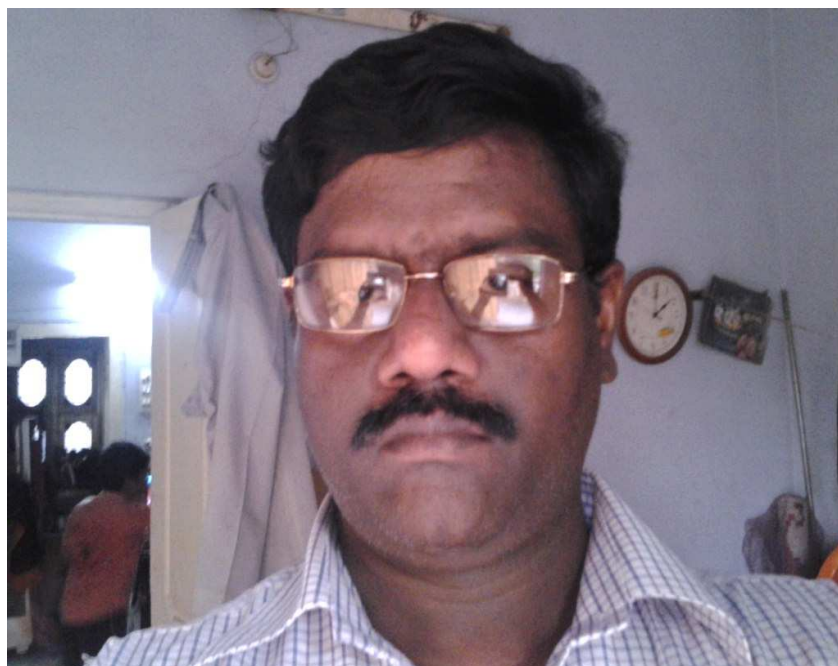


INTER MEDIATE CHEMISTRY

**PRACTICAL MANUAL
(NOT FOR SALE)**



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Inter Mediate Practical Scheme of Valuation (30 Marks) (3Hours)

I. QUALITATIVE ANALYSIS 10 MARKS

- | | |
|-----------------------------|----------------------------|
| 1. Preliminary examinations | $\frac{1}{2} \times 4 = 2$ |
| 2. Anions | $1+1+1+1 = 4$ |
| 3. Cation | $2+ 1 = 3$ |
| 4. Correct report | 1 |

II. VOLUMETRIC ANALYSIS 11 MARKS

- | | |
|--|----------|
| 1. Producer in the first 10 Minutes. With equation | 2+ 1 = 3 |
| 2. Tabular form (up to 1% error) | 5 |
| (b/w 1% to 2% error 4 Marks & above 2% error 2 Marks) | |
| 3. For indicating the formula | 1 |
| 4. For calculation | 2 |

III. Identification of functional group 04 MARKS.

- | | | |
|---------------------|---|--------|
| 1. Physical state : | Solid / Liquid | ½ Mark |
| 2. Ignition Test: | Sooty flame – Aromatic | ½ Mark |
| | Non sooty flame – Aliphatic | |
| 3. Solubility | 1) In water 2) In NaOH | 1 Mark |
| | 3) In HCl 4) Conc. H ₂ SO ₄ | |

4.	Identification test for Functional Group 1 Mark	5.	Confirmation tests 1 Mark
	1. Acetic acid: Test with NaHCO ₃ – Effervescence		Esterification Test
	2. Ethyl alcohol: Test with NaHCO ₃ – No reaction		Esterification Test
	3. Benzoic acid: Test with NaHCO ₃ – Effervescence		Esterification Test
	4. Acetaldehyde: Test with Schiff’s reagent		Test with 2,4,DNP
	5. Glucose : Test with Conc. H ₂ SO ₄ – Charring in cold condition		Molish Test
	6. Fructose: Test with Conc. H ₂ SO ₄ – Charring upon heat		Molish Test
	7. Phenol: Test with neutral FeCl ₃ in alcohol		Libermann Test
	8 Aniline: Test with NaNO ₂ , HCl and Phenol		Carbyl amine Test
	9 Benzaldehyde: Test with Schiff’s reagent		Test with 2,4,DNP
	10 Acetone: Test with Schiff’s reagent(No reaction)		Test with 2,4,DNP

IV. Viva voce 02 Marks

V. Record 03 Marks

1. ESTIMATION OF NaOH

Aim: Estimate the amount of sodium hydroxide present in 200ml of the given solution. 0.1 M HCl solution is supplied.

Apparatus: Burette, Burette stand, Pipette, Conical flask, Beakers, Porcelain tile etc.

Chemicals: NaOH solution HCl solution

Indicator: Methyl orange



1Mole of NaOH = 1Mole of HCl

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

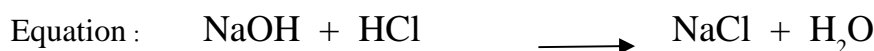
Procedure: The burette (50ml) is first rinsed with tap water, then with distilled water and finally with the given HCl solution. 20ml of NaOH solution is transferred into a clean conical flask by means of pipette. 1 (or) 2 drops of methylorange indicator is added to the solution.

The solution turns yellow in colour. The HCl solution is added slowly while shaking the flask. The addition is continued till the colour changes from yellow to pink. It is the end point.

The titrations are repeated till two consecutive readings coincide.

S.No:	Volume of NaOH	Burette reading		Volume of HCl Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$



HCl
 Molarity (M_1) = 0.1 M
 Volume (V_1) =
 No. of moles (n_1) = 1 mole
 Molarity (M_2) =

NaOH
 Molarity (M_2) = ?
 Volume (V_2) = 20ml
 No. of moles (n_2) = 1 mole

$$M_2 = \frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1} = \frac{0.1 \times \dots \times 1}{20 \times 1} = \dots$$

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Molarity of NaOH =

Weight of NaOH in 200ml solution = Molarity x Molecular weight x Vol. in ml

$$= \frac{\dots \times 40 \times 200}{1000} = \dots \text{ grams.}$$

Result: 1. Molarity of NaOH solution =

2. Weight of NaOH in 200ml solution =

2. ESTIMATION OF HCl

AIM: Estimate the amount of hydrochloric acid present in 100ml of the given solution. 0.5 M Na_2CO_3 solution is supplied.

Apparatus: Burette, Burette stand, Pipette, Conical flask, Beakers, Porcelain tile etc.

Chemicals: Na_2CO_3 solution & HCl solution

Indicator: Methyl orange

Equation: $\text{Na}_2\text{CO}_3 + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$

1 Mole of Na_2CO_3 = 2 Moles of HCl

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Procedure: The burette(50ml) is first rinsed with tap water, then with distilled water and finally with the given HCl solution. 20ml of Na_2CO_3 solution is transferred into a clean conical flask by means of pipette. 1 (or) 2 drops of methyl orange indicator is added to the solution. The solution turns yellow in colour.

The HCl solution is added slowly while shaking the flask. The addition is continued till the colour changes from yellow to pink. It is the end point.

The titrations are repeated till two consecutive readings coincide.

The readings are entered in a tabular form.

S.No:	Volume of Na_2CO_3	Burette reading		Volume of HCl Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Equation: $\text{Na}_2\text{CO}_3 + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$

Na_2CO_3 solution

Molarity (M_1) = 0.5 M

Volume (V_1) = 20ml

No. of moles (n_1) = 1 mole

Molarity (M_2) =

$$\frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1}$$

$$= \frac{0.5 \times 20 \times 2}{\dots \times 1} = \dots\dots\dots$$

HCl solution

Molarity (M_2) = ?

Volume (V_2) =

No. of moles (n_2) = 2 moles

Molarity of HCl =

Weight of HCl in 100 ml solution = Molarity x Molecular weight x Vol. in ml

1000

$$= \frac{\dots\dots \times 36.5 \times 100}{1000}$$

= grams.

Result:

1. Molarity of HCl solution =

2. Weight of HCl in 100 ml solution =

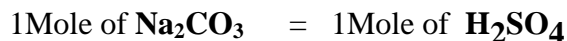
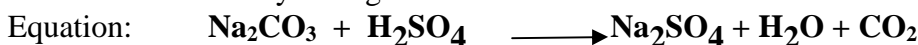
3. ESTIMATION OF Na₂CO₃

AIM: Estimate the amount of sodium carbonate present in 500ml of the given solution. 0.02 M H₂SO₄ solution is supplied.

Apparatus: Burette, Burette stand, Pipette, Conical flask, Beakers, Porcelain tile etc.

Chemicals: Na₂CO₃ solution H₂SO₄ solution

Indicator: Methyl orange



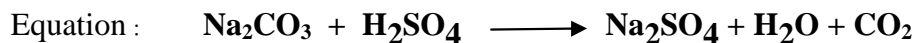
Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Procedure: The burette(50ml) is first rinsed with tap water, then with distilled water and finally with the given H₂SO₄ solution. 20ml of Na₂CO₃ solution is transferred into a clean conical flask by means of pipette. 1 (or) 2 drops of methyl orange indicator is added to the solution. The solution turns yellow in colour.

The H₂SO₄ solution is added slowly while shaking the flask. The addition is continued till the colour changes from yellow to pink. It is the end point. The titrations are repeated till two consecutive readings coincide. The readings are entered in a tabular form.

S.No.	Volume of Na ₂ CO ₃	Burette reading		Volume of H ₂ SO ₄ Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$



H₂SO₄ solution

Molarity (M₁) = 0.02 M

Volume (V₁) =

No. of moles (n₁) = 1 mole

Molarity (M₂) =

$$\frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1}$$

$$= \frac{0.02 \times \dots \times 1}{20 \times 1} = \dots$$

Molarity of Na₂CO₃ =

Na₂CO₃ solution

Molarity (M₂) = ?

Volume (V₂) = 20ml

No. of moles (n₂) = 1 mole

Weight of Na₂CO₃ in 500 ml solution = $\frac{\text{Molarity} \times \text{Molecular weight} \times \text{Vol. in ml}}{1000}$

$$= \frac{\dots \times 106 \times 500}{1000}$$

= grams.

Result:

1. Molarity of Na₂CO₃ solution =

2. Weight of Na₂CO₃ in 500 ml solution =

4. ESTIMATION OF H₂SO₄

AIM: Estimate the amount of Sulphuric acid present in 250ml of the given solution . 0.3 M NaOH solution is supplied.

Apparatus: Burette, Burette stand, Pipette ,Conical flask, Beakers, Porcelain tile etc.

Chemicals: NaOH solution & H₂SO₄ solution

Indicator: Methyl orange



2 Moles of NaOH = 1 Mole of H₂SO₄

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Procedure: The burette(50ml) is first rinsed with tap water, then with distilled water and finally with the given H₂SO₄ solution. 20ml of NaOH solution is transferred into a clean conical flask by means of pipette. 1 (or) 2 drops of methyl orange indicator is added to the solution. The solution turns yellow in colour.

The H₂SO₄ solution is added slowly while shaking the flask. The addition is continued till the colour changes from yellow to pink. It is the end point. The titrations are repeated till two consecutive readings co - inside. The readings are entered in a tabular form.

S.No.	Volume of NaOH	Burette reading		Volume of H ₂ SO ₄ Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$



NaOH solution

Molarity (M₁) = 0.3 M

Volume (V₁) = 20ml

No.of moles (n₁) = 2 moles

Molarity (M₂) =

H₂SO₄ Solution

Molarity (M₂) = ?

Volume (V₂) =

No.of moles(n₂) = 1 mole

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$$M_2 = \frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1}$$

$$= \frac{0.3 \times 20 \times 1}{\dots \times 2} = \dots$$

Molarity of H₂SO₄ =

Weight of H₂SO₄ in 250 ml solution = Molarity x Molecular weight x Vol. in ml

$$= \frac{1000 \times \dots \times 98 \times 250}{1000}$$

$$= \dots \text{ grams.}$$

Result:

1. Molarity of H₂SO₄ =
2. Weight of H₂SO₄ in 250 ml solution =

5. ESTIMATION OF FERROUS AMMONIUM SULPHATE

AIM: Estimate the amount of Ferrous ammonium sulphate present in 50ml of the given solution. 0.01 M KMnO_4 solution is supplied.

Apparatus: Burette, Burette stand, Pipette, Conical flask, Beakers and Porcelain tile.

Chemicals: Ferrous ammonium sulphate solution, KMnO_4 solution, H_2SO_4 solution

Indicator: In this titration external indicator is not required.
Because KMnO_4 acts as a self - indicator.

Equation: $2\text{KMnO}_4 + 10\text{FeSO}_4 + 8\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 5\text{Fe}_2(\text{SO}_4)_3 + 2\text{MnSO}_4 + 8\text{H}_2\text{O}$
2 Moles of KMnO_4 = 10 Moles of **Mohr's salt**

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Procedure: The burette is filled with KMnO_4 solution. The initial reading of the burette is adjusted to 'zero'(0) the burette is clamped vertically to a burette stand.

20ml of Ferrous ammonium sulphate solution is transferred into a clean conical flask by means of pipette. 20ml of dilute sulphuric acid is added to the flask solution.

The KMnO_4 solution is added slowly while shaking the flask. The titration is continued till the solution attains permanent pale pink colour. It is the end point.

The titrations are repeated till two consecutive readings coincide.

The readings are entered in a tabular form.

S.No.	Volume of Ferrous ammonium sulphate	Burette reading		Volume of KMnO_4 Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Equation: $2\text{KMnO}_4 + 10\text{FeSO}_4 + 8\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 5\text{Fe}_2(\text{SO}_4)_3 + 2\text{MnSO}_4 + 8\text{H}_2\text{O}$

KMnO_4 solution

Molarity (M_1) = 0.01 M

Volume (V_1) =

No. of moles (n_1) = 2 moles

Molarity (M_2) =

Mohr's salt solution

Molarity (M_2) = ?

Volume (V_2) = 20ml

No. of moles (n_2) = 10 moles

$$\frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1}$$

$$= \frac{0.01 \times \dots \times 10}{20 \times 2} = \dots\dots\dots$$

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Molarity of Mohr's salt =

Weight of Mohr's salt in 50ml solution = Molarity x Molecular weight x Vol. in ml

1000

= x 392 x 50

1000

= grams.

Result:

1. Molarity of Mohr's salt solution =

2. Weight of Mohr's salt in 50 ml solution =

6. ESTIMATION OF OXALIC ACID

AIM: Estimate the amount of Oxalic acid present in 1000 ml of the given solution.
0.02 M KMnO_4 solution is supplied.

Apparatus: Burette, Burette stand, Pipette, Conical flask, Beakers, Burners and Porcelain tile.

Chemicals: Oxalic acid solution, KMnO_4 solution, H_2SO_4 solution

Indicator: In this titration external indicator is not required.
Because KMnO_4 acts as a self - indicator.

Equation: $2\text{KMnO}_4 + 5\text{H}_2\text{C}_2\text{O}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 10\text{CO}_2 + 8\text{H}_2\text{O}$
2 Moles of KMnO_4 = 5 Moles of Oxalic acid

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Procedure: The burette is filled with KMnO_4 solution. The initial reading of the burette is adjusted to 'zero' (0) the burette is clamped vertically to a burette stand.
20ml of Oxalic acid solution is transferred into a clean conical flask by means of pipette.
20ml of dilute sulphuric acid is added to the flask solution.

The solution is then heated to short of boiling (Nearly 80°C).

The KMnO_4 solution is added slowly while shaking the flask. The titration is continued till the solution attains permanent pale pink colour. It is the end point.

The titrations are repeated till two consecutive readings coincide.

The readings are entered in a tabular form.

S.No.	Volume of Oxalic acid	Burette reading		Volume of KMnO_4 Final- Initial
		Initial	Final	
1	20ml			
2	20ml			
3	20ml			

Principle: $M_1V_1/n_1 = M_2V_2/n_2$

Equation : $2\text{KMnO}_4 + 5\text{H}_2\text{C}_2\text{O}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 10\text{CO}_2 + 8\text{H}_2\text{O}$

KMnO_4 solution

Oxalic acid solution

Molarity (M_1) = 0.01 M

Molarity (M_2) = ?

Volume (V_1) =

Volume (V_2) = 20ml

No. of moles (n_1) = 2 moles

No. of moles (n_2) = 5 moles

Molarity (M_2) =

$$= \frac{M_1 \cdot V_1 \cdot n_2}{V_2 \cdot n_1} = \frac{0.02 \times \dots \times 5}{20 \times 2} = \dots\dots\dots$$

Molarity of Oxalic acid =

Weight of Oxalic acid in 1000 ml solution = **Molarity x Molecular weight x Vol. in ml**

$$= \frac{\dots \times 126 \times 1000}{1000}$$

= grams.

Result:

1. Molarity of Oxalic acid solution =
2. Weight of Oxalic acid in 1000 ml solution =

SALT ANALYSIS (10 Marks).

I. Preliminary examinations:

- 1) **Colour:** - Colour less / Blue / Pale green / Pink.
- 2) **State:** - Crystalline solid / Amorphous
- 3) **Odour:** - No odour / Pungent smell
- 4) **Solubility:** - Water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed 2) Looses water	1) May be ammonium salt 2) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt + dil.HCl	Brisk effervescences are Observed	May be CO_3^{-2}
2	Salt + Conc. H_2SO_4	White fumes are evolved	1) May be Cl^-
3	Salt + Cu turnings + H_2SO_4 and heat strongly.	Reddish brown fumes are evolved	2) May be Br^-
4	Salt sol + BaCl_2 sol.	Reddish brown fumes are evolved	May be NO_3^-
		White ppt is formed It is insoluble in Conc.HCl	May be SO_4^{-2}

CONFIRMATORY TEST FOR ANIONS:

Confirmatory test for CO_3^{-2} :

S.No	Experiment	Observation	Inference
1	Salt + dil.HCl	Brisk effervesces are observed The burning splinter is puts off when it is exposed to the gas evolved & lime water turns milky.	CO_3^{-2} is confirmed
2	Salt sol + BaCl_2 .	White ppt is formed. It is soluble in NH_4OH	CO_3^{-2} is confirmed.

Confirmatory test for Cl^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder + Conc. H_2SO_4	Pale green fumes are evolved	Cl^- is confirmed
2	Salt sol + AgNO_3 sol	Curdy white ppt. It is soluble in NH_4OH	Cl^- is confirmed

Confirmatory test for Br^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder + Conc. H_2SO_4	Reddish brown fumes are evolved	Br^- is confirmed
2	Salt solution + AgNO_3 sol	Yellow colour ppt is formed. It is partially soluble in NH_4OH	Br^- is confirmed

Confirmatory test for NO_3^- ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution + 2ml of freshly prepared FeSO_4 solution and then the test tube kept in an inclined position and conc H_2SO_4 is added slowly along the sides of test tube.	A brown ring ($[\text{Fe}.\text{NO}(\text{H}_2\text{O})_5] \text{SO}_4$)+ is formed at the junction of the two liquid layers.	NO_3^- is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution + dil.HCl	White ppt is formed	May be Pb^{+2}
II	Salt solution + dil.HCl + H_2S gas	Black ppt is formed	May be Cu^{+2}
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt formed 2) Dark green ppt is formed	1) May be Al^{+3} 2) May be Fe^{+2}
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is formed 2) Flesh colour ppt is formed	1) May be Zn^{+2} 2) May be Mn^{+2}
V	Salt solution + NH_4Cl + NH_4OH + $(NH_4)_2CO_3$	White ppt is formed	May be Ba^{+2} (or) Ca^{+2}
VI	Salt solution + NaOH solution On heating	1) White ppt is formed 2) Pungent smell is evolved	1) May be Mg^{+2} 2) May be NH_4^+

Confirmatory test for cations: Confirmatory test for Pb^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + K_2CrO_4 sol.	Yellow ppt is formed It is insoluble in HNO_3	Pb^{+2} is confirmed

Confirmatory test for Cu^{+2} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + $K_4[Fe(CN)_6]$ 2. Salt solution + NaOH sol	Chocolate Brown ppt Blue Colour ppt	Cu^{+2} is confirmed Cu^{+2} is confirmed

Confirmatory test for Al^{+3} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + NaOH sol	White Gelatinous Ppt	Al^{+3} is confirmed

Confirmatory test for Fe^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + NaOH sol	Dark Green Ppt	Fe^{+2} is confirmed

Confirmatory test for Zn^{+2} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + NaOH sol	White Gelatinous Ppt	Zn^{+2} is confirmed

Confirmatory test for Mn^{+2} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + NaOH sol	Slowly Reddish Brown ppt is formed	Mn^{+2} is confirmed

Confirmatory test for Ca^{+2} / Ba^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + K_2CrO_4 sol	1. No PPT	Ca^{+2} is confirmed

Confirmatory test for Ca^{+2} / Ba^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + K_2CrO_4 sol	2. Yellow ppt is formed	Ba^{+2} is confirmed

Confirmatory test for Mg^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + $(NH_4)_2CO_3$ solution	Slowly White ppt is formed	Mg^{+2} is confirmed

Confirmatory test for NH_4^+ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + Nessler's reagent ($K_2[HgI_4]$)	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH_4^+ is confirmed

Result : 1) Cation: 2) Anion: 3) Salt:

SALT ANALYSIS -I

I. Priliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc.H ₂ SO ₄ and heat strongly.	Reddish brown fumes are evolved	May be NO ₃ ⁻

Confirmatory test for NO₃⁻ ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO ₄ solution and then the test tube kept in an inclined position and conc H ₂ SO ₄ is added slowly along the sides of test tube.	A brown ring [Fe.NO(H ₂ O) ₅] SO ₄ is formed at the junction of the two liquid layers.	NO ₃ ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution + NH ₄ Cl + NH ₄ OH	White gelatinous ppt formed	May be Al ⁺³

Confirmatory test for cations:

Confirmatory test for Al⁺³ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +NaOH sol	White Gelationous Ppt is formed	Al ⁺³ is confirmed

Result : 1) Cation: Al⁺³

2) Anion: NO₃⁻

3) Salt: Al(NO₃)₃

SALT ANALYSIS -II

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Loses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not Observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl^- is absent 2) Br^- is absent
3	Salt +Cu turnings + Conc. H_2SO_4 and heat strongly.	Reddish brown fumes are not evolved	NO_3^- is absent
4	Salt sol + BaCl_2 sol.	White ppt is formed	May be SO_4^{-2}

Confirmatory test for SO_4^{-2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO_4^{-2} is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	White gelatinous ppt formed	May be Al^{+3}

Confirmatory test for cations:

Confirmatory test for Al^{+3} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + NaOH sol	White Gelationous Ppt is formed	Al^{+3} is confirmed

Result: 1) Cation: Al^{+3} 2) Anion: SO_4^{-2} 3) Salt: $\text{Al}_2(\text{SO}_4)_3$

SALT ANALYSIS -III

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed	1) May be ammonium salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	Reddish brown fumes are evolved	May be Br^-

Confirmatory test for Br^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder	Reddish brown fumes are evolved	Br is confirmed
2	+Conc. H_2SO_4 Salt solution + AgNO_3 sol	Yellow colour ppt is formed. It is partially soluble in NH_4OH	Br is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1)White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is not formed	Ba^{+2} (or) Ca^{+2} are absent
VI	Salt solution + NaOH solution On heating	1) White ppt is not formed 2) Pungent smell is evolved	Mg^{+2} is absent May be NH_4^+

Confirmatory test for cations:

Confirmatory test for NH_4^+ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +Nessler's reagent ($\text{K}_2[\text{HgI}_4]$)	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH_4^+ is confirmed

Result: 1) **Cation:** NH_4^+ 2) **Anion:** Br^- 3) **Salt:** : NH_4Br

SALT ANALYSIS -IV

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - Pungent smell |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed	1) May be ammonium salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent

Confirmatory test for CO_3^{-2} :

S.No	Experiment	Observation	Inference
1	Salt + dil.HCl	Brisk effervesces are observed The burning splinter is puts off when it is exposed to the gas evolved & lime water turns milky.	CO_3^{-2} is confirmed
2	Salt sol + BaCl_2	White ppt is formed. It is soluble in NH_4OH	CO_3^{-2} is confirmed.

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1)White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is not formed	Ba^{+2} (or) Ca^{+2} are absent
VI	Salt solution + NaOH solution On heating	1) White ppt is not formed 2) Pungent smell is evolved	Mg^{+2} is absent May be NH_4^+

Confirmatory test for cations:

Confirmatory test for NH_4^+ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +Nessler's reagent ($\text{K}_2[\text{HgI}_4]$)	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH_4^+ is confirmed

Result: 1) Cation: NH_4^+ 2) Anion: CO_3^{-2} 3) Salt: $(\text{NH}_4)_2\text{CO}_3$

SALT ANALYSIS -V

I. Preliminary examinations:

- 1) **Colour:** - Colour less
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed	1) May be ammonium salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are evolved	May be Cl^-

Confirmatory test for Cl^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder + Conc. H_2SO_4	Pale green fumes are evolved	Cl^- is confirmed
2	Salt sol + AgNO_3 sol	Curdy white ppt. It is soluble in NH_4OH	Cl^- is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed	1) Al^{+3} is absent
IV	Salt solution + NH_4Cl + NH_4OH	2) Dark green ppt is not formed	2) Fe^{+2} is absent
V	NH_4OH + H_2S gas	1) White ppt is not formed	1) Zn^{+2} is absent
VI	2) Flesh colour ppt is not formed	2) Mn^{+2} is absent	
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is not formed	Ba^{+2} (or) Ca^{+2} are absent
VI	Salt solution + NaOH solution	1) White ppt is not formed	Mg^{+2} is absent
	On heating	2) Pungent smell is evolved	May be NH_4^+

Confirmatory test for NH_4^+ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +Nessler's reagent ($\text{K}_2[\text{HgI}_4]$)	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH_4^+ is confirmed

Result : 1) **Cation:** NH_4^+ 2) **Anion:** Cl^- 3) **Salt:** $\text{NH}_4 \text{Cl}$

SALT ANALYSIS -VI

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed	1) May be ammonium salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc.H ₂ SO ₄ and heat strongly.	Reddish brown fumes are evolved	May be NO ₃ ⁻

Confirmatory test for NO₃⁻ ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO ₄ solution and then the test tube kept in an inclined position and conc H ₂ SO ₄ is added slowly along the sides of test tube.	A brown ring [Fe.NO(H ₂ O) ₅] SO ₄ is formed at the junction of the two liquid layers.	NO ₃ ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al ⁺³ is absent 2) Fe ⁺² is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn ⁺² is absent 2) Mn ⁺² is absent
V	Salt solution +NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is not formed	Ba ⁺² (or) Ca ⁺² are absent
VI	Salt solution + NaOH solution On heating	1) White ppt is not formed 2) Pungent smell is evolved	Mg ⁺² is absent May be NH ₄ ⁺

Confirmatory test for NH₄⁺ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +Nessler's reagent (K ₂ [HgI ₄])	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH ₄ ⁺ is confirmed

Result: 1) **Cation:** NH₄⁺ 2) **Anion:** NO₃⁻ 3) **Salt:** : NH₄NO₃

SALT ANALYSIS -VII

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) White sublimation is formed	1) May be ammonium salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not Observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc. H ₂ SO ₄ and heat strongly.	Reddish brown fumes are not evolved	NO ₃ ⁻ is absent
4	Salt sol + BaCl ₂ sol.	White ppt is formed	May be SO ₄ ⁻²

Confirmatory test for SO₄⁻² ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO ₄ ⁻² is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1)White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al ⁺³ is absent 2) Fe ⁺² is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn ⁺² is absent 2) Mn ⁺² is absent
V	Salt solution + NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is not formed	Ba ⁺² (or) Ca ⁺² are absent
VI	Salt solution + NaOH solution On heating	SS2) Pungent smell is evolved	Mg ⁺² is absent May be NH ₄ ⁺

Confirmatory test for NH₄⁺ ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +Nessler's reagent (K ₂ [HgI ₄])	Reddish Brown ppt. It is also Called as Iodide of Millen 's Base	NH ₄ ⁺ is confirmed

Result: 1) **Cation:** NH₄⁺ 2) **Anion:** SO₄⁻² 3) **Salt:** (NH₄)₂CO₃

SALT ANALYSIS - VIII

I. Preliminary examinations:

- 1) **Colour:** - Colour less
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	Reddish brown fumes are evolved	Br^- is absent

Confirmatory test for Br^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder	Reddish brown fumes are evolved	Br is confirmed
2	+Conc. H_2SO_4 Salt solution + AgNO_3 sol	Yellow colour ppt is formed. It is partially soluble in NH_4OH	Br is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is formed	May be Ba^{+2} (or) Ca^{+2}

Confirmatory test for Ca^{+2} / Ba^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + K_2CrO_4 sol	2. Yellow ppt is formed	Ba^{+2} is confirmed

Result: 1) Cation: Ba^{+2} 2) Anion: Br^- 3) Salt: BaBr_2

SALT ANALYSIS - IX

I. Preliminary examinations:

- 1) **Colour:** - Colour less
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	White fumes are evolved	May be Cl ⁻ t

Confirmatory test for Cl⁻ ion:

S.No	Experiment	Observation	Inference
1	Salt +MnO ₂ powder + Conc.H ₂ SO ₄	Pale green fumes are evolved	Cl ⁻ is confirmed
2	Salt sol +AgNO ₃ sol	Curdy white ppt. It is soluble in NH ₄ OH	Cl ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al ⁺³ is absent 2) Fe ⁺² is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn ⁺² is absent 2) Mn ⁺² is absent
V	Salt solution +NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is formed	May be Ba ⁺² (or) Ca ⁺²

Confirmatory test for cations:

Confirmatory test for Ca⁺²/ Ba⁺² ion:

S.No	Experiment	Observation	Inference
1	Salt solution +K ₂ CrO ₄ sol	2. Yellow ppt is formed	Ba ⁺² is confirmed

Result : 1) Cation: Ba⁺² 2) Anion: Cl⁻ 3) Salt: BaCl₂

SALT ANALYSIS - X

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc.H ₂ SO ₄ and heat strongly.	Reddish brown fumes are evolved	May be NO ₃ ⁻

Confirmatory test for NO₃⁻ ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO ₄ solution and then the test tube kept in an inclined position and conc H ₂ SO ₄ is added slowly along the sides of test tube.	A brown ring [Fe.NO(H ₂ O) ₅] SO ₄ is formed at the junction of the two liquid layers.	NO ₃ ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al ⁺³ is absent 2) Fe ⁺² is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn ⁺² is absent 2) Mn ⁺² is absent
V	Salt solution +NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is formed	May be Ba ⁺² (or) Ca ⁺²

Confirmatory test for Ca⁺²/Ba⁺² ion:

S.No	Experiment	Observation	Inference
1	Salt solution +K ₂ CrO ₄ sol	2. Yellow ppt is formed	Ba ⁺² is confirmed

Result: 1) **Cation:** Ba⁺² 2) **Anion:** NO₃⁻ 3) **Salt:** Ba (NO₃)₂

SALT ANALYSIS - XI

I. Priliminary examinations:

- 1) **Colour:** - Colour less
 2) **State:** - Crystalline solid
 3) **Odour:** - No odour
 4) **Solubility:** - water soluble
 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	White fumes are evolved	May be Cl ⁻

Confirmatory test for Cl⁻ ion:

S.No	Experiment	Observation	Inference
1	Salt +MnO ₂ powder + Conc.H ₂ SO ₄	Pale green fumes are evolved	Cl ⁻ is confirmed
2	Salt sol + AgNO ₃ sol	Curdy white ppt. It is soluble in NH ₄ OH	Cl ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt is not formed	1) Al ⁺³ is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH	2) Dark green ppt is not formed	2) Fe ⁺² is absent
V	NH ₄ OH +H ₂ S gas	1) White ppt is not formed	1) Zn ⁺² is absent
		2) Flesh colour ppt is not formed	2) Mn ⁺² is absent
V	Salt solution +NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is formed	May be Ba ⁺² (or) Ca ⁺²

Confirmatory test for Ca⁺²/ Ba⁺² ion:

S.No	Experiment	Observation	Inference
1	Salt solution +K ₂ CrO ₄ sol	1. No ppt	Ca ⁺² is confirmed

Result : 1) **Cation:** Ca⁺² 2) **Anion:** Cl⁻ 3) **Salt:** Ca Cl₂

SALT ANALYSIS - XII

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl^- is absent 2) Br^- is absent
3	Salt +Cu turnings + Conc. H_2SO_4 and heat strongly.	Reddish brown fumes are evolved	May be NO_3^-

Confirmatory test for NO_3^- ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO_4 solution and then the test tube kept in an inclined position and conc H_2SO_4 is added slowly along the sides of test tube.	A brown ring $[\text{Fe}.\text{NO}(\text{H}_2\text{O})_5] \text{SO}_4$ is formed at the junction of the two liquid layers.	NO_3^- is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is formed	May be Ba^{+2} (or) Ca^{+2}

Confirmatory test for $\text{Ca}^{+2}/\text{Ba}^{+2}$ ion:

S.No	Experiment	Observation	Inference
1	Salt solution + K_2CrO_4 sol	1. No ppt	Ca^{+2} is confirmed

Result: 1) **Cation:** Ca^{+2} 2) **Anion:** NO_3^- 3) **Salt:** $\text{Ca}(\text{NO}_3)_2$

SALT ANALYSIS - XIII

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Blue Colour |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - Water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc.H ₂ SO ₄ and heat strongly.	Reddish brown fumes are evolved	May be NO ₃ ⁻

Confirmatory test for NO₃⁻ ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO ₄ solution and then the test tube kept in an inclined position and conc H ₂ SO ₄ is added slowly along the sides of test tube.	A brown ring [Fe.NO(H ₂ O) ₅] SO ₄ is formed at the junction of the two liquid layers.	NO ₃ ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is formed	May be Cu ⁺²

Confirmatory test for Cu⁺² ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + K ₄ [Fe(CN) ₆] 2. Salt solution+NaOH sol	Chacolate Brown ppt Blue Colour ppt	Cu ⁺² is confirmed Cu ⁺² is confirmed

Result : 1) Cation: Cu⁺² 2) Anion: NO₃⁻ 3) Salt: Cu(NO₃)₂

SALT ANALYSIS - XIV

I. Preliminary examinations:

- 1) **Colour:** - Blue Colour
 2) **State:** - Crystalline solid
 3) **Odour:** - No odour
 4) **Solubility:** - water soluble
 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not Observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc. H ₂ SO ₄ and heat strongly.	Reddish brown fumes are not evolved	NO ₃ ⁻ is absent
4	Salt sol + BaCl ₂ sol.	White ppt is formed	May be SO ₄ ⁻²

Confirmatory test for SO₄⁻² ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO ₄ ⁻² is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is formed	May be Cu ⁺²

Confirmatory test for Cu⁺² ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + K ₄ [Fe(CN) ₆] 2. Salt solution+NaOH sol	Chacolate Brown ppt Blue Colour ppt	Cu ⁺² is confirmed Cu ⁺² is confirmed

Result: 1) Cation: Cu⁺² 2) Anion: SO₄⁻² 3) Salt: CuSO₄

SALT ANALYSIS - XV

I. Preliminary examinations:

- 1) **Colour:** - Pale green colour
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Loses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings +Conc. H ₂ SO ₄ and heat strongly.	Reddish brown fumes are not evolved	NO ₃ ⁻ is absent
4	Salt sol + BaCl ₂ sol.	White ppt is formed	May be SO ₄ ⁻²

Confirmatory test for SO₄⁻² ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO ₄ ⁻² is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) Dark green ppt is formed	May be Fe ⁺²

Confirmatory test for Fe⁺² ion:

	Experiment	Observation	Inference
1	Salt solution +NaOH sol	Dark Green Ppt	Fe ⁺² is confirmed

Result : 1) Cation: Fe⁺² 2) Anion: SO₄⁻² 3) Salt: FeSO₄

SALT ANALYSIS - XVI

I. Preliminary examinations:

- | | |
|-----------------------|---------------------|
| 1) Colour: | - Colour less |
| 2) State: | - Crystalline solid |
| 3) Odour: | - No odour |
| 4) Solubility: | - water soluble |
| 5) Dry test: | |

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings + Conc.H ₂ SO ₄ and heat strongly.	Reddish brown fumes are evolved	May be NO ₃ ⁻

Confirmatory test for NO₃⁻ ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO ₄ solution and then the test tube kept in an inclined position and conc H ₂ SO ₄ is added slowly along the sides of test tube.	A brown ring [Fe.NO(H ₂ O) ₅] SO ₄ is formed at the junction of the two liquid layers.	NO ₃ ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is formed	May be Pb ⁺²

Confirmatory test for Pb⁺² ion:

S.No	Experiment	Observation	Inference
1	Salt solution+ K ₂ CrO ₄ sol.	Yellow ppt is formed It is insoluble in HNO ₃	Pb ⁺² is confirmed

Result : 1) Cation: Pb⁺² 2) Anion: NO₃⁻ 3) Salt: Pb(NO₃)₂

SALT ANALYSIS -XVII

I. Preliminary examinations:

- 1) **Colour:** - Colour less
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are evolved	May be Cl ⁻

Confirmatory test for Cl⁻ ion:

S.No	Experiment	Observation	Inference
1	Salt +MnO ₂ powder + Conc.H ₂ SO ₄	Pale green fumes are evolved	Cl ⁻ is confirmed
2	Salt sol +AgNO ₃ sol	Curdy white ppt. It is soluble in NH ₄ OH	Cl ⁻ is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb ⁺² is absent
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	Cu ⁺² is absent
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al ⁺³ is absent 2) Fe ⁺² is absent
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn ⁺² is absent 2) Mn ⁺² is absent
V	Salt solution +NH ₄ Cl + NH ₄ OH + (NH ₄) ₂ CO ₃	White ppt is not formed	Ba ⁺² (or) Ca ⁺² are absent
VI	Salt solution + NaOH solution	White ppt is formed	May be Mg ⁺²

Confirmatory test for Mg⁺² ion:

S.No	Experiment	Observation	Inference
1	Salt solution + (NH ₄) ₂ CO ₃ solution	Slowly White ppt is formed	Mg ⁺² is confirmed

Result: 1) Cation: Mg⁺² 2) Anion: Cl⁻ 3) Salt: MgCl₂

SALT ANALYSIS - XVIII

I. Preliminary examinations:

- 1) **Colour:** - Colour less
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	1) Looses water	1) May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{2-} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl^- is absent 2) Br^- is absent
3	Salt +Cu turnings + Conc. H_2SO_4 and heat strongly.	Reddish brown fumes are evolved	May be NO_3^-

Confirmatory test for NO_3^- ion:

S.No	Experiment	Observation	Inference
1	Brown ring test: 2 ml of salt solution +2ml of freshly prepared FeSO_4 solution and then the test tube kept in an inclined position and conc H_2SO_4 is added slowly along the sides of test tube.	A brown ring $[\text{Fe}.\text{NO}(\text{H}_2\text{O})_5] \text{SO}_4$ is formed at the junction of the two liquid layers.	NO_3^- is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is f not ormed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is not formed	Ba^{+2} (or) Ca^{+2} are absent
VI	Salt solution + NaOH solution	White ppt is formed	May be Mg^{+2}

Confirmatory test for Mg^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + $(\text{NH}_4)_2\text{CO}_3$ solution	Slowly White ppt is formed	Mg^{+2} is confirmed

Result: 1) Cation: Mg^{+2} 2) Anion: NO_3^- 3) Salt: $\text{Mg}(\text{NO}_3)_2$

SALT ANALYSIS - XIX

I. Preliminary examinations:

- 1) **Colour:** - Colourless
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl^- is absent 2) Br^- is absent
3	Salt +Cu turnings +Conc. H_2SO_4 and heat strongly.	Reddish brown fumes are not evolved	NO_3^- is absent
4	Salt sol + BaCl_2 sol.	White ppt is formed	May be SO_4^{-2}

Confirmatory test for SO_4^{-2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO_4^{-2} is confirmed

III) IDENTIFICATION OF CAT ION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is not formed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	1) White ppt is not formed 2) Flesh colour ppt is not formed	1) Zn^{+2} is absent 2) Mn^{+2} is absent
V	Salt solution + NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$	White ppt is not formed	Ba^{+2} (or) Ca^{+2} are absent
VI	Salt solution + NaOH solution	White ppt is formed	May be Mg^{+2}

Confirmatory test for Mg^{+2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution + $(\text{NH}_4)_2\text{CO}_3$ solution	Slowly White ppt is formed	Mg^{+2} is confirmed

Result: 1) Cation: Mg^{+2} 2) Anion: SO_4^{-2} 3) Salt: MgSO_4

SALT ANALYSIS -XX

I. Priliminary examinations:

- 1) **Colour:** - Pink Colour
- 2) **State:** - Crystalline solid
- 3) **Odour:** - No odour
- 4) **Solubility:** - water soluble
- 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	White fumes are evolved	May be Cl^-

Confirmatory test for Cl^- ion:

S.No	Experiment	Observation	Inference
1	Salt + MnO_2 powder + Conc. H_2SO_4	Pale green fumes are evolved	Cl^- is confirmed
2	Salt sol + AgNO_3 sol	Curdy white ppt. It is soluble in NH_4OH	Cl^- is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is f not ormed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	Flesh colour ppt is formed	May be Mn^{+2}

Confirmatory test for Mn^{+2} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution + NaOH sol	Slowly Reddish Brown ppt is formed	Mn^{+2} is confirmed

Result : 1) Cation: Mn^{+2} 2) Anion: Cl^- 3) Salt: MnCl_2

SALT ANALYSIS -XXI

I. Priliminary examinations:

- 1) **Colour:** - Pink Colour
 2) **State:** - Crystalline solid
 3) **Odour:** - No odour
 4) **Solubility:** - water soluble
 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO_3^{-2} is absent
2	Salt +Conc. H_2SO_4	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl^- is absent 2) Br^- is absent
3	Salt +Cu turnings +Conc. H_2SO_4 and heat strongly.	Reddish brown fumes are not evolved	NO_3^- is absent
4	Salt sol + BaCl_2 sol.	White ppt is formed	May be SO_4^{-2}

Confirmatory test for SO_4^{-2} ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO_4^{-2} is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	Pb^{+2} is absent
II	Salt solution +dil.HCl + H_2S gas	Black ppt is not formed	Cu^{+2} is absent
III	Salt solution + NH_4Cl + NH_4OH	1) White gelatinous ppt is not formed 2) Dark green ppt is f not ormed	1) Al^{+3} is absent 2) Fe^{+2} is absent
IV	Salt solution + NH_4Cl + NH_4OH NH_4OH + H_2S gas	Flesh colour ppt is formed	May be Mn^{+2}

Confirmatory test for Mn^{+2} ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +NaOH sol	Slowly Reddish Brown ppt is formed	Mn^{+2} is confirmed

Result : 1) Cation: Mn^{+2} 2) Anion: SO_4^{-2} 3) Salt: MnSO_4

SALT ANALYSIS - XXII

I. Priliminary examinations:

- 1) **Colour:** - Colourless
 2) **State:** - Crystalline solid
 3) **Odour:** - No odour
 4) **Solubility:** - water soluble
 5) **Dry test:**

S.No	Experiment	Observation	Inference
1	Take a pinch of salt in a dry test tube and heat it	Looses water	May be hydrated salt

II) IDENTIFICATION OF ANION:

S.No	Experiment	Observation	Inference
1	Salt +dil.HCl	Brisk effervescences are not observed	CO ₃ ⁻² is absent
2	Salt +Conc.H ₂ SO ₄	1) White fumes are not evolved 2) Reddish brown fumes are not evolved	1) Cl ⁻ is absent 2) Br ⁻ is absent
3	Salt +Cu turnings +Conc. H ₂ SO ₄ and heat strongly.	Reddish brown fumes are not evolved	NO ₃ ⁻ is absent
4	Salt sol + BaCl ₂ sol.	White ppt is formed	May be SO ₄ ⁻²

Confirmatory test for SO₄⁻² ion:

S.No	Experiment	Observation	Inference
1	Salt solution+lead acetate solution	White ppt is formed It is insoluble in Conc.HCl	SO ₄ ⁻² is confirmed

III) IDENTIFICATION OF CATION:

G.No	Experiment	Observation	Inference
I	Salt solution +dil.HCl	White ppt is not formed	May be Pb ⁺²
II	Salt solution +dil.HCl +H ₂ S gas	Black ppt is not formed	May be Cu ⁺²
III	Salt solution +NH ₄ Cl + NH ₄ OH	1) White gelatinous ppt not formed 2) Dark green ppt is not formed	1) May be Al ⁺³ 2) May be Fe ⁺²
IV	Salt solution +NH ₄ Cl + NH ₄ OH NH ₄ OH +H ₂ S gas	1) White ppt is formed	1) May be Zn ⁺²

Confirmatory test for Zn⁺² ion:

S.No	Experiment	Observation	Inference
1	1. Salt solution +NaOH sol	White Gelationous Ppt	Zn ⁺² is confirmed

Result: 1) Cation: Zn⁺² 2) Anion: SO₄⁻² 3) Salt: ZnSO₄

IDENTIFICATION OF FUNCTIONAL GROUP IN THE ORGANIC COMPOUNDS

(04 - Marks)

Aim: Identify the functional group in the given organic compound

I. Physical State:

Crystalline solid	- Glucose and Fructose.
Needle shaped Crystalline solid	- Benzoic acid
Straw colour liquid	- Aniline
Pink colour liquid	- Phenol
Colourless Liquid	- Alcohols, Aldehyde, Ketones, Benzaldehyde and Acetic acid.

II. Ignition test:

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burnt with a non-sooty flame. The compound burnt with a sooty flame	It is an aliphatic Compound It is an aromatic compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	Soluble	In Soluble	In Soluble	aliphatic carboxylic acid
	Soluble	In Soluble	In Soluble	In Soluble	Glucose, Fructose
	Soluble	Soluble	Soluble	Soluble	Alcohols.
	Soluble	In Soluble	In Soluble	In Soluble	Acetaldehyde, Ketones
	In Soluble	In Soluble	In Soluble	Soluble	Aromatic aldehyde (Benzaldehyde)
	Soluble	Soluble	In Soluble	Soluble	Aromatic carboxylic acid
	In Soluble	Soluble	In Soluble	Soluble	Phenols
	In Soluble	In Soluble	Soluble	Soluble.	Aromatic amines

IV. Identification of functional group & Confirmatory tests:

i) Test with Conc. H₂SO₄: (Carbohydrates)

S.No	Experiment	Observation	Inference
1	Shake a small amount of the organic substance with few drops of Conc. H ₂ SO ₄	Charring in cold condition Charring upon heat	May be Glucose May be Fructose

Molisch test:

S.No	Experiment	Observation	Inference
1	Molisch test: To a small amount of aqueous solution compound, few drops of alcoholic α - naphthol solution is added. Then conc. H ₂ SO ₄ is added down the side of the test tube carefully	At the junction of the two liquids a deep violet colour ring is obtained. This colour is discharged by adding alkali	Carbohydrate is present

ii) Test with NaHCO₃: (Carboxylic acids and Ethyl alcohol)

S.No	Experiment	Observation	Inference
1	Given organic compound + 2ml NaHCO ₃	Effervescence taken placed and CO ₂ gas is liberated <i>Effervescences are not evolved</i>	May be Aliphatic carboxylic acid/ Aromatic carboxylic acid May be alcohol.

Esterification test:

S.No	Experiment	Observation	Inference
1	To few drops of the liquid taken in a dry test tube, few drops of acetic anhydride and conc. H ₂ SO ₄ are added. The mixture is heated for two minutes. Then added to dilute Na ₂ CO ₃ solution	A fruity smell is produced.	The compound is an aliphatic carboxylic acid The compound is an aromatic carboxylic acid. The compound is an alcohol

iii) **Test with Schiff's reagent :**

S.No	Experiment	Observation	Inference
1	2 drops of organic compound + 2ml colourless Schiff's reagent	Voilet colour is produced Voilet colour is not produced	May be Aldehyde May be Ketone

Test with 2,4 – DNP :

S.No	Experiment	Observation	Inference
1	To small amount of organic compound 2,4-DNP is added and shaken well	Yellow (or) Red ppt is formed	Aliphatic / Aromatic aldehyde is present (or) Ketone is present

iv) **Test with Neutral FeCl₃ : (Phenol)**

S.No	Experiment	Observation	Inference
1	To a small amount of organic compound (phenol) in water few drops of neutral ferric chloride is added .	Violet colour solution is obtained	May be phenol

Libermann test :

S.No	Experiment	Observation	Inference
1	To few drops of liquid compound Sodium nitrite is added . The mixture is warmed, shaken and cooled, to this mixture few drops of conc.H ₂ SO ₄ is added and poured in cold water.	A red solution is formed.	Phenol.

v) **Diazonium test : (Aniline):**

S.No	Experiment	Observation	Inference
1	Diazotization (Azo dye test): Dissolve 5 drops of compound in Conc. HCl and 3ml of water.cool in ice and add few drops 20%NaNO ₂ solution. Add the cold diazonium solution to Acid solution of β-Naphthol and add 2ml of 10% NaOH solution.	A red colour azo dye is formed.	May be it is a primary Aromatic amine.

Carbyl amine test:

S.No	Experiment	Observation	Inference
1	Isocyanide test: To a small amount of the compound few drops of concentrated HCl and few drops of chloroform (CHCl ₃)are added. Add 10% alcoholic solution of potassium hydroxide to the above mixture and warm.	Offensive (Unpleasent) smell of isocyanide observed.	Primary amine is present

Result : The given compound is

1. ACETIC ACID

Aim: Identify the functional group in the given organic compound

I. Physical State: Colourless Liquid - Alcohols, Aldehyde, Ketones, Benzaldehyde and Acetic acid.

II. Ignition test: -

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	Soluble	Soluble	In Soluble	May be Carboxylic acid

IV. Identification of functional group :

Test with NaHCO₃:

S.No	Experiment	Observation	Inference
1	Organic compound + 2ml NaHCO ₃	Effervescence taken placed and CO ₂ gas is liberated	May be Aliphatic carboxylic acid

V. Confirmatory test: Esterification test:

S.No	Experiment	Observation	Inference
1	To few drops of the liquid taken in a dry test tube, few drops of Ethyl alcohol and Conc.H ₂ SO ₄ are added. The mixture is heated for two minutes. Then added to dilute Na ₂ CO ₃ solution.	A fruity smell is produced.	The compound is Aliphatic carboxylic acid

Result: The given compound is Aliphatic carboxylic acid.

2. ETHYL ALCOHOL

Aim: Identify the functional group in the given organic compound

I. Physical State: Colourless Liquid - Alcohols, Aldehyde, Ketones, Benzaldehyde and acetic acid.

II. Ignition test:

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	Soluble	Soluble	Soluble	May be alcohols.

IV. Identification of functional group:

i) Test with NaHCO₃:

S.No	Experiment	Observation	Inference
1	Organic compound + 2ml NaHCO ₃	Effervescences are not evolved.	Carboxylic acids are absent May be alcohol.

V. Confirmatory tests: Esterification test:

S.No	Experiment	Observation	Inference
1	To few drops of the liquid taken in a dry test tube, few drops of acetic anhydride and conc.H ₂ SO ₄ are added. The mixture is heated for two minutes. Then added to dilute Na ₂ CO ₃ solution.	A fruity smell is produced.	The compound is an alcohol

Result : The given compound is alcohol.

3. BEZOIC ACID

Aim: Identify the functional group in the given organic compound

I. **Physical State:** Needle shaped crystalline solid - Benzoic acid.

II. **Ignition test:**

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a sooty flame.	It is an aromatic Compound

III. **Solubility:**

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	Soluble	In Soluble	Soluble	May be aromatic carboxylic acid

IV. **Identification of functional group :**

Test with NaHCO₃:

S.No	Experiment	Observation	Inference
1	Organic compound + 2ml NaHCO ₃	Effervescence taken placed and CO ₂ gas is liberated	May be aromatic carboxylic acid

V. **Confirmatory test: Esterification test:**

S.No	Experiment	Observation	Inference
1	To few drops of the liquid taken in a dry test tube, few drops of Ethyl alcohol and Conc. H ₂ SO ₄ are added. The mixture is heated for two minutes. Then added to dilute Na ₂ CO ₃ solution.	A fruity smell is produced.	The compound is Aromatic carboxylic acid

Result : The given compound is Aromatic carboxylic acid.

4. ACETALDEHYDE

Aim: Identify the functional group in the given organic compound

I. **Physical State:** Colourless Liquid - Alcohols, Aldehyde, Ketones, Benzaldehyde and Acetic acid.

II. **Ignition test:** -

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. **Solubility:**

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	In Soluble	In Soluble	In Soluble	In Soluble	May be aliphatic compound

IV. **Identification of functional group**

Test with Schiff's reagent :

S.No	Experiment	Observation	Inference
1	2 drops of organic compound + 2ml colourless Schiff's reagent	Violet colour is produced	May be aliphatic aldehydes

V. **Confirmatory test: Test with 2,4 - DNP :**

S.No	Experiment	Observation	Inference
1	To small amount of organic compound 2,4-DNP is added and shaken well	Yellow (or) Red ppt is formed	It is an Aldehyde

Result : The given compound is Aliphatic aldehyde.

5. GLUCOSE

Aim: Identify the functional group in the given organic compound

I. **Physical State:** Crystalline solid - Glucose, Fructose and Benzoic acid

acid

II. Ignition test:

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	In Soluble	In Soluble	In Soluble	Glucose, Fructose

IV. Identification of functional group :

ii) **Test with Conc. H₂SO₄:** (Carbohydrates)

S.No	Experiment	Observation	Inference
1	Shake a small amount of the organic substance with few drops of Conc.H ₂ SO ₄	Charring in cold condition with a smell of burnt sugar	May be Glucose

V. Confirmatory test:

S.No	Experiment	Observation	Inference
1	Mollish test: To a small amount of aqueous solution compound, few drops of alcoholic α - naphthol solution is added. Then conc. H ₂ SO ₄ is added down the side of the test tube carefully.	At the junction of the two liquids a deep violet colour ring is obtained. This colour is discharged by adding alkali	It is a Carbohydrate

Result : The given compound is *Glucose* .

6. FRUCTOSE

Aim: Identify the functional group in the given organic compound

I. **Physical State:** Crystalline solid - Glucose, Fructose and Benzoic acid

II. Ignition test:

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	Soluble	In Soluble	In Soluble	In Soluble	Glucose, Fructose

IV. Identification of functional group :i) **Test with Conc. H₂SO₄:** (Carbohydrates)

S.No	Experiment	Observation	Inference
1	Shake a small amount of the organic substance with few drops of Conc.H ₂ SO ₄	Charring upon heat with a smell of burnt sugar	May be Fructose

V. Confirmatory test:

S.No	Experiment	Observation	Inference
1	Mollish test: To a small amount of aqueous solution compound, few drops of alcoholic α - naphthol solution is added. Then conc. H ₂ SO ₄ is added down the side of the test tube carefully	At the junction of the two liquids a deep violet colour ring is obtained. This colour is discharged by adding alkali	It is a Carbohydrate

Result : The given compound is *Fructose* .

7. PHENOL

Aim: Identify the functional group in the given organic compound

I. Physical State: Pink colour liquid - May be Phenol

II. Ignition test:

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a sooty flame.	May be aromatic compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	In Soluble	Soluble	In Soluble	Soluble	May be aromatic compound

IV. Identification of functional group: Test with Neutral FeCl₃ :

S.No	Experiment	Observation	Inference
1	To a small amount of organic compound (phenol) in water few drops of neutral ferric chloride is added .	Violet colour solution is obtained	May be phenol

V. Confirmatory test: Libermann test :

S.No	Experiment	Observation	Inference
1	To few drops of liquid compound Sodium nitrite is added . The mixture is warmed, shaken and cooled, to this mixture few drops of conc.H ₂ SO ₄ is added and poured in cold water.	A red solution is formed.	Phenol.

Result: The given compound is Phenol .

8. ANILINE

Aim: Identify the functional group in the given organic compound

I. Physical State: Straw colour liquid - May be aniline

II. Ignition test: -

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a sooty flame.	May be aromatic compound

III. Solubility:

Solvent/	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	In Soluble	In Soluble	Soluble	White precipitate which dissolved in excess of acid	May be basic substances like aromatic amines.

IV. Identification of functional group: Diazonium test :

S.No	Experiment	Observation	Inference
1	Azo dye test : Dissolve 5 drops of compound in Conc.HCl and 3ml of water.cool in ice and add few drops 20%NaNO ₂ solution.Add the cold diazonium solution to Acid solution of β-Naphthol and add 2ml of 10% NaOH solution.	A red colour azo dye is formed.	May be it is a primary Aromatic amine.

V. Confirmatory test: Carbyl amine test :

S.No	Experiment	Observation	Inference
1	Isocyanide test: To a small amount of the compound few drops of concentrated HCl and few drops of chloroform (CHCl ₃) are added. Add 10% alcoholic solution of potassium hydroxide to the above mixture and warm.	Offensive (Unpleasant) smell of isocyanides Observed.	It is a primary amine.

Result: The given compound is Aromatic amine (Aniline).

9. BENZALDEHYDE

Aim: Identify the functional group in the given organic compound

I. Physical State: Colourless Liquid - Alcohols, Aldehyde, Ketones, Benzaldehyde and Acetic acid.

II. Ignition test: -

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a sooty flame.	May be aromatic compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	In Soluble	In Soluble	In Soluble	In Soluble	May be aromatic compound

IV. Identification of functional group:

Test with Schiff's reagent:

S.No	Experiment	Observation	Inference
1	2 drops of organic compound +2ml colourless Schiff's reagent	Violet colour is produced	May be aromatic compound

V. Confirmatory test: Test with 2,4 - DNP :

S.No	Experiment	Observation	Inference
1	To small amount of organic compound 2,4-DNP is added and shaken well	Yellow (or) Red ppt is formed	It is an aromatic compound

Result: The given compound is Aromatic aldehyde (Benzaldehyde).

10. ACETONE

Aim: Identify the functional group in the given organic compound

I. Physical State: Colourless Liquid - Alcohols, Aldehyde, Ketones, Benzaldehyde and Acetic acid.

II. Ignition test: -

S.No	Experiment	Observation	Inference
1	A little amount of the compound is ignited in a spatula.	The compound burns with a non-sooty flame.	It is an aliphatic Compound

III. Solubility:

Solvent	In H ₂ O	In NaOH	In HCl	In H ₂ SO ₄	Soluble
	In Soluble	In Soluble	In Soluble	In Soluble	May be aliphatic compound

IV. Identification of functional group:

Test with Schiff's reagent :

S.No	Experiment	Observation	Inference
1	2 drops of organic compound +2ml colourless Schiff's reagent	No colour is not produced	May be Ketone

V. Confirmatory test: Test with 2,4 - DNP :

S.No	Experiment	Observation	Inference
1	To small amount of organic compound 2,4-DNP is added and shaken well	Yellow (or) Red ppt is formed	It is a Ketone

Result : The given compound is Aliphatic Ketone.

Inter Mediate Practical Scheme of Valuation (30 Marks) (3Hours)

I.	QUALITATIVE ANALYSIS	10 MARKS
	1. Preliminary examinations	$\frac{1}{2} \times 4 = 2$
	2. Anions	$1+1+1+1 = 4$
	3. Cation	$2+ 1 = 3$
	4. Correct report	1
II.	VOLUMETRIC ANALYSIS	11 MARKS
	1. Producer in the first 10 Minutes. With equation	$2+ 1 = 3$
	2. Tabular form (up to 1% error)	5
	(b/w 1% to 2% error 4 Marks & above 2% error 2 Marks)	
	3. For indicating the formula	1
	4. For calculation	2
III.	Identification of functional group	04 MARKS.
	1. Physical state : Solid / Liquid	$\frac{1}{2}$ Mark
	2. Ignition Test: Sooty flame – Aromatic	$\frac{1}{2}$ Mark
	Non sooty flame – Aliphatic	
	3. Solubility 1) In water 2) In NaOH	1 Mark
	3) In HCl 4) Conc. H ₂ SO ₄	

4.	Identification test for Functional Group 1 Mark	5.	Confirmation tests 1 Mark
	1. Acetic acid: Test with NaHCO ₃ – Effervescence		Esterification Test
	2. Ethyl alcohol: Test with NaHCO ₃ – No reaction		Esterification Test
	3. Benzoic acid: Test with NaHCO ₃ – Effervescence		Esterification Test
	4. Acetaldehyde: Test with Schiff's reagent		Test with 2,4,DNP
	5. Glucose : Test with Conc. H ₂ SO ₄ – Charring in cold condition		Molish Test
	6. Fructose: Test with Conc. H ₂ SO ₄ – Charring upon heat		Molish Test
	7. Phenol: Test with neutral FeCl ₃ in alcohol		Libermann Test
	8. Aniline: Test with NaNO ₂ , HCl and Phenol		Carbyl amine Test
	9. Benzaldehyde: Test with Schiff's reagent		Test with 2,4,DNP
	10. Acetone: Test with Schiff's reagent(No reaction)		Test with 2,4,DNP

IV. Viva voce 02 Marks

V. Record 03 Marks

