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Date 4th May 20

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EXPERIMENT - 1

Aim:
Preparation of 250 ml of 0.05 M solution of Mohr's salt.

Theory:
Molecular mass of Mohr's salt, $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O = 392$
Hence, for preparing 1000 ml of 1M Mohr's salt solution
Mohr's salt required = 392 g
∴ For preparing 250 ml. of 0.05 M Mohr's salt solution

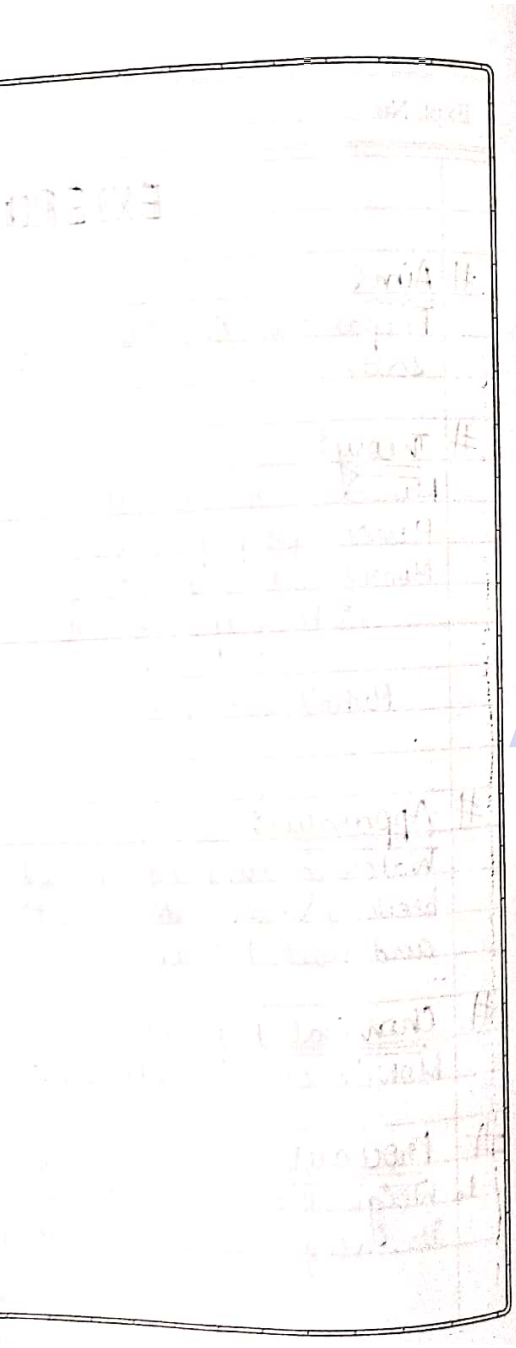
$$\text{Mohr's salt required} = \frac{392}{1000} \times 250 \times 0.05 = 4.9 \text{ g}$$

Apparatus:
Watch glass, weight box, fractional weight box, 250ml beaker, glass rod, 250 ml measuring flask, dropper and wash bottle.

Chemicals Required
Mohr's salt, conc. H_2SO_4 and distilled water.

Procedure
1. Weigh the clean and dry watch glass and record its weight in the notebook.

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2. Weigh accurately 4.9 g of Mohr's salt crystals on the watch glass and record the weight in the notebook.
3. Transfer carefully the weighed Mohr's salt from the watch glass into a clean 250 ml measuring flask using a funnel.
4. Wash the watch glass thoroughly with distilled water to transfer the sticking salt completely into the flask. Dissolve the salt in the beaker with gentle stirring.
5. Add about 5 ml of conc. H_2SO_4 to the solution in the measuring flask to check the hydrolysis of ferrous sulphate.
6. Use the funnel with distilled water and transfer to measuring flask.
7. Add enough distilled water to the measuring flask carefully upto just below the etched mark on its neck with the help of wash bottle.
8. Add the last few drops of distilled water with a pipette or a dropper until the lower level of the meniscus just touches the mark on the measuring flask.
9. Stopper the measuring flask and shake it gently to make the solution homogeneous.

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- (1) Weight of watch glass : 19.16g
- (2) Weight of salt : 4.9g
- (3) Weight of watch glass + salt : 24.06g

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Result :
M Mohr's salt solution is prepared.

- # Precautions :
- 1. Weigh the salt very carefully.
 - 2. H_2SO_4 is added in measuring flask to prevent hydrolysis.
 - 3. Transfer the Mohr's salt into measuring flask very carefully.

Teacher's signature : *[Signature]* / 11/5

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EXPERIMENT = 2

Aim:
 Prepare 0.05M solution of ferrous ammonium sulphate (Mohr's salt). Using this solution find out the molarity and strength of the given $KMnO_4$ solution

Chemical Equations:
Ionic equations
 $MnO_4^- + 8H^+ + 5e^- \longrightarrow Mn^{2+} + 4H_2O$
 $Fe^{2+} \longrightarrow Fe^{3+} + e^- \times 5$
 $MnO_4^- + 8H^+ + 5Fe^{2+} \longrightarrow 5Fe^{3+} + Mn^{2+} + 4H_2O$

Indicator:
 $KMnO_4$ is a self-indicator

End Point:
 colourless to permanent pink colour ($KMnO_4$ is burette)

Procedure:
 1. Prepare 250 ml of 0.05M Mohr's salt solution by dissolving 4.9 g of Mohr's salt in water as described in experiment 1. Rinse the pipette with the 0.05M Mohr's salt solution and pipette out 10 ml of it in a washed titration flask.

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Observations

- * Weight of watch glass = 19.16g
- * Weight of watch glass + salt = 24.06g
- * Weight of Mohr's salt = 4.9g
- * Volume of Mohr's salt solution prepared = 250ml
- * Molarity of Mohr's salt solution = 0.05M
- * Volume of Mohr's salt solution taken for each titration = 10ml

S.No.	Vol of Mohr's salt/ml	Burette Readings		Vol. of $KMnO_4$ solution used/ml
		Initial(ml)	Final(ml)	
1.	10ml	0.0	9.8	9.8
2.	10ml	9.8	19.6	9.8
3.	10ml	19.6	29.4	9.8
4.	10ml	29.4	39.2	9.8

concordant reading = 9.8 ml

Calculations :

- $M_1 = \text{Molarity of Mohr's salt} = \frac{1}{20}$
- $M_2 = \text{Molarity of } KMnO_4 \text{ solution}$
- $V_1 = \text{Volume of Mohr's salt} = 10 \text{ ml}$
- $V_2 = \text{Volume of } KMnO_4 \text{ solution} = 9.8 \text{ ml}$
- $n_1 = \text{Moles of Mohr's salt} = 10$
- $n_2 = \text{Moles of } KMnO_4 \text{ solution} = 2$

$$\frac{M_1 V_1}{n_1} = \frac{M_2 V_2}{n_2}$$
$$\frac{1 \times 10}{20} = \frac{M_2 \times 9.8}{2}$$
$$M_2 = \frac{1}{20} \times \frac{2}{9.8} = \frac{1}{9.8} = 0.01 \text{ M}$$

∴ Strength = Molarity × Molar mass of KMnO_4
= 0.01×158
= 1.58 g/l .

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- Rinse and fill the burette with the given KMnO_4 solution.
- Add one test tube 10 ml full of dilute sulphuric acid to the solution in the titration flask.
- Note the initial reading of the burette.
- Now add KMnO_4 solution from the burette till a permanent light pink colour is imparted to the solution in the titration flask on addition of last single drop of KMnO_4 solution.
- Note the final reading of the burette.
- Repeat the above steps 4-5 times to get a set of three concordant readings.

Result
Molarity of $\text{KMnO}_4 = 0.01 \text{ mol/l}$
Strength of $\text{KMnO}_4 = 1.58 \text{ g/l}$

Precautions:

- Read the upper meniscus for the reading.
- Wash all the apparatus before use.
- Must add dil. H_2SO_4 in conical flask each time for titration.

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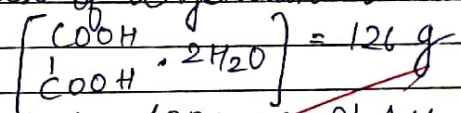
EXPERIMENT = 3

Aim :

Prepare 250 ml of M solution of oxalic acid from crystalline oxalic⁴⁰ acid.

Theory :

Molecular mass of crystalline oxalic acid



Hence, for preparing 1000 ml of 1 M oxalic acid, weight of oxalic acid crystals required = 126 g

∴ For preparing 250 ml of $\frac{1}{40}$ solution,

$$\text{oxalic acid crystals required} = \frac{126 \times 250 \times \frac{1}{40}}{1000} = 0.7875 \text{ g}$$

Apparatus :

Watch glass, analytical balance, weight box, fractional weight box, 250 ml beaker, glass, rod, 250 ml measuring flask and wash bottle.

Chemicals Required :

Oxalic acid crystals and distilled water.

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Procedure:

1. Take a watch glass, wash it with distilled water and then dry it.
2. Weigh the clean and dried watch glass accurately and record its weight in the notebook.
3. Weigh 0.7875g oxalic acid on the watch glass accurately and record this weight in the notebook.
4. Transfer gently and carefully the oxalic acid from the watch glass into a clean 250 ml measuring flask using a funnel. Wash the watch glass with distilled water with the help of a wash bottle to transfer the particles sticking to it into the cone. The volume of distilled water for this purpose should not be more than 50ml.
5. Finally wash the funnel well with distilled water with the help of a wash bottle to transfer the solution sticking to the funnel into measuring flask.
6. Swirl the measuring flask till solid oxalic acid dissolves.
7. Add enough distilled water to the measuring flask carefully upto just below the etched mark on it, with the help of a wash bottle.
8. Add the last few drops of distilled water with a pipette or a dropper until the lower level of the meniscus just touches the mark on the

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- (1) Weight of watch glass : 16.65 g
- (2) Weight of oxalic acid : 0.7875 g
- (3) Weight of watch glass + oxalic acid : 17.4375 g

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measuring flask.
9. Stopper the measuring flask and shake gently to make the solution uniform throughout.

Result :
M oxalic acid solution is prepared

- # Precautions :
- 1. Weigh the salt very carefully.
 - 2. Wash all the apparatus before use.
 - 3. Transfer the salt from the funnel to measuring flask very carefully.

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Observations

- * Weight of watch glass = 16.65g
- * Weight of watch glass + oxalic acid = 17.4375g
- * Weight of oxalic acid = 0.7875g
- * Volume of solution prepared = 250ml
- * Molarity of oxalic acid solution = $\frac{1}{40}$
- * Volume of oxalic acid solution taken for each titration = 10ml

S.No	Vol of Oxalic acid (ml)	Burette Readings		Volume of the $KMnO_4$ solution (ml)
		Initial	Final	
1.	10ml	0.0	10.7	10.7
2.	10ml	10.7	21.3	10.6
3.	10ml	21.3	31.9	10.6
4.	10ml	31.9	42.5	10.6

Concordant reading = 10.6ml

Calculations :

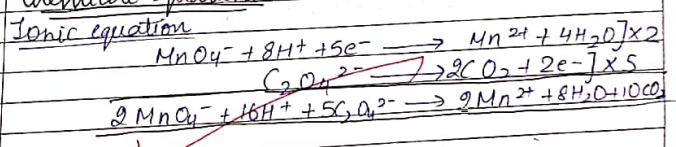
- $M_1 =$ Molarity of oxalic acid = $\frac{1}{40}$
- $M_2 =$ Molarity of $KMnO_4$ solution
- $V_1 =$ Volume of oxalic acid = 10ml
- $V_2 =$ Volume of $KMnO_4$ solution = 10ml
- $n_1 =$ Moles of oxalic acid = 5
- $n_2 =$ Moles of $KMnO_4$ solution = 2

EXPERIMENT - 21

Aim:

Prepare M solution of oxalic acid. With its help, determine the molarity and strength of the given solution of potassium permanganate ($KMnO_4$)

Chemical Equations:



Indicator

self-indicator.

End point:

Colourless to permanent pink colour ($KMnO_4$ in burette).

Procedure:

1. Weigh 0.7875g of oxalic acid crystals and dissolve them in water to prepare 250 ml of M oxalic acid solution using a 500 ml measuring flask. Rinse the pipette with the M oxalic acid solution and pipette out 20ml of it in a washed titration flask.

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$$\frac{N_1 V_1}{n_1} = \frac{N_2 V_2}{n_2}$$

$$\frac{1 \times 10}{5} = \frac{N_2 \times 100}{1}$$

$$N_2 = \frac{1 \times 1}{4 \times 25} = \frac{1}{100} = 0.01M$$

Strength = Molarity \times Molar mass of $KMnO_4$
 $= 0.01 \times 158$
 $= 1.58 \text{ g/L}$

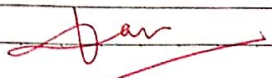
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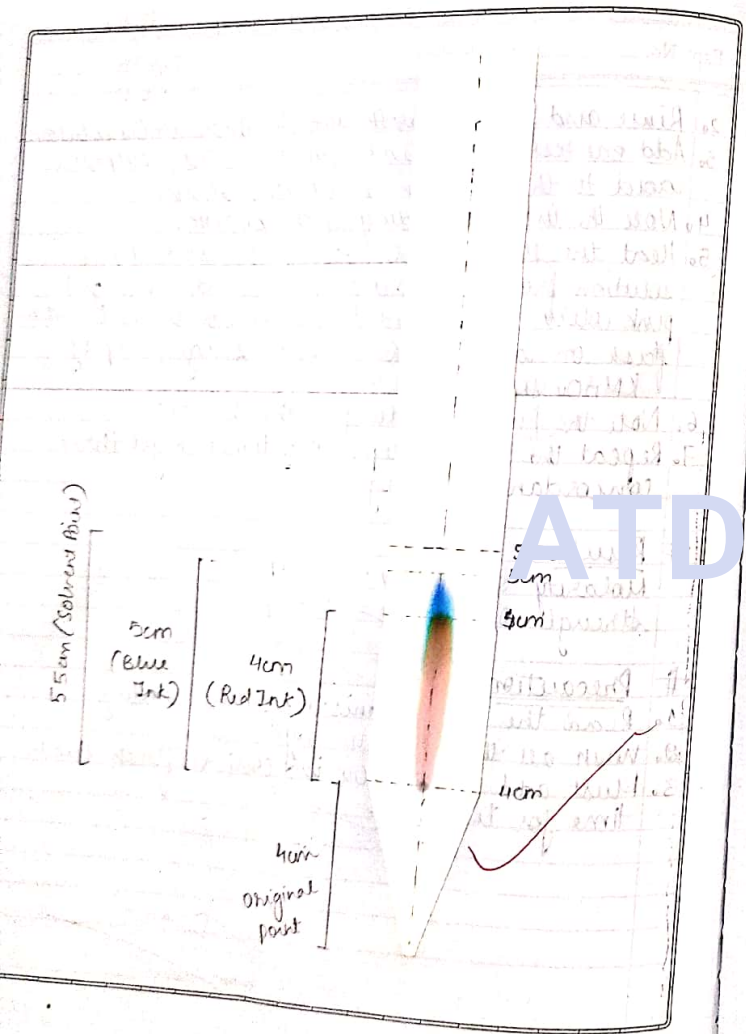
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2. Rinse and fill the burette with the given $KMnO_4$ solution.
3. Add one test tube (10 ml) full of dilute sulphuric acid to the solution in titration flask.
4. Note the initial reading of the burette.
5. Heat the flask to $60-70^\circ C$ and add $KMnO_4$ solution from the burette till a permanent light pink colour is imparted to the solution in the titration flask on addition of a last single drop of $KMnO_4$ solution.
6. Note the final reading of the burette.
7. Repeat the above steps 4-5 times to get three concordant readings.

Result:
Molarity of $KMnO_4 = 0.01M$
Strength of $KMnO_4 = 1.58 \text{ g/L}$

- # Precautions:
1. Read the upper meniscus for the reading.
 2. Wash all the apparatus before use.
 3. Must add dil. H_2SO_4 in conical flask each time for titration.


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Date 19th May

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EXPERIMENT - 5

Aim :
To separate the coloured components present in the mixture of black ink by ascending paper chromatography and find their R_f values.

Apparatus :
Gas jar, glass rod, filter paper strip (Whatman No. 1 filter paper), jar cover and a fine capillary tube.

Requisment :
A black ink, alcohol and distilled water

- # Procedure :
1. Take a whatman filter paper strip (20x2cm) and draw a line with pencil above 3cm from one end. Draw another line lengthwise from the centre of the paper as shown in fig.
 2. With the help of fine capillary tube, put a drop of the mixture of red and blue inks at the point P. Let it dry in air. Put another drop on the same spot and dry again. Repeat 2-3 times, so that the spot is rich in the mixture.
 3. Suspend the filter paper vertically in a gas jar containing the solvent (eluent) with the help of a

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Observation

Sample	Distance travelled by components (cm)	Distance travelled by solvent (cm)	R _f value
Black Ink	Red Ink = 4cm	5.5 cm	$\frac{4}{5.5} = 0.727$
	Blue Ink = 5cm	5.5 cm	$\frac{5}{5.5} = 0.909$

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glass rod in such a way that the pencil line (and the spot) remains about 2cm above the solvent level (50% alcohol + distilled water).

- Cover the jar and keep it undisturbed. Notice the rising solvent along with the mixture of black ink. After the solvent has risen about 15cm you will notice two different spots of blue and red colour on the filter paper.
- Take the filter paper out of the jar and mark the distance that the solvent has risen on the paper with a pencil. This is called solvent front.
- Dry the paper. Put pencil marks in the centre of the spot.
- Measure the distance of the two spots from the original line and the distance of the solvent from the original line.
- Calculate the R_f values of the blue and red inks by using the formula:

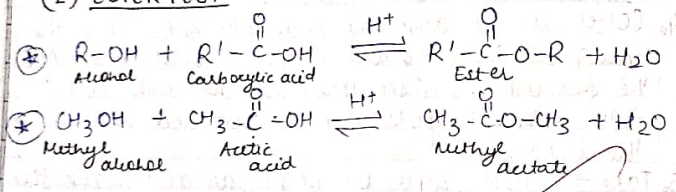
$$R_f = \frac{\text{Distance travelled by the blue or red ink from the point of application}}{\text{Distance travelled by the solvent from the original line.}}$$

Result :-
 The R_f value of Red ink = 0.727
 The R_f value of Blue ink = 0.909

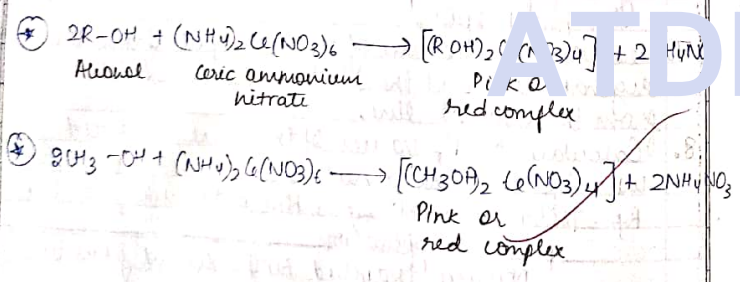
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Reaction :

(1) ESTER TEST



(2) CERIC AMMONIUM NITRATE TEST



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EXPERIMENT - 6

Aim :
To identify the functional group present in the given organic sample.

EXPERIMENT	OBSERVATION	INFERENCE
1. ESTER TEST Take 1ml of the given liquid in a clean dry test tube, add 1 ml of glacial acetic acid & 3 drops of conc. sulphuric acid. The mixture is added into 20ml of cold water taken in a beaker and smell.	A fainty smoke is observed.	Observation indicates the presence of an alcoholic group.
2. CERIC AMMONIUM NITRATE TEST Place 1ml of the given compound in a clean dry test-tube, add a few drops of ceric ammonium nitrate reagent and shake well.	Appearance of pink or red colour is observed.	Observation indicates the presence of an alcoholic group.

Result : The organic sample contains alcoholic group.

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Reactions :

(1) LITMUS TEST

$$R-\overset{\overset{O}{\parallel}}{C}-OH + H_2O \rightleftharpoons R-\overset{\overset{O}{\parallel}}{C}-O^- + H_3O^+$$

(2) SODIUM HYDROGENCARBONATE TEST

$$R\text{COOH} + NaHCO_3 \rightarrow RCOONa + CO_2 \uparrow + H_2O$$

Carboxylic acid (Effervescence)

(3) ESTER TEST

$$R\text{COOH} + C_2H_5OH \xrightarrow{H_2SO_4} RCOOC_2H_5 + H_2O$$

Carboxylic acid (Fruity smell)

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EXPERIMENT - 7

Aim :

To identify the functional group present in the given organic sample.

EXPERIMENT	OBSERVATION	INFERENCE
1. LITMUS TEST		
Place a drop of the given liquid on a moist blue litmus paper and note the change in colour	The colour changes to red	It indicates the presence of carboxylic group.
2. SODIUM HYDROGENCARBONATE TEST		
To 1 ml of organic liquid in a test-tube, add a pinch of sodium hydrogencarbonate (NaHCO ₃)	A brisk effervescence is observed	It indicates the presence of carboxylic group.
3. ESTER TEST		
Take about 0.1g of the organic compound, 1ml of ethyl alcohol and 1-2 drops of conc. H ₂ SO ₄ in a test tube. Heat the reaction	A fruity smell is observed	Observation indicates the presence of carboxylic group.

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Mixture on a water bath for about 5 mins. Pour the reaction mixture in a beaker containing water

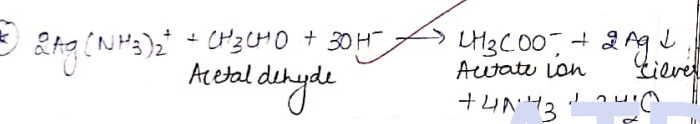
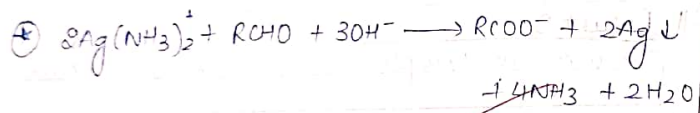
Result :
The organic sample contains carboxylic acid.

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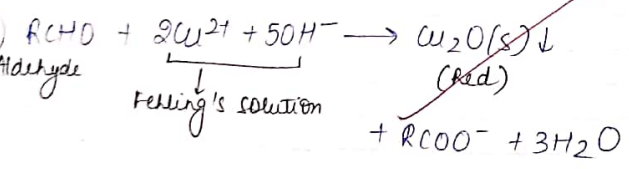
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Reactions :

(1) TOLLEN'S TEST



(2) FEHLING'S TEST



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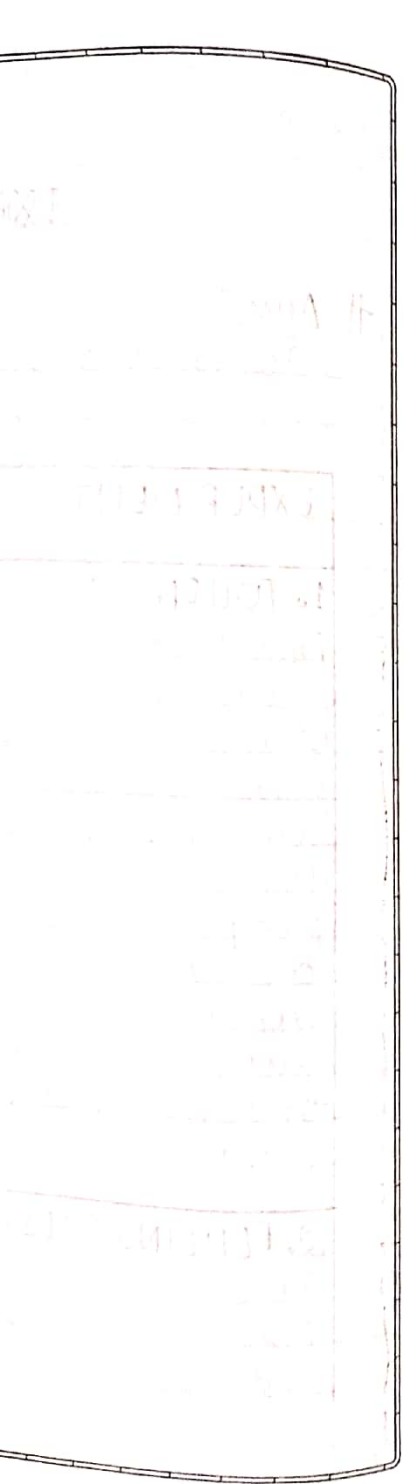
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EXPERIMENT - 8

Aim :
To identify the functional group present in the given organic sample.

EXPERIMENT	OBSERVATION	INFERENCE
<p>1. TOLLEN'S TEST</p> <p>Place 1ml of silver nitrate solⁿ in a clean test tube and add 2-3ml of dilute NaOH solution. A brown precipitate forms. Now add a little of the given solution dropwise until the brown precipitate of silver oxide just dissolves. To this add 3-4 drops of the given liquid and warm the test tube on a water bath for about 5 minutes.</p>	<p>A shining mirror on the walls of the test tube is observed.</p>	<p>Observation indicates the presence of the aldehydic group.</p>
<p>2. FEHLING'S TEST</p> <p>Take 1 ml each of Fehling's solution A and B in a test tube. Add</p>	<p>Appearance of red precipitate</p>	<p>Observation indicates the presence</p>

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4-5 drops of the given organic compound and warm the test tube in hot water bath for 4-5 minutes.		of the aldehydic group
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Result:
The organic sample contains the aldehydic group

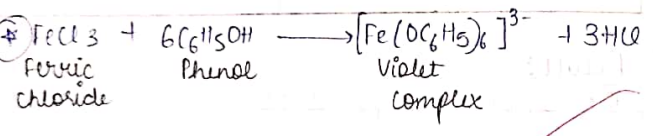
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Reaction :

(2) FERRIC CHLORIDE TEST



Date 17th Aug 2022

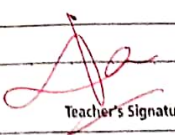
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EXPERIMENT - 9

Aim :
 To identify the functional group present in the given organic sample.

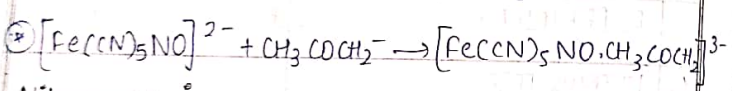
EXPERIMENT	OBSERVATION	INFERENCE
1. LITMUS TEST Place a drop of the given liquid or a crystal if solid on moist blue litmus paper.	The colour changes to red.	It indicates the presence of phenolic group.
2. FERRIC CHLORIDE TEST Take 1ml of neutral ferric chloride solution in a clean test tube and 2-3 drops of the liquid compound.	A change in colour is observed	Observation indicates the presence of phenolic group.

Result :
 Given organic sample contains phenolic group.


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Reactions:

(2) SODIUM NITROPRUSSIDE TEST



Nitroprusside ion

Red colouration

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EXPERIMENT - 10

Aim:
 To identify the functional group present in the given organic sample

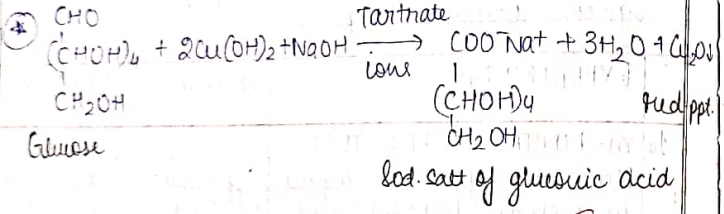
EXPERIMENT	OBSERVATION	INFERENCE
1. <u>m-DINITROBENZENE TEST</u> Place 0.5 ml of the give liquid in a clean test tube and add about 0.1g of finely powdered m-dinitrobenzene. No. 1 to a 2. ml of dilute 'x' in 'y' & shake.	Appearance of violet colour which slowly fades	Observation indicates the presence of ketonic group.
2. <u>SODIUM NITROPRUSSIDE TEST</u> Dissolve a crystal of sodium nitroprusside in about 1ml of distilled water in a clean test tube and then add 0.5 ml of the given compound. Shake and add sodium hydroxide sol ⁿ dropwise.	A red colouration is observed	Observation indicates the presence of ketonic group.

Result: The given organic sample contains ketonic group.

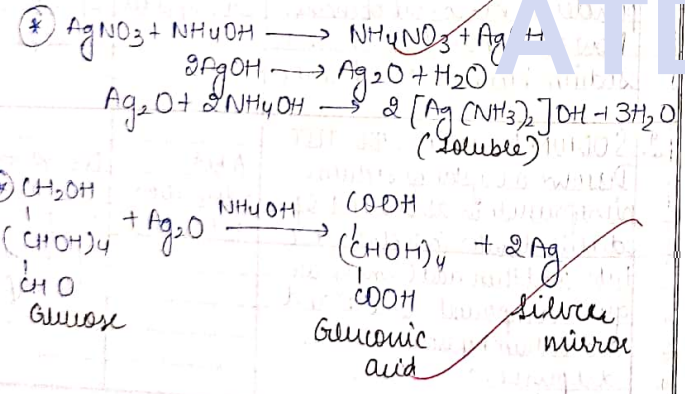
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Reaction:

(2) FEHLING'S TEST



(3) TOLLEN'S TEST



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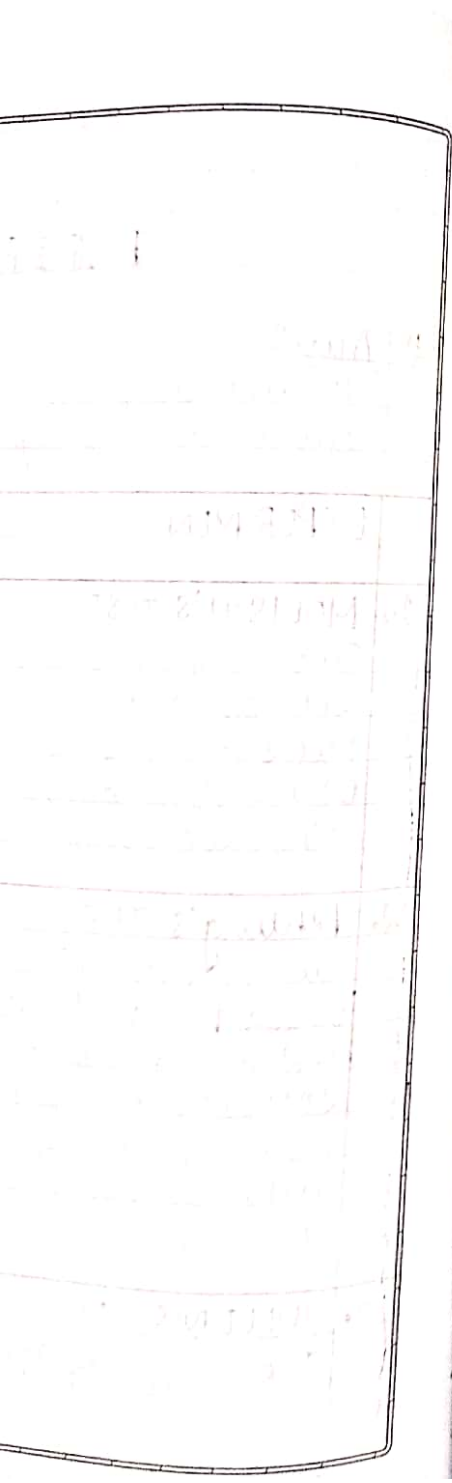
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EXPERIMENT - 11

Aim: To test the presence of carbohydrate in a given food sample.

EXPERIMENT	OBSERVATION	INFERENCE
1. MOLISCH'S TEST Take 1-2 ml of carbohydrate sol ⁿ and add few drops of Molisch's reagent. Put 1 ml of conc H ₂ SO ₄ along the side of the test tube.	Red-violet ring is produced	It indicates the presence of carbohydrate in food sample
2. Fehling's TEST Take 2 ml of aqueous sol ⁿ of carbohydrate and add 10 ml each of Fehling's solution A and Fehling's solution B. Keep the test tube in boiling water bath.	Appearance of reddish precipitate	It indicates the presence of carbohydrate in food sample
3. TOLLEN'S TEST Take 2-3 ml of aqueous sol ⁿ	A shining	It indicates

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of carbohydrate in a test tube. Add to it 2-3 ml of Tollen's reagent. Keep the test tube in a boiling water bath for 10 minutes	Silver mirror is observed	The presence of carbohydrate in food sample
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Result:
~~Given food sample contains carbohydrates~~

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EXPERIMENT = 12

Aim:
To test the presence of proteins in a given food sample.

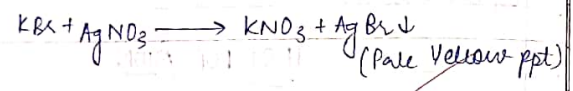
EXPERIMENT	OBSERVATION	INFERENCE
1. BIURET TEST Take a sample, Add 2ml of NaOH sol ⁿ , Now add 4-5 drops of CuSO ₄ solution. W. m. d. e. n. x. i. u. s. J. s. a. n. t. 5. m. A. H. o.	Bluish violet colour appears	It indicates the presence of protein in food sample
2. XANTHOPROTEIC TEST Take the sample. Add few drops of conc. HNO ₃ and heat	Yellow ppt is formed	It indicates the presence of protein in food sample

Result:
Given food sample contains proteins.

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⇒ Chemical Reactions Involved

1. SILVER NITRATE TEST



2. Chlorine water test



Bromine (Br₂) being soluble in (CCl₄) / CH₂Cl₂ giving an orange colour to CS₂ layer.

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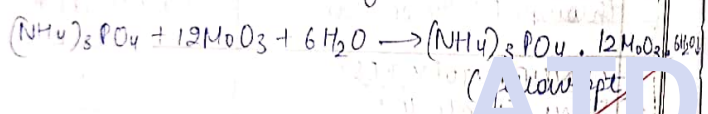
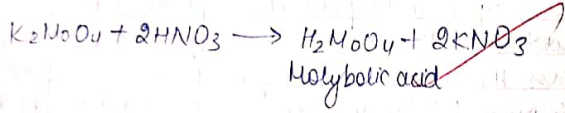
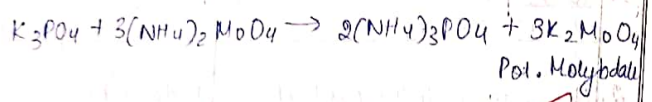
Expt. No. _____ Page No. _____

Test for anion

EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add 1-2 of dil H ₂ SO ₄	No reaction	dil group is absent
2. Now, again to the pinch of salt add conc. H ₂ SO ₄ . Pass the reddish brown fumes through FeSO ₄ solution.	Reddish brown fumes evolve solution does not turn black	Radical may be Br ⁻ or NO ₃ ⁻ Radical may be Br ⁻
<u>CONFIRMATORY TEST</u>		
1. To the aqueous soln of salt, add dil HNO ₃ . Then boil, cool for sometime and add AgNO ₃	Light yellow ppt is formed	Br ⁻ is confirmed.
2. <u>Chlorine water test</u> To the salt, add conc. H ₂ SO ₄ and add 1-2 ml of carbon disulphide and then chlorine water. Shake vigorously.	Carbon disulphide (CS ₂) layer acquires orange colouration	Br ⁻ is confirmed.
# <u>Result</u> : The given salt contains anion: Br ⁻ cation: NH ₄ ⁺		
Teacher's Signature: <i>[Signature]</i>		

⇒ Chemical Reactions Involved

⊕ AMMONIUM MOLYBDATE TEST



Date _____

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EXPERIMENT = 147

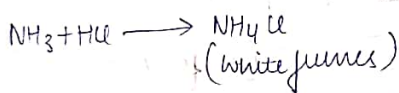
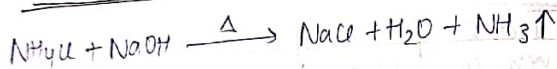
Aim:
To test the presence of anion and cation in the given salt sample.

Test for Anion

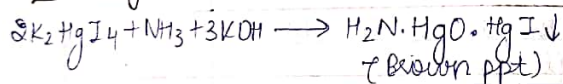
EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add dil. H ₂ SO ₄	No brisk effervescence evolves	CO ₃ ²⁻ absent
2. To the pinch of salt add conc. H ₂ SO ₄	No fumes are evolved	Radical may be PO ₄ ³⁻ (As Cl ⁻ , Br ⁻ , NO ₂ ⁻ , CH ₃ COO ⁻ is absent)
3. To the salt add conc. HNO ₃ sol ⁿ and boil. Add ammonium molybdate solution in excess and boil again.	A deep yellow ppt is formed.	PO ₄ ³⁻ is confirmed

Teacher's Signature : _____

⇒ Chemical Reactions



Nessler's Reagent test



Date _____

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Page No. _____

TEST FOR CATION

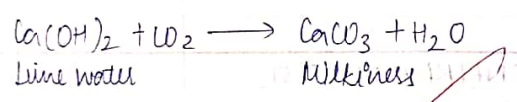
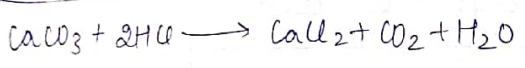
EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add NaOH soln and heat	Ammonical smell is observed	Radical may be NH_4^+
<u>CONFIRMATORY TEST</u>		
2. Bring a glass rod clipped in dil. HCl near the mouth of above test tube	White fumes are observed	NH_4^+ is confirmed.
3. Add Na_2S reagent to above test tube	Brown ppt is formed	NH_4^+ is confirmed.

Result: The given salt contains
 anion: PO_4^{3-}
 cation: NH_4^+

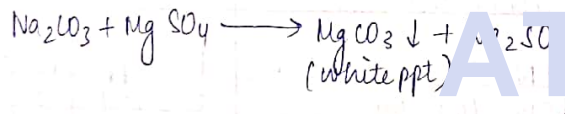
Teacher's Signature: _____

⇒ Chemical Reactions Involved

(1) lime water test



(2) Magnesium sulphate test



Date _____

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EXPERIMENT - 15

Aim:

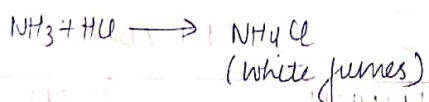
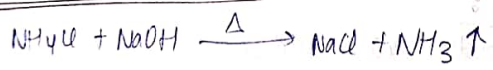
To detect anion and cation in salt sample

TEST FOR ANION

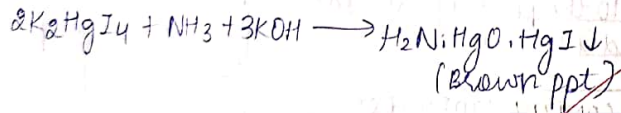
EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add dil H_2SO_4	Bisk effervescence	CO_3^{2-} may be present
<u>CONFIRMATORY TEST</u>		
1. <u>Lime water test</u> Pass the fumes evolved above through lime water	Lime water turns milky	CO_3^{2-} is confirmed
2. <u>Magnesium sulphate test</u> To the salt solution add Na_2CO_3 and then magnesium sulphate solution	White ppt is formed	CO_3^{2-} is confirmed.

Teacher's Signature : _____

⇒ Chemical Reactions Involved



Nessler's Reagent



Date _____

Expt. No. _____

Page No. _____

TEST OF CATION

EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add NaOH solution and heat	Ammoniacal smell is observed	Radical may be NH_4^+
<u>CONFIRMATORY TEST</u>		
1. Bring a glass rod dipped in dil. HCl near the mouth of above test tube	White fumes are observed	NH_4^+ is confirmed
2. Add Nessler's Reagent to the above test tube.	Brown ppt is formed	NH_4^+ is confirmed.

Result: The given salt contains:
 anion: CO_3^{2-}
 cation: NH_4^+

Teacher's Signature: _____

⇒ Chemical Reaction Involved

(1) Oxalic Acid Test

$$\begin{array}{c} \text{COOH} \\ | \\ \text{COOH} \end{array} + 2\text{CH}_3\text{COONa} \rightarrow \begin{array}{c} \text{COONa} \\ | \\ \text{COONa} \end{array} + 2\text{CH}_3\text{COOH}$$

Acetic acid
(Vinegar smell)

(2) Ester test

$$2\text{C}_2\text{H}_3\text{COONa} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{CH}_3\text{COOH}$$

$$\text{C}_2\text{H}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$$

Ethyl acetate
(Fruity smell)

Date _____

Page No. _____

EXPERIMENT = 16

Aim?
To detect the presence of cation and anion in the given salt.

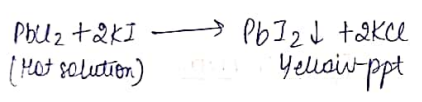
TEST FOR ANION

EXPERIMENT	OBSERVATION	INFERENCE
1. To the salt add dil H_2SO_4	No reaction	dil group is absent
2. To the salt add conc. H_2SO_4	Smell of vinegar	CH_3COO^- may be present
CONFIRMATORY TEST		
1. Take some salt on a watch glass and mix it with solid Oxalic acid.	Vinegar smell	CH_3COO^- confirmed
2. Ester test Take some salt in a test tube. Add conc. H_2SO_4 and heat. Now add ethanol and pour the content of test tube in a beaker full of water.	Fruity smell or ester	CH_3COO^- confirmed

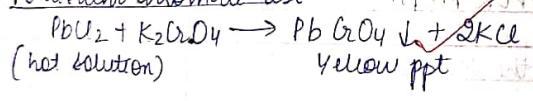
Teacher's Signature: _____

⇒ Chemical Reactions Involved

(1) Potassium Iodide test



(2) Potassium chromate test



Expt. No. _____ Date _____
 Page No. _____

Test for cation

EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add min. amount of water to dissolve salt. To the original solution add dil HCl. Now separate the white ppt form through filter paper and boil it and divide the solution into two parts.	White ppt is formed	Radical may be Pb^{2+}
CONFIRMATION TEST To the first part of above sol ⁿ , add KI sol ⁿ .	Yellow ppt is formed	Pb^{2+} is confirmed
2. Potassium chromate Test To the second part of above solution, add K_2CrO_4 sol ⁿ	Yellow ppt is formed	Pb^{2+} is confirmed

Result: The given salt contains:
 anion: CH_3COO^-
 cation: Pb^{2+}

Teacher's Signature: _____

[Handwritten Signature]

⇒ Chemical Reaction Involved

(a) Copper chips Test
 $KNO_3 + H_2SO_4 \rightarrow KHSO_4 + HNO_3$
 $4HNO_3 + C \rightarrow 4NO_2 \uparrow + CO_2 + 2H_2O$
 (Paper pellet)

(b) Ring Test
 $6FeSO_4 + 3H_2SO_4 + 2HNO_3 \rightarrow 3Fe(SO_4)_3 + 11H_2O + 2NO$
 $FeSO_4 + NO + 5H_2O \rightarrow [Fe(NO)(H_2O)_5] \cdot SO_4$
 (Brown ring)

Date _____
Page No. _____

EXPERIMENT - 17

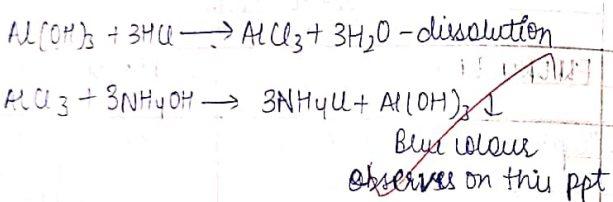
Aim:
 To detect the presence of cation and anion in the given salt.
Test for anion.

EXPERIMENT	OBSERVATION	INFERENCE
1. To pinch of salt, add dil H_2SO_4	No reaction	dil group absent
2. To the pinch of salt, add conc. H_2SO_4	Reddish brown fumes evolved	Radical may be Br^- or NO_2^-
3. To the balance of salt add H_2SO_4	Sol turns black	NO_2^- may be present
CONFIRMATORY TEST		
1. <u>Cu Chips test</u> Heat a small quantity of salt with conc. H_2SO_4 add few copper chips	Dark brown fumes of NO_2 are formed	NO_2^- ion is confirmed.
2. <u>Ring Test</u> Add a small quantity of freshly prepared soln of ferrous sulphate to a part of aq. soln and then pour conc. H_2SO_4 acid slowly along the sides of test tube.	A dark brown ring is formed at the junction of the layers of the acid and the soln	NO_2^- is confirmed.

Teacher's Signature : _____

⇒ Chemical Reactions Involved

(1) Lake test



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Date _____

Expt. No. _____

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Test for cation

EXPERIMENT	OBSERVATION	INFERENCE
1. To the pinch of salt add conc. NaOH and heat	No reaction i.e. no ammonia smell	NH_4^+ is absent
2. On adding HCl to original solution	No white ppt is formed	Pb^{2+} is absent
3. To the above sol ⁿ add Na_2S	No black or white ppt is formed	Pb^{2+}, Cu^{2+} are absent
4. To the above sol ⁿ of group II add conc. HNO_3 . Boil off Na_2S from the filtrate then boil the salt with added conc. HNO_3 . Then add NH_4Cl and NH_4OH slowly till the ammoniacal smell appears	White ppt is formed	Al^{3+} may be present
5. <u>Lake test</u> Dissolve the ppt in dil. HCl and add two drops of blue litmus sol ⁿ to it. Now add NH_4OH dropwise till blue colour develops	Blue ppt floating in the colourless solution	Al^{3+} is confirmed

Result: The given salt contains Anion: NO_3^- Cation: Al^{3+}
 Teacher's Signature: _____

⇒ Anion Test

(1) Barium chloride Test
 $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + \text{NaCl}$
 (white)

(2) Lead acetate test
 $\text{Na}_2\text{SO}_4 + \text{Pb}(\text{CH}_3\text{COO})_2 \rightarrow \text{PbSO}_4 + 2\text{CH}_3\text{COO}^-$

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EXPERIMENT = 7B

- # Aim:
 To analyse the presence of anion and cation in a given salt no. 12.
- # Apparatus:
 Test tube, dropper, test tube holder, burner, etc.
- # Chemical Reagents:
 dil. H_2SO_4 , conc. H_2SO_4 , BaCl_2 solⁿ, dil. HCl , NaOH solⁿ, conc. HNO_3 , solid NH_4Cl , NH_4OH , $(\text{NH}_4)_3\text{PO}_4$.

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. <u>Dil. H_2SO_4 test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
2. <u>Conc. H_2SO_4 test</u> To the pinch of salt add conc. H_2SO_4	No gas evolved	Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- is absent.

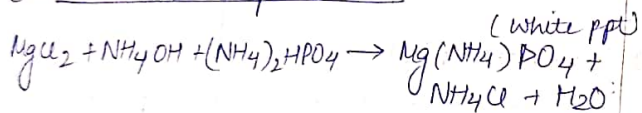
Teacher's Signature : _____

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Expt. No. _____		Date _____	
		Page No. _____	
INDEPENDENT GROUP			
1.	<u>Barium chloride test</u>		
	To the aq. solution of salt add dil HCl and BaCl ₂ sol ⁿ	White ppt is formed which is insoluble in dil HCl	SO ₄ ²⁻ is confirmed
2.	<u>Lead Acetate test</u>		
	To the aq. solution of salt add lead acetate solution	White ppt is formed which is soluble in hot ammonium acetate solution	SO ₄ ²⁻ is confirmed
CATION TEST			
	To 1-2 ml of salt add NaOH & heat	No ammoniacal smell observed	NH ₄ ⁺ is absent
	→ To the small quantity of salt add water.	original sol ⁿ is formed	
	→ To the original sol ⁿ add dil. HCl.	No white ppt formed	Pb ²⁺ is absent
	→ To the above sol ⁿ add Na ₂ S.	No black ppt	Ca ²⁺ is absent
	→ To the above sol ⁿ of group II add 4-5 drops of conc HNO ₃ and boil and cool the sol ⁿ and then add NH ₄ OH in excess	No ppt is formed.	Fe ²⁺ , Fe ³⁺ , Al ³⁺ absent.
	→ To the sol ⁿ of group III add Na ₂ S	No ppt is formed	Mn ²⁺ , Zn ²⁺ is absent.
Teacher's Signature : _____			

⇒ Cation Test

(1) Ammonium Phosphate Test



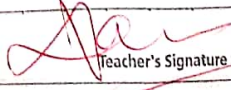
Date _____

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→	Boil the above sol ⁿ of group IV to remove NO_2, S . Now add $(NH_4)_2CO_3$	No white ppt is formed	Ba^{2+}, Sr^{2+} Ca^{2+} absent
1.	<u>Ammonium Phosphate Test</u> To the original sol ⁿ . add NH_4Cl and NH_4OH in excess. Then add ammonium phosphate sol ⁿ . and rub the sides of test tube with a glass rod.	White ppt is formed	Mg^{2+} is confirmed

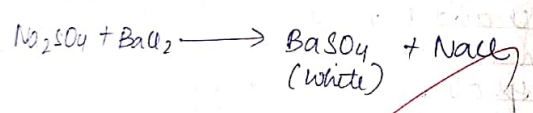
Result :
 Anion is SO_4^{2-} , cation is Mg^{2+} , salt is $MgSO_4$
 The given salt no. 12 is Magnesium sulphate.

- # Precautions :
- * Use minimum quantity of reagents.
 - * Use chemicals carefully.
 - * Prolong heating of test tube should be avoided.


 Teacher's Signature: _____

⇒ Anion test

(1) Barium Chloride Test



(2) Lead Acetate Test



Date _____

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Page No. _____

EXPERIMENT - 19

- # Aim:
To analyse the presence of anion and cation in a given salt no. 6
- # Apparatus:
Test tube, holder, dropper, burner, etc.
- # Chemicals Required:
dil. H_2SO_4 , conc. H_2SO_4 , $BaCl_2$, $Pb(CH_3COO)_2$, NH_4OH , NH_4Cl , Na_2S , conc. HNO_3 , dil. HCl .

EXPERIMENT	OBSERVATION	INFERENCE
<u>ANION TEST</u>		
1. <u>Dil. H_2SO_4 test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
2. <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4	No gas evolved	Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- absent

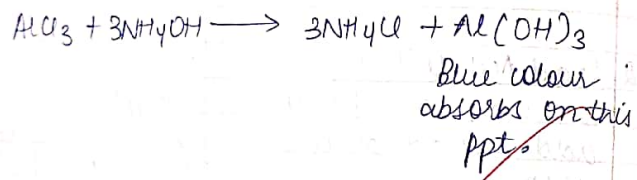
Teacher's Signature: _____

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Expt. No. _____		Date _____	
		Page No. _____	
INDEPENDENT GROUP			
1.	Barium chloride Test To the aq. sol ⁿ of salt add dil HCl and BaCl ₂ solution	White ppt is formed which is insoluble in dil HCl	SO ₄ ²⁻ is confirmed
2.	Lead Acetate Test To the aq. sol ⁿ of salt add lead acetate sol ⁿ	White ppt is formed which is soluble in ammonium acetate sol ⁿ .	CO ₃ ²⁻ is confirmed
CATION TEST			
→	To the small quantity of salt (in H ₂ O)	Original sol ⁿ is formed	
→	To the original sol ⁿ add dil HCl	No white ppt formed	Pb ²⁺ is absent
→	To the above sol ⁿ add Na ₂ S	No black ppt formed	Cu ²⁺ is absent
→	To the above sol ⁿ of group II add 2-3 drops of conc. HNO ₃ . Boil the sol ⁿ and then add NH ₄ Cl. Boil and cool the sol ⁿ and then add NH ₄ OH in excess.	Gelatinous white ppt is formed	Radical may be Al ³⁺
Teacher's Signature : _____			

⇒ Cation-test

(4) Lake Test



Date _____

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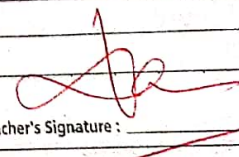
⇒ <u>Confirmatory test</u>		
1. <u>Lake Test</u>		
Dissolve the white ppt. in dil HCl. Add 2 drops of blue litmus sol ⁿ to it. Now add NH ₄ OH dropwise till blue colour develops.	Blue ppt floating in colourless sol ⁿ	Al ³⁺ is confirmed

Result :

Anion : SO_4^{2-}
 Cation : Al^{3+}
 Salt : $\text{Al}_2(\text{SO}_4)_3$

Precautions :

1. Use minimum quantity of reagents.
2. Use chemicals carefully
3. Prolong heating should be avoided.

Teacher's Signature : 

Date _____

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EXPERIMENT = 20

Aim's

To analyse the presence of anion and cation in a given salt no 18

Apparatus:

Test tube, dropper, holder, burner, etc.

Chemicals Required :

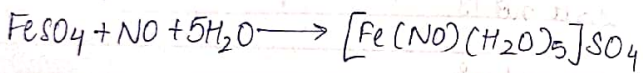
dil. H_2SO_4 , conc. H_2SO_4 , dil. HCl , Na_2S , solid NH_4Cl , NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. <u>Dil. H_2SO_4 Test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
2. <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4 . Now add Cu chips to above mixture and heat. Pass the reddish brown gas through $FeSO_4$ sol ⁿ	Solution turns black	Radical may be NO_3^-

Teacher's Signature: _____

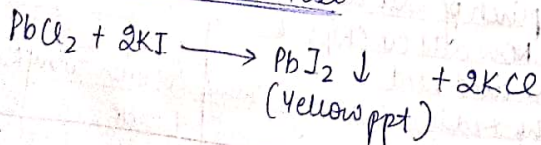
⇒ Anion Test

(1) Ring test



⇒ Cation test

(1) Potassium Iodide Test



Date _____

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Confirmatory Test

1. Ring Test

Add a small quantity of freshly prepared FeSO_4 to the aq. sol ⁿ and then pour conc. H_2SO_4 slowly along the sides of test tubes.	A dark brown ring is formed at the junction of the layers of the acid and the sol ⁿ .	NO_3^- is confirmed
--	--	------------------------------

CATION TEST

- To the pinch of salt add NaOH solⁿ and heat. No ammoniacal smell observed. NH_4^+ absent
- To the pinch of salt add minimum amount of H_2O to dissolve it. Original salt is formed.
- To the original solⁿ add dil. HCl . White ppt. formed. Radical may be Pb^{2+}
- Now separate the white ppt. through filter paper and boil it with water. White ppt. dissolves.
- Divide the solⁿ into two parts.

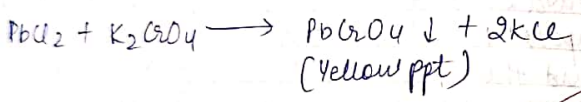
Confirmatory test

1. Potassium Iodide Test

To the first part of above sol ⁿ add KI sol ⁿ .	Yellow ppt. formed	Pb^{2+} confirmed
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Teacher's Signature: _____

(2) Potassium chromate Test



Date _____
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2. Potassium Chromate Test		
To the second part of above soln add. K_2CrO_4 soln	Yellow ppt formed	Pb^{2+} confirmed

Result :-
Anion :- NO_3^-
Cation :- Pb^{2+}
Salt :- $Pb(NO_3)_2$
The given salt no. 18 contains lead nitrate

Precautions
Use the minimum quantity of reagents.
Use chemicals carefully.
A large section of test tube should be avoided.

Teacher's Signature : _____

Date _____

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EXPERIMENT = 21

Aim :
To analyse the presence of anion and cation in a given salt no. 35.

Apparatus :
Test tube, dropper, test tube holder, burner etc.

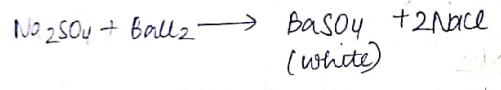
Chemicals Required :
dil. H_2SO_4 , conc. H_2SO_4 , dil. HCl , Na_2S , NH_4OH , solid NH_4Cl , $BaCl_2$.

EXPERIMENT	OBSERVATION	INFERENCE
<u>ANION TEST</u>		
(1) <u>Dil. H_2SO_4 Test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
(2) <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4	No gas/vapour evolved	Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- absent.

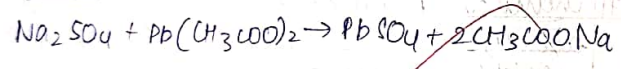
Teacher's Signature : _____

⇒ Prion Test

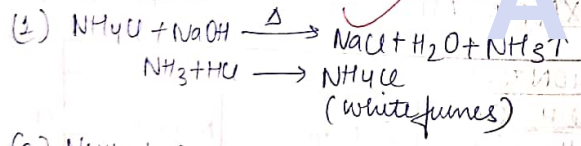
(1) Barium chloride Test



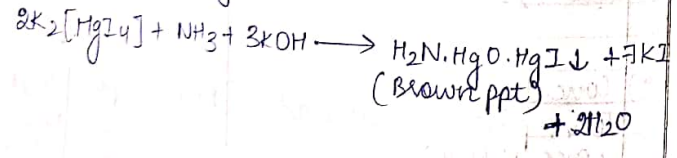
(2) Lead Acetate Test



⇒ Cation Test



(2) Nessler's Reagent



Date _____

Expt. No. _____

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INDEPENDENT GROUP		
(1) <u>Barium chloride Test</u>	To the aq. soln of salt add dil HCl and BaCl_2 soln	White ppt is formed which is insoluble in dil. HCl. SO_4^{2-} is confirmed
(2) <u>Lead Acetate Test</u>	To the aqueous solution of salt add lead acetate solution.	White ppt is formed which is soluble in excess of hot ammonium acetate soln. SO_4^{2-} is confirmed
CONFIRMATORY TEST		
(1)	the i/c of a cold NaOH soln and heat.	Ammoniacal smell observed. Radical may be NH_4^+
CONFIRMATORY TEST		
(1)	Bring a glass rod dipped in dil HCl near the mouth of above test tube.	White fumes observed. NH_4^+ is confirmed
(2)	Add Nessler's reagent to the above test tube.	Brown ppt formed. NH_4^+ is confirmed
Teacher's Signature : _____		

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Result :
Anion : SO_4^{2-}
Cation : NH_4^+
Salt : $(NH_4)_2SO_4$
The given salt no. 35 contain ammonium sulphate

Precautions :
(1) Use chemicals carefully
(2) Use minimum quantity of reagents
(3) Prolong heating of test tube should be avoided.

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Teacher's Signature : _____

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EXPERIMENT = 22

Aim :

To analyse the presence of anion and cation in a given salt no. 49.

Apparatus :

Test tube, dropper, burner, test tube holder etc.

Chemicals Required :

dil. H_2SO_4 , $MgSO_4$, NH_4OH , dil. HCl , Nessler's Reagent

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
(1) <u>Dil. H_2SO_4 Test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
(2) <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4	colourless gas is evolved	Radical may be Cl^-
Bring a glass rod dipped in NH_4OH to the mouth of the test tube	White fumes evolved out	Radical may be Cl^-

Teacher's Signature : _____

=> Anion Test
 (1) Silver nitrate test

$$KCl + AgNO_3 \rightarrow KNO_3 + AgCl \downarrow$$
 (curd white ppt.)
 => Cation Test
 (1) $NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + H_2O + NH_3 \uparrow$
 $NH_3 + HCl \rightarrow NH_4Cl$
 (white fumes)
 (2) Nessler's Reagent
 $2K_2[HgI_4] + NH_3 + 3KOH \rightarrow H_2NHgO.HgI \downarrow + 7KI$
 Brown ppt.

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<u>Confirmatory Test</u>			
(1) <u>SILVER NITRATE TEST</u>	To the aq. sol ⁿ of the salt, add dil HNO ₃ . Boil, cool and add AgNO ₃ sol ⁿ .	curd white ppt is formed	Cl ⁻ is confirmed
<u>CATION TEST</u>			
	To the pinch of salt, add NaOH sol ⁿ and heat.	Ammonical smell observed	Radical may be NH ₄ ⁺
<u>Confirmatory Test</u>			
(2)	Bring a glass rod dipped in dil HCl near the mouth of above test tube.	White fumes observed	NH ₄ ⁺ is confirmed
	Add Nessler's reagent to the above test tube.	Brown ppt forms	NH ₄ ⁺ is confirmed
# <u>Result</u> :			
Anion : Cl ⁻ , Cation : NH ₄ ⁺ , Salt : NH ₄ Cl			
The given salt no. 49 is ammonium chloride.			
# <u>Precautions</u> :			
1. Use chemicals carefully			
2. Use minimum quantity of reagents.			
3. Prolong heating of test tube should be avoided.			
Teacher's Signature : _____			

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EXPERIMENT = 23

Aim :

To analyse the presence of anion and cation in a given salt no. 10.

Apparatus :

Test tube, dropper, test tube holder, burner etc.

Chemicals Required :

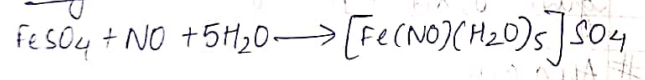
dil. H_2SO_4 , conc. H_2SO_4 , dil. HCl , Na_2S , solid NH_4Cl , NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
<u>ANION TEST</u>		
(1) <u>Dil. H_2SO_4 Test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
(2) <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4 . Now add Cu chips to above mixture and heat. Pass the reddish brown gas through $FeSO_4$ solution	Reddish brown gas is evolved Solution turns black	Radical may be Bi or Nb

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⇒ Anion Test

(3) Ring Test



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Confirmatory Test

1. RING TEST

Add a small quantity of freshly prepared FeSO_4 to the aq. solⁿ and then pour conc. H_2SO_4 slowly along the sides of test tube. A dark brown ring is formed at the junction of the layers of the acid & solution. NO_3^- is confirmed.

CATION TEST

- To the pinch of salt add NaOH and heat. No ammoniacal smell observed. NH_4^+ absent
- To small quantity of salt add water.
- To the aq. solⁿ add HCl . No white ppt formed. Pb^{2+} absent
- To the above solⁿ of group I, add Na_2S . To the above solⁿ of group II, boil it then add solid NH_4Cl and boil and then cool. No ppt formed. Cu^{2+} absent. Fe^{3+} and Al^{3+} absent
- Now add excess of NH_4OH to it.
- To the above solⁿ of group III add Na_2S . No ppt formed. Mn^{2+} and Zn^{2+} absent
- Boil the above solⁿ of group IV - to remove Na_2S . Now add $(\text{NH}_4)_2\text{CO}_3$ to it. White ppt formed. Ba^{2+} , Ca^{2+} , Sr^{2+} may be present

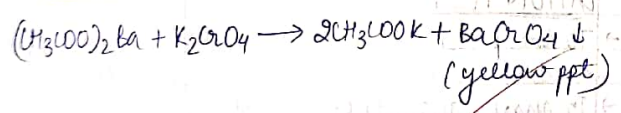
Teacher's Signature : _____

⇒ Cation Test

(1) Flame Test

Barium imparts grassy green colour to the flame.

(2) Potassium chromate Test



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Dissolve the white ppt in hot dil. acetic acid and divide the sol ⁿ into three parts.			
<u>Confirmatory Test For Ba²⁺</u>			
1. <u>Flame Test</u>	Dip the glass rod in conc. HCl and wash it with the salt	Apple green flame is observed.	Ba ²⁺ is confirmed
2. <u>Potassium Chromate Test</u>	To a small part of the sol ⁿ , add a few drops of conc. HCl. Add a few drops of potassium chromate solution	Yellow ppt. is formed	Ba ²⁺ is confirmed

Result :
 Anion : NO₃⁻, Cation : Ba²⁺, Salt : Ba(NO₃)₂
 The given salt is Barium nitrate.

- # Precautions :
1. Use minimum quantity of reagent.
 2. Use chemicals carefully.
 3. Prolong heating of test tube should be avoided.

Teacher's Signature _____

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EXPERIMENT - 24

Aim :
To analyse the presence of anion and cation in the given salt no. 32.

Apparatus :
Test tube, dropper, test tube holder, burner etc.

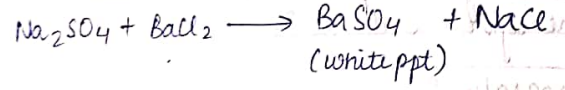
Chemicals Required :
dil H_2SO_4 , conc. H_2SO_4 , dil HCl , Na_2S , NH_4OH , solid NH_4Cl , $BaCl_2$

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. <u>Dil H_2SO_4 Test</u> To the pinch of salt add dil H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
2. <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4	No gas/vapour evolved	Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- absent

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⇒ Prison Test

(1). Barium Chloride Test



(2) Lead Acetate Test



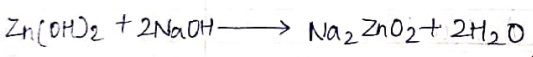
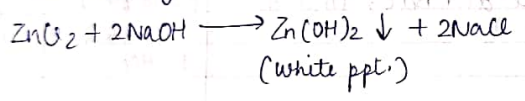
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INDEPENDENT GROUP		
1. <u>Barium Chloride Test</u>	To the aq. soln of salt add dil HCl and BaCl ₂ solution.	White ppt is formed which is insoluble in dil HCl. SO ₄ ²⁻ is confirmed.
2. <u>Lead Acetate Test</u>	To the aq. soln of salt add lead acetate solution.	White ppt is formed which is soluble in excess of ammonium acetate soln. SO ₄ ²⁻ is confirmed.
<u>CATION TEST</u>		
→	To the original soln add dil HCl	No white ppt is formed. Pb ²⁺ is absent.
→	To the above solution, add Na ₂ S	No black ppt is formed. Cu ²⁺ is absent.
→	Boil the above soln, add NH ₄ Cl, boil and cool.	No ppt. is formed. Radical of group III are absent.
→	Now add NH ₄ OH in excess to the above soln of group III add Na ₂ S	Dull white ppt. is formed. Zn ²⁺ may be present.

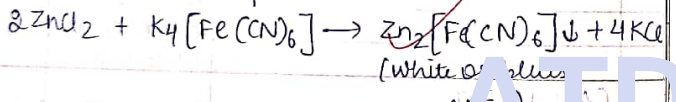
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⇒ Cation Test

(1) Sodium Hydroxide Test



(2) Potassium Ferrocyanide Test



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Confirmatory Test

Disperse the ppt in dil HCl. Boil H₂S. Divide the solⁿ into two parts

1. Sodium Hydroxide solⁿ

To the first part add NaOH solⁿ dropwise

white ppt is formed

Zn²⁺ is confirmed

2. Potassium ferrocyanide Test

To the second part, add potassium ferrocyanide solⁿ

white ppt is formed

Zn²⁺ is confirmed

Result :

Anion : SO₄²⁻

Cation : Zn²⁺

salt : ZnSO₄

The given salt is Zinc sulphate

Precautions :

1. Use minimum quantity of reagent.
2. Prolong heating of test tube should be avoided
3. Use chemicals carefully

Teacher's Signature: Law

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EXPERIMENT = 25

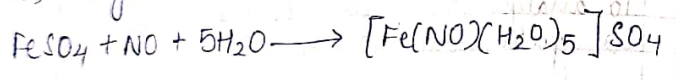
- # Aim :
To analyse the presence of anion and cation in a given salt no. 15.
- # Apparatus :
Test tube, dropper, test tube holder, burner etc.
- # Chemicals required :
dil. H_2SO_4 , conc. H_2SO_4 , dil HCl, Na_2S , solid NH_4Cl , NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
<u>ANION TEST</u>		
1. <u>Dil H_2SO_4 Test</u> To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is confirmed
2. <u>Conc. H_2SO_4 Test</u> To the pinch of salt add conc. H_2SO_4 . Now add Cu chips to above mixture and heat. Pass the reddish brown gas through $FeSO_4$ solution	Reddish brown gas is evolved Solution turns black	Radical may be Bi or Nb_3 Radical may be Nb_3

Teacher's Signature : _____

⇒ Anion Test

(4) Ring Test



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Confirmatory Test		
1.	<u>Ring Test</u>	
	Add a small quantity of freshly prepared $FeSO_4$ to the aq. soln and then pour conc. H_2SO_4 slowly along the sides of test tube.	A dark brown ring is formed at the junction of the layers of acid and the soln
		NO_3^- is confirmed
CATION TEST		
→	To the pinch of salt, add $NaOH$ and heat	No ammoniacal smell observed
		NH_4^+ absent
→	To the original soln add dil HCl	No white ppt. is formed
		Pb^{2+} absent
→	To the soln of group I add Na_2S	No black ppt. is formed
		Cu^{2+} absent
→	Add solid NH_4Cl and boil and then cool, to the above soln. Now add excess of NH_4OH to it.	No ppt. formed
		Fe^{3+} and Al^{3+} absent
→	To the above soln of group III add Na_2S .	No ppt. formed
		Mn^{2+} and Zn^{2+} absent
	Boil the above soln of group IV to remove Na_2S .	White ppt. formed
	Now add $(NH_4)_2CO_3$ to it.	$Ba^{2+}, Ca^{2+}, Sr^{2+}$ may be present
Teacher's Signature : _____		

