in gm/litre.

$$\text{Weight of Fe in } 392.12 \text{ gm} = 56$$

$$\text{Weight of Fe in 1 gm FAS} = \frac{56}{392.12} \text{ g}$$

$$= \frac{56 \times 11.51}{392.12}$$

$$= \frac{644.56}{392.12} = 1.6438 \text{ gm/lit}$$

Observation table:

(A) Ratio of Standard Solution of KMnO_4 Solution and FAS.

S.No	Volume of FAS Sol ⁿ by pipette (in ml)	Burette reading First	Burette reading Last	Volume of KMnO_4 Sol ⁿ (ml)	Relevant Volume
1	20 ml	0.0 ml	17.5 ml	17.5 ml	
2	20 ml	0.0 ml	17.5 ml	17.5 ml	17.5 ml
3	20 ml	0.0 ml	17.5 ml	17.5 ml	

(B) Ratio of KMnO_4 Solⁿ and FAS Solⁿ of unknown Concentration.

S.No	Volume of FAS Sol ⁿ by pipette (in ml)	Burette reading First	Burette reading Last	Volume of KMnO_4 Sol ⁿ (ml)	Relevant Volume
1	20 ml	0.0 ml	15.5 ml	15.5 ml	
2	20 ml	0.0 ml	15.4 ml	15.4 ml	15.4 ml
3	20 ml	0.0 ml	15.7 ml	15.4 ml	

Result:

In the given FAS Solⁿ of unknown Concentration of Fe^{+2} ions is 1.6438 gm/l.

Teacher's Signature.....

Experiment - 10Object:

To prepare Crystal of given pure organic solid (Benzoic acid) from hot water.

Principle:

Benzoic acid is a Crystalline solid has high solubility in hot water an impure sample of benzoic acid is dissolved in hot water and then filtered to remove insoluble impurities.

Requirements:

Crude sample of benzoic acid, 250 ml measuring flask, funnel, a glass rod, & a trough.

Procedure:

1. Take about 2-3 ml of the Crude sample of benzoic acid in a 250 ml beaker, in another take about 150 ml of water and keep it for boiling.
2. Add slowly with stirring least amount of boiling water to the beaker containing crude sample of benzoic acid so then it gets dissolved easily add 0.5 g of animal Charcoal to the solution and boil for a minute.

Teacher's Signature.....

3. Filter the solⁿ while hot using a fluted filter paper place it in a stemless funnel collect the clear filtrate in a beaker.
4. Allow the filtered solⁿ of coal at room temperature now cool it by placing it on a beaker filled with cold water.
5. Separate the crystals by suction using Buchner funnel wash the crystals with water, dry the crystals.
6. Record the weight of the crystals

Result:

The crystals of benzoic acid are shining white.

Yield:

8.5 gm

Teacher's Signature.....

Experiment - IIObject:

Identification of functional group in the given organic compound and also observe element test.

Primary test:

State = Solid

Colour = Colourless

Odour = Fruity smell

Solubility = Soluble

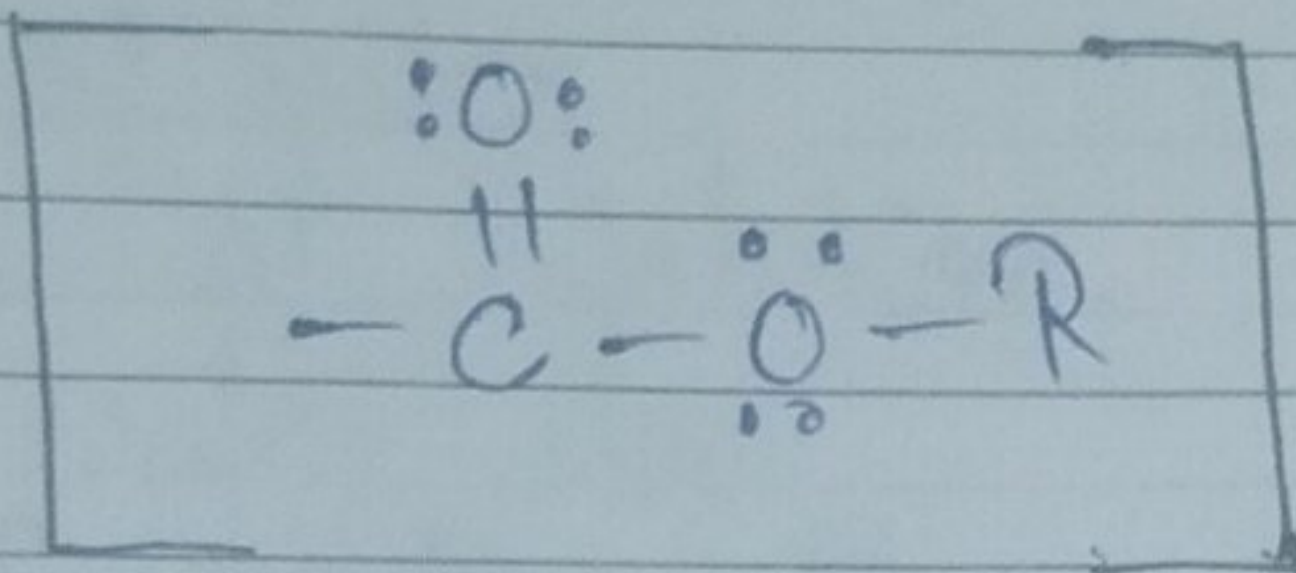
S.No	Experiment	Observation	Inference
1	Flame test: Take a organic compound on and burn it with help of burner	Gives white fumes	Aliphatic Compound
2	Litmus test: Take on red or blue litmus paper into Car Carbon Compound solution.	Turns blue litmus to Red	Acidic
3	Nitrogen test: Organic Compound + fresh solution of FeSO_4 + Concentration H_2SO_4	Solution do not give yellow colour	N - absent

Teacher's Signature.....

4.	functional group: Hydroxylamine hydrochloride + methanol and 2N. KOH Sol ⁿ of methol + $\text{NH}_2\text{OH} \cdot \text{HCl}$ + KOH sol ⁿ + Δ + dil HCl + Cool + FeCl_3	Radish-Violet Colour appear	Ester group is present
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Result:

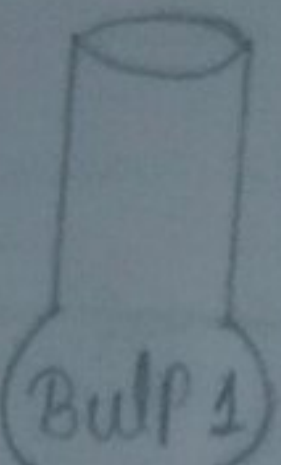
In the given organic Compound the $-\text{[COOR]}$
Ester-group is present



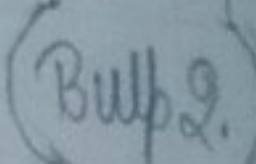
Teacher's Signature.....

Diagram:

Arm 1.



Arm 2



Oswald Viscometer

Experiment - 12Object:

Find out viscosity of given liquid with help of viscometer.

Apparatus:

Ostwald viscometer, relative viscosity bottle, beaker, etc.

Principle:

$$\frac{\eta_1}{\eta_2} = \frac{t_1 d_1}{t_2 d_2}$$

η_1 = Viscosity of water

η_2 = Viscosity of solution.

t_1 = Time of water flow

t_2 = Time of solution flow

d_1 = Density of water

d_2 = Density of solution.

Chemical Required: Water solution.

Observation I

(i) Room temperature = 27°C

(ii) Viscosity of H_2O = 0.1

(iii) Density of H_2O = 0.1 gm/ml

(iv) Density of liquid = 1.005 gm/ml

Teacher's Signature.....

Calculation

$$1. \quad X_2 = \frac{t_2 d_2}{t_1 d_1} X_1$$

$$t_2 = 80 \text{ sec}$$

$$d_2 = 1.005 \text{ gm/cm}^3$$

$$X_1 = 0.01$$

$$t_1 = 70 \text{ sec}$$

$$d_1 = 1.0 \text{ gm}$$

but t_1, t_2, d_1, d_2 or, value = ineq — ①

$$X_2 = \frac{t_2 d_2}{t_1 d_1} X_1$$

$$X_2 = \frac{80 \times 1.005 \times 0.01}{70 \times 1.0} = 0.114875 \text{ poise}$$

$$2. \quad X_2 = \frac{t_2 d_2}{t_1 d_1} X_1$$

$$t_2 = 85 \text{ sec}$$

$$d_2 = 1.01 \text{ gm/cm}^2$$

$$X_1 = 0.01$$

$$t_1 = 70 \text{ sec}$$

$$d_1 = 1.0 \text{ gm/cm}^2$$

$$X_2 = \frac{85 \times 1.01 \times 0.01}{70 \times 1.0} = 0.0122642 \text{ poise}$$

$$3 \quad X_2 = \frac{t_2 d_2}{t_1 d_1} X_1$$

$$t_2 = 90 \text{ sec}$$

$$d_2 = 1.015 \text{ gm/cm}^3$$

$$X_1 = 0.01 \text{ poise}$$

$$t_1 = 70 \text{ sec}$$

$$d_1 = 1 \text{ gm/cm}^3$$

$$X_2 = \frac{90 \times 1.015 \times 0.01}{70 \times 1.0} = 0.01365$$

Observation IInd

DATE

- (i) Viscosity of water = 0.01 poise
 (ii) Density of water (d_1) = 100 gm/cm³
 (iii) Density of solⁿ (d_2) = 1.01 gm/cm³
 (iv) Time taken in solⁿ = 80 sec.

Observation Table Ist

Time taken by water flow (t_1)	Time taken by sol ⁿ flow (t_2)
70 sec	80 sec
75 sec	80 sec
65 sec	75 sec
$t_1 = 70$ sec	$t_2 = 80$ sec

Observation : Viscosity of solⁿ = 0.114875

Observation table IInd

Time taken by water flow (t_1)	Time taken by sol ⁿ flow (t_2)
70	90 sec
75	80 sec
65	80 sec
$t_1 = 70$ sec	$t_2 = 80$ sec

Observation :

viscosity of solⁿ = 0.0122642 poise

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$$4. \quad \begin{aligned} l_2 &= 90 \text{ sec} & l_1 &= 70 \text{ sec} \\ d_2 &= 1.020 \text{ gm/cm}^3 & d_1 &= 1.0 \text{ gm/cm}^3 \\ x_1 &= 0.01 \end{aligned}$$

$$x_2 = \frac{90 \times 1.020 \times 0.01}{70 \times 1.0} = 0.13114 \text{ poise}$$

$$5. \quad x_2 = \frac{d_2 d_1 x_1}{d_1 l_1}$$

$$\begin{aligned} x_2 &= \frac{100 \times 1.025 \times 0.01}{70 \times 1.0} \\ &= 0.01464 \text{ poise} \end{aligned}$$

$$\begin{aligned} l_2 &= 100 \text{ sec} \\ d_2 &= 1.025 \text{ gm/cm}^3 \\ l_1 &= 70 \text{ sec} \\ d_1 &= 1.0 \text{ gm/cm}^3 \\ x_1 &= 0.01 \end{aligned}$$

Observation Table IIIrd

Time taken by water flow (t_1)	Time taken by sol ⁿ flow (t_2)
70 sec	90 sec
75 sec	85 sec
65 sec	95 sec
$t_1 = 70$ sec	$t_2 = 90$ sec

Observation:

Viscosity of solution = 0.01365 poise

Observation table IVth

Time taken by water flow (t_1)	Time taken by sol ⁿ flow (t_2)
70 sec	85 sec
75 sec	90 sec
65 sec	96 sec
$t_1 = 70$ sec	$t_2 = 90$ sec

Observation: Viscosity of solution (η_s) = 0.13114 poiseObservation table Vth

Time taken by water flow (t_1)	Time taken by sol ⁿ flow (t_2)
70 sec	95 sec
70 sec	105 sec
65 sec	100 sec
$t_1 = 70$ sec	$t_2 = 100$ sec

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Observation:Viscosity of Solution (x_2) = 0.01464 poiseResult:Viscosity of Solⁿ at 27°C = 0.01464 poise

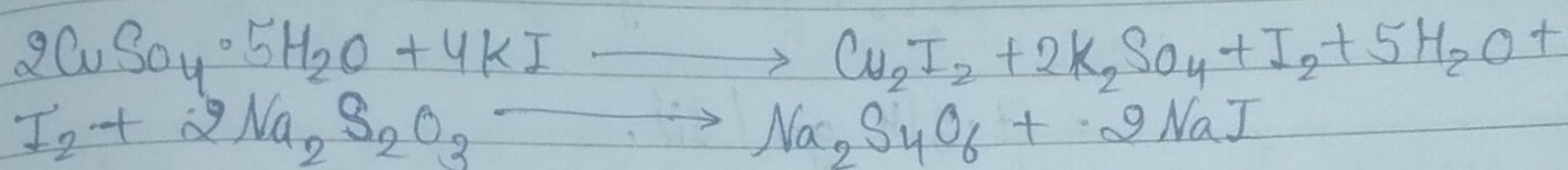
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Experiment - 13Object:

To find Concentration of Cu^{+2} ions in given CuSO_4 Solⁿ by iodimetric titration.

Principle:

Iodine is liberated when CuSO_4 Solⁿ reacts with KI giving reddish brown colour to solⁿ. The liberated iodine is titrated against hypo (Sodium thiosulphate) Solⁿ using starch as an indicator. At the end point blw colour and a white ppt of CuI is obtained.

Required Equipment:

Burette, Burette stand, pipette, Conical flask, reagent, beaker etc.

Required Solution:

- (1) Standard Solⁿ of CuSO_4 (N/30)
- (2) N/30 hypo Solⁿ as an intermediate
- (3) 10% Solⁿ of KI
- (4) Starch Solⁿ as an indicator
- (5) Potassium thiocyanate solution.

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Calculation:

(i) Concentration of solⁿ of CuSO_4 in gm/lit
$$= \frac{W \times V_2}{V_1} = x$$

Weight of $\text{CuSO}_4 \cdot W = 2.08 \text{ gm}$
 $V_1 =$ Volume of Sodium thio sulphate for unknown
Concentration solⁿ = 7.8 ml.

$V_2 =$ Volume of Sodium thio sulphate for standard solⁿ
by $\text{CuSO}_4 = 8.2 \text{ ml}$

$$x = \frac{4 \times 2.08 \times 7.8}{8.2} \text{ gm/lit}$$

$$= 7.914 \text{ gm/lit.}$$

(ii) Concentration of $\text{Cu}^{+2} / \text{Cu}^{+3}$ ions in CuSO_4
solⁿ in gm/lit = 249.63 gm

Weight for 1 gm Cu = $\frac{63}{249.63} \times x$.

Concentration of Cu^{+2} ions = $\frac{63}{249.63} \times 7.914$
$$= 1.9973 \text{ gm/lit}$$

Observation table :(A) Titration of Sol^n thiosulphate and standard $\text{Sol}^n \text{CuSO}_4$

S.No	Volume of CuSO_4 taken by pipette (in ml)	Burette Reading First	Burette Reading Last	$\text{Na}_2\text{S}_2\text{O}_3$ Volume	Relevant Volume (in ml)
1.	10 ml	0.0	8.9 ml	8.9 ml	
2.	10 ml	0.0	8.9 ml	8.2 ml	8.2 ml
3.	10 ml	0.0	8.9 ml	8.2 ml	

(B) Titration of Sodium thiosulphate and CuSO_4 Sol^n of unknown Concentration

S.No	Volume of CuSO_4 taken by pipette (in ml)	Burette Reading First	Burette Reading Last	Volume of $\text{Na}_2\text{S}_2\text{O}_3$	Relevant Volume (in ml)
1.	10	0.0	8.1	8.1	
2.	10	0.0	7.8	7.8	7.8 ml
3.	10	0.0	7.8	7.8	

Result:

Concentration of Cu^{+2} ions in given CuSO_4 Sol^n of is 1.9973 gml/lit.

Teacher's Signature.....

Experiment - 14Object:

Identification of functional group in given organic compound and also known as observe element test.

Primary test:

State: Solid

Odour: Sweet smell

Colour: White

Solubility: water soluble

S.No	Experiment	Observation	Inference
1.	Flame test: Take a organic compound on spatula & burn it with help of burner	Gives white fumes	Compound.
2.	Litmus test: Take a litmus paper into the Carbon compound solution	No Change	Neutral
3.	Nitrogen test: Carbon compound + fresh sol ⁿ of FeSO_4 + Con. H_2SO_4	Litmus do not change.	N_2^- absent
4.	Functional group:		

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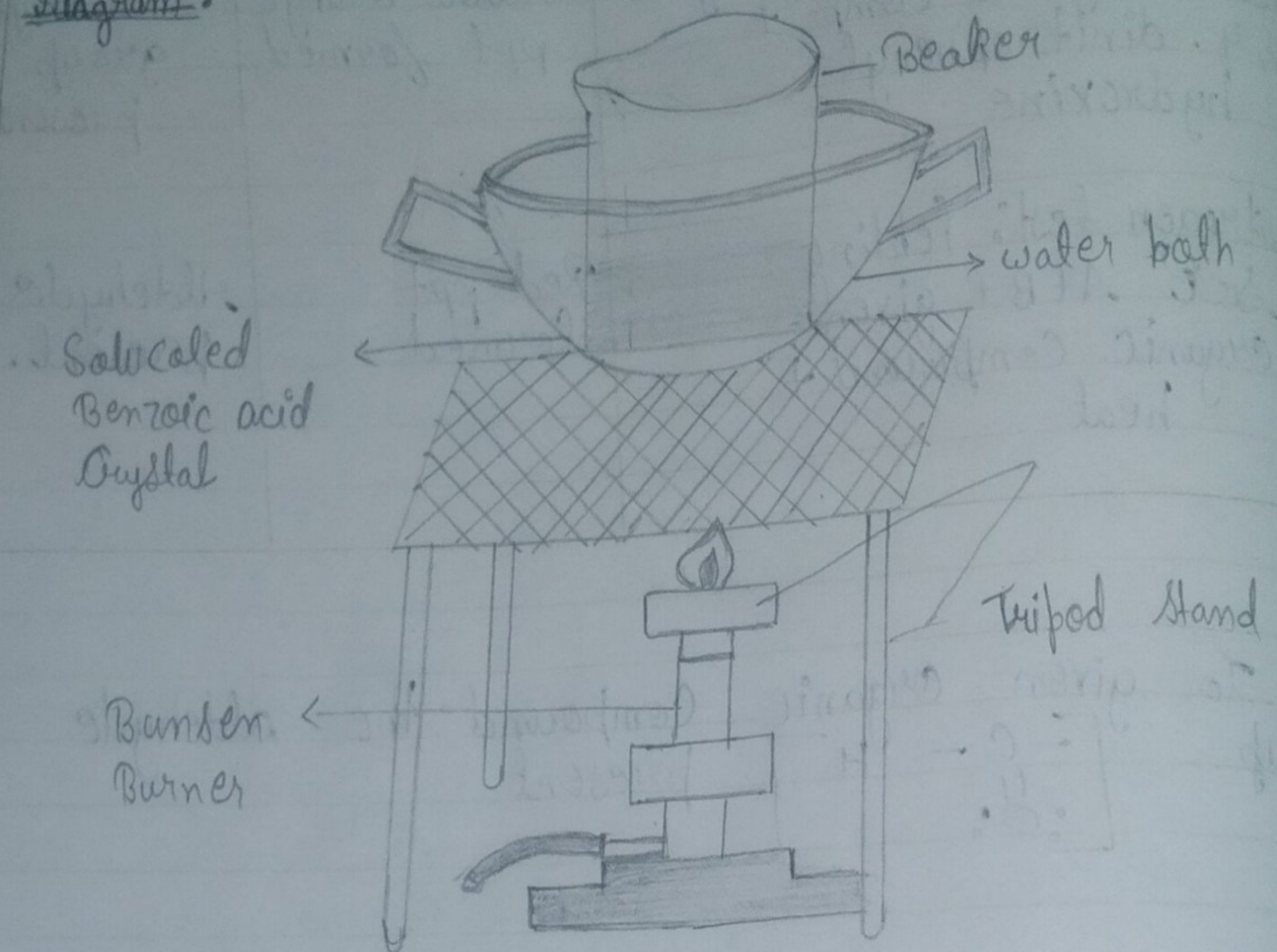
(i)	2, 4 dinitrophenyl hydrogen Test: Organic comp. + 2, 4. dinitrophenyl hydroxine	Yellow orange ppt formed	Carbonyl group present
(ii)	Nitrogen test: Fehling Sol ⁿ A+B + given organic compound + heat	Red ppt formed	Aldehyde present.

Result:

To given organic compound the aldehyde
group $\left[\begin{array}{c} \text{C} - \text{H} \\ | \\ \text{Y} \end{array} \right]$ present

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Diagram:



Result:

Needle-like crystals are formed.

Object:

Purification of given organic compound (Benzoic acid) by crystallization.

Apparatus and material required:

Beaker of 250 ml, funnel, benzoic acid and water filter paper.

Procedure:

Take 1.5g of benzoic acid in 30-50 ml of water. Heat it and filter it while it is hot. Cool the solⁿ and then filter it while crystals of pure benzoic acid is obtained.

Result:

The weight of pure benzoic acid is 1.1 gram.

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Experiment - 16Object:

Determine percentage composition of given binary mixture (acetone and ethyl methyl ketone by surface tension method).

Apparatus:

Stalagmometer, Beaker, organic liquid.

Principle:

A number of solution of acetone and ethyl methyl ketone are prepared and the number of drops are present constant in each case when the mixture flows in b/w the upper and lower in stalagmometer.

The surface tension or number of drops are then found out in case of unknown mixture. Where concentration these be determined from graph.

Observation:

$$n_1 = 72.75 \text{ dyne/cm}$$

$$d_1 = 1 \text{ gm/ml}$$

$$d_2 = 1.078 \text{ gm/ml}$$

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Calculation:

$$10\% = \frac{8}{n_2} = \frac{1.31 \times 1.00}{2.022 \times 1.088} = 13.29$$

$$20\% = \frac{8}{n_2} = \frac{1.31 \times 1.00}{2.24 \times 1.078} = 14.74$$

$$30\% = \frac{8}{n_2} = \frac{1.31 \times 1.00}{2.26 \times 1.078} = 15.53$$

$$40\% = \frac{8}{n_2} = \frac{1.31 \times 1.00}{2.56 \times 1.078} = 14.87$$

$$\text{Unknown 1} = \frac{8}{n_2} = \frac{1.31 \times 1.00}{2.21 \times 1.078} = 14.36$$

Observation Table:

S.No	Liquid	Time taken by water flow (t_1)	Time taken by Organic liquid (t_2)	Viscosity
1	10%	1.30	2.02	13.39
2	20%	1.34	2.024	14.74
3	30%	1.32	2.36	15.53
4	40%	1.32	2.26	14.87
5	Unknown	1.30	2.21	14.36
6				

Result:

The percentage composition of given liquid is 15 l.

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Experiment - 17Object:

To identify element, functional group compound and make a suitable derivative

Primary test:

Physical appearance = Solid

Colour = white

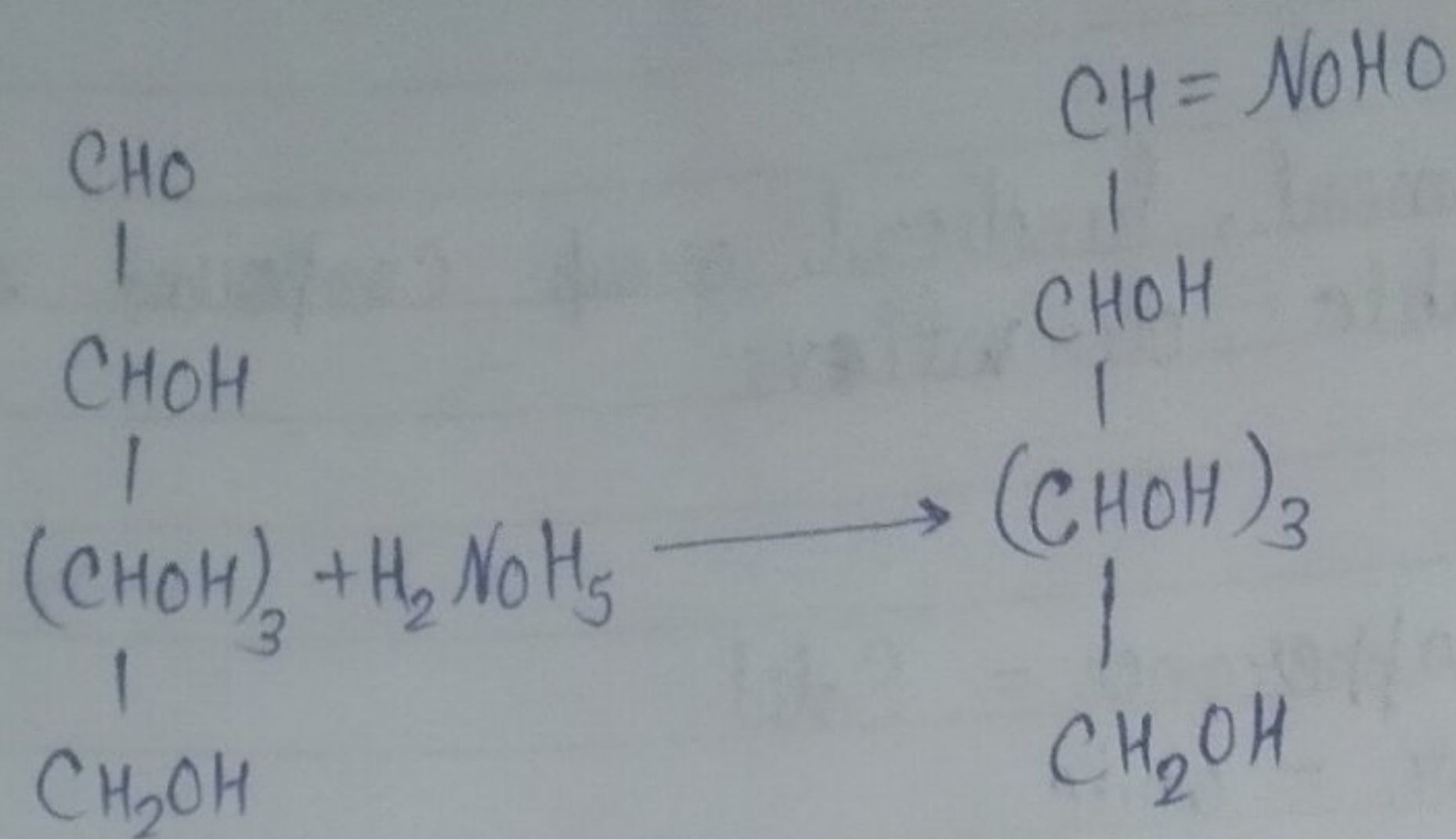
Odour = Slightly sweet smell.

Solubility = Soluble in water.

Secondary test:

S.No	Test	Observation	Result
1.	Flame test: Take compound on spatula then heat on burner	Compound burns without black flames	Compound is aliphatic.
2.	Litmus test: Take blue and red litmus paper into the sol ⁿ	Litmus paper colour is unchanged	Compound is neutral.
3.	Element test: Lassaigne Sol ⁿ + FeSO ₄ + Con. H ₂ SO ₄	No colour or ppt is obtained	Nitrogen is absent
4.	Functional test: Aqueous sol ⁿ and compound + Stain.	Sol ⁿ turns red	Carbohydrate is present.

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Glucose

Glucosamine

(molish stain)		
5. Melting Point of Compound	$\approx 146.^\circ\text{C}$	Glucose may be present
6. Confirmatory test:		
(a) Compound + Fehling Sol ⁿ (A+B) + Δ	Red ppt is obtained	Glucose is present
(b) Aqueous Sol ⁿ of compound 2ml + 5g lead acetate boiled + 5ml NH_4OH + 0 2 min	Pink Colour obtained	Glucose is Confirmed
(c) Barfeid's reagent + Compound for 2 min	Red ppt obtained	Glucose is Confirmed

Result:

In given Carbon Compound functional group is carbohydrate and its derivative is glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) is present.

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Experiment - 18Object:

To identify element functional group and its derivative in given organic compound.

Primary test:

Physical State: Solid

Colour: White

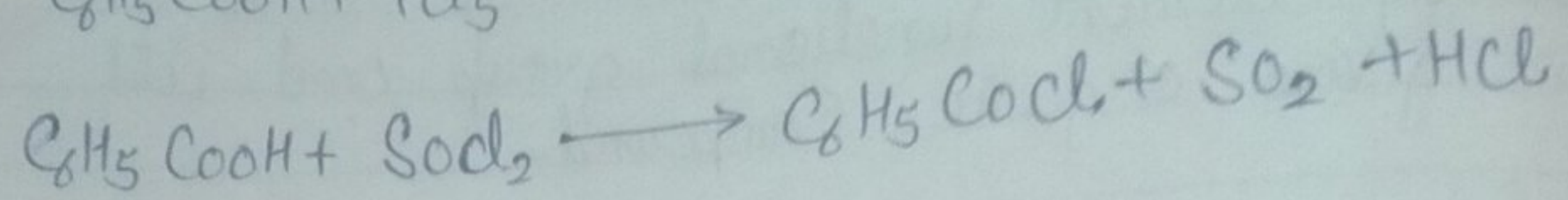
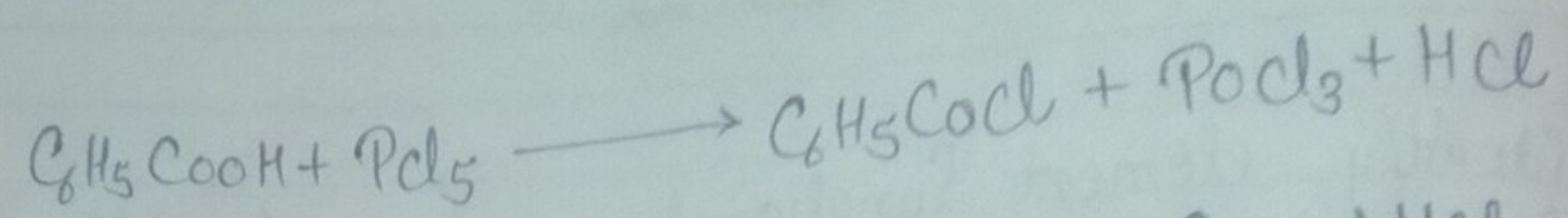
Odour: Pungent smell

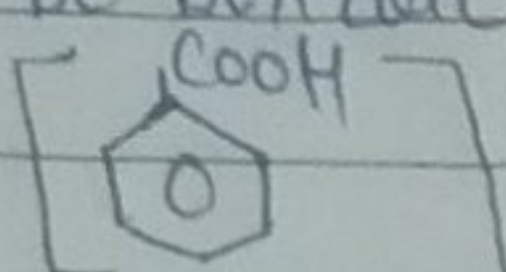
Solubility: Soluble in boiling water

Secondary test:

S.No	Test	Observation	Result
1	Flame test: Take Compound on spatula and heat on burner	Burns with black flames	Compound is aromatic
2	Litmus test: Dip blue litmus in sol ⁿ of Compound	litmus paper turns red	Compound is acidic.
3	Element test: L.S + freshly prepared FeSO_4 Sol ⁿ + Con. H_2SO_4	No colour or ppt obtained	Nitrogen absent
4	Functional group test:		

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Aqueous sol ⁿ of Carbon Compound + neutral FeCl ₃ solution	ppt obtained	Carboxyl group present.
5. M.P of Compound M.P of given Compound	$\approx 121^{\circ}\text{C}$	
		May be benzoic acid 
6. Confirmatory test:		
1. Compound + NH ₄ OH sol ⁿ + neutral FeCl ₃ solution	hoff coloured ppt	Benzoic acid is + nt
2. Compound + Concentration H ₂ SO ₄ + alcohol + Δ	Fruity smell	Benzoic acid is + nt

Result:

In the given Compound functional group is Carboxylic acid, Compound is benzoic acid.

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