

# II<sup>TH</sup> PRACTICAL CHEMISTRY GUIDE

**MR. S. JOHNSON., M.Sc., M.Sc., B.Ed.,**  
**PGT – CHEMISTRY**



**SACRED HEART MAT. HR. SEC. SCHOOL**  
**SCHOLINGANALLUR**  
**CHENNAI – 600115**

“GREAT THINGS ARE DONE BY A  
SERIES OF SMALL THINGS  
BROUGHT TOGETHER.”

—VINCENT VAN GOGH

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Mr. S. JOHNSON, M.Sc., M.Ne.B.Ed.,  
[www.Padasalai.Net](http://www.Padasalai.Net)

SYSTEMATIC ANALYSIS OF SIMPLE SALT- I [LEAD NITRATE]			
S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper sulphate, iron salt
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A reddish brown gas with a fishy odour evolves	Presence of a nitrate salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic Colour flame Observed.	Absence of a copper, barium, calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1mL of dil. HCl. Gently heat it	A reddish brown gas with the fishy odour turning a moist ferrous sulphate paper brown evolves	Presence of nitrate
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	Reddish brown gas turning acidified ferrous sulphate paper green evolves.	Presence of nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Change is Observed.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	A reddish brown gas with fishy odour turning a moist ferrous sulphate paper brown evolves	Presence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange is Observed.	Absence of chloride.

<b>Analysis with Sodium carbonate extract</b>			
<b>Preparation of Sodium carbonate extract</b>			
Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Observed.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is formed	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1ml of lead acetate	No white ppt is formed	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	A brown ring is formed	Presence of nitrate confirmed.
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitrobruside.	No purple or violet colouration appears	Absence of sulphide.
<b>Preparation of salt solution:</b>			
To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".			
1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it	A White ppt is formed.	Presence of 1st group metal ions (Pb <sup>2+</sup> )
<b>Analysis of the 1st group ppt:</b>			
	To the ppt add about 1ml of water and boil it	The ppt dissolves	Presence of Lead

1	<b>Test for Lead:</b> To one portion of the hot solution add about 1ml of $K_2CrO_4$	A yellow ppt is obtained	Presence of Lead
2	To an another portion of the hot solution add about 1ml of KI. To the yellow ppt add about 1ml of water, boil and cool.	A yellow ppt is obtained. The yellow ppt dissolves on boiling, and on cooling golden spangles appear	Presence of lead is confirmed.
<b>Result:</b> The Anion Present : NITRATE The cation Present : LEAD The Given simple salt : LEAD NITRATE			

**SYSTEMATIC ANALYSIS OF SIMPLE SALT-II [COPPER SULPHATE]**

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Blue	May be copper sulphate
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	Blue Changes into White due to dehydration	May be copper sulphate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	Bluish green flame.	Presence of a Copper salt
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1mL of dil. HCl. Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. <math>H_2SO_4</math>:</b> Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heat it	No Characteristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of <math>MnO_2</math> and Conc. <math>H_2SO_4</math>:</b> Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc. $H_2SO_4$ and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. <math>H_2SO_4</math> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. $H_2SO_4$ . Gently heat it	No reddish brown gas evolves	Absence of nitrate.

8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. $H_2SO_4$ . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.

#### Analysis with Sodium carbonate extract

#### Preparation of Sodium carbonate extract

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. $HNO_3$ + 1ml of $AgNO_3$ , and shake it	No Characteristic ppt is Observed.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	A white ppt insoluble in dil $H_2SO_4$ is formed	Presence of sulphate is Confirmed.
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	A white ppt soluble in excess of ammonium acetate is formed	Presence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. $H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$ along the sides of the test tube.	No brown ring is formed	Absence of Nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil $HNO_3$ + about 1mL each of ammonium molybdate and Conc. $HNO_3$	No canary yellow ppt is formed.	Absence of Phosphate
15	<b>Test with sodium nitro bruside:</b> 1ml of the sodium carbonate extract + 1ml of dil. ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

#### Preparation of salt solution:

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".



1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No ppt is formed.	Absence of 1st group metal ions ( $Pb^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $H_2S$ gas.	A Black ppt is formed	Presence of 2nd group metal ions ( $Cu^{2+}$ )

**Analysis of the 2nd group ppt:**

1	<b>Test for copper:</b> i). To one portion of the solution add ammonium hydroxide	No ppt is obtained, but the solution is blue	Presence of Copper
2	ii) To the blue coloured solution add about 1ml each of acetic acid and potassium ferro cyanide	A red brown ppt is obtained	Presence of Copper Confirmed

Result:

The Anion Present : SULPHATE

The cation Present : COPPER

The Given simple salt : COPPER SULPHATE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT-III [COPPER CARBONATE]**

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Green	May be Copper Carbonate
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A colourless, odourless gas turning lime water milky evolves	Presence of carbonate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	Bluish green flame.	Presence of a copper salt
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1mL of dil. HCl . Gently heat it	A colourless, odourless gas evolves as a brisk Effervescence and turns lime water milky	Presence of carbonate is Confirmed
5	<b>Action of Conc. <math>H_2SO_4</math>:</b> Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heat it	No Characteristic gas evolves	Absence of Chloride, Bromide, Nitrate

6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Observed.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate

15	<b>Test with sodium nitro bruside:</b> 1ml of the sodium carbonate extract + 1ml of dil. ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.
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**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of dil. HCl, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No ppt is formed.	Absence of 1st group metal ions ( $Pb^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $H_2S$ gas.	A Black ppt is formed	Presence of 2nd group metal ions ( $Cu^{2+}$ )

**Analysis of the 2nd group ppt:**

1	<b>Test for copper:</b> i). To one portion of the solution add ammonium hydroxide	No ppt is obtained, but the solution is blue	Presence of Copper
2	ii) To the blue coloured solution add about 1ml each of acetic acid and potassium ferro cyanide	A red brown ppt is obtained	Presence of Copper Confirmed

**Result:**

The Anion Present : CARBONATE  
The cation Present : COPPER  
The Given simple salt : COPPER CARBONATE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- IV [FERRIC CHLORIDE]**

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Brown	May be an iron salt
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	No Characteristic Change Occurs	Absence of Zinc, Ammonium, Nitrate

3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth	Presence of Chloride
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A greenish yellow gas turning starch iodide paper blue evolves	Presence of Chloride
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it. Pass the vapours into dilute sodium hydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and lead acetate	A yellow ppt is obtained	Presence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	A curdy white ppt insoluble in dil. Ammonia is formed	Presence of chloride

11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1mL of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of NH <sub>4</sub> Cl, NH <sub>4</sub> OH and shake it well	A brown ppt is formed	presence of 3rd group metal ions (Fe <sup>3+</sup> )

**Analysis of the 3rd group ppt:**

1	To the ppt add a pinch of sodium peroxide and boil it	A red or brown ppt is obtained	Presence of Iron
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2	i.) To one portion of the red ppt add about 1mL of dil HCl and boil it and then add about 1ml of potassium ferrocyanide	A blue ppt is obtained	Presence of Iron is Confirmed
3	ii.) To an another portion of the ppt add about 1mL of dil. HNO <sub>3</sub> boil it and then add about 1ml of KCNS	A blood red colouration is seen	Presence of Iron is Confirmed

Result:

The Anion Present : CHLORIDE

The cation Present : FERRIC

The Given simple salt : FERRIC CHLORIDE

SYSTEMATIC ANALYSIS OF SIMPLE SALT- V [ALUMINIUM SULPHATE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	No Characteristic Change Occurs	Absence of Zinc, Ammonium, Nitrate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Charactristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Charactristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide

7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	A white ppt insoluble in dil H <sub>2</sub> SO <sub>4</sub> is formed	Presence of sulphate is Confirmed.
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	A white ppt soluble in excess of ammonium acetate is formed	Presence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitropruside:</b> 1ml of the sodium carbonate extract + 1ml of dil ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

<b>Preparation of salt solution:</b>			
To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".			
1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $Pb^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $H_2S$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $Cu^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $NH_4Cl$ and $NH_4OH$ and shake it well	A gelatinous white ppt is formed	Presence of 3rd group metal ion ( $Al^{3+}$ )
<b>Analysis of the 3rd group ppt:</b>			
1	<b>Test for Aluminium:</b> To the ppt add a pinch of sodium peroxide and boil it	A colourless solution is obtained	Presence of Aluminium
2	To the colourless solution add dil.HCl and shake it	A gelatinous white ppt is obtained	Presence of Aluminium is Confirmed
<b>Result:</b> The Anion Present : SULPHATE The cation Present : ALUMINIUM The Given simple salt : ALUMINIUM SULPHATE			

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- VI [ALUMINIUM NITRATE]

S NO	Experiment	Observation	Inference
Analysis of anions			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A reddish brown gas with a fishy odour evolves	Presence of a nitrate salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium



4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl Gently heat it	A reddish brown gas with the fishy odour turning a moist ferrous sulphate paper brown evolves	Presence of nitrate
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	Reddish brown gas turning acidified ferrous sulphate paper green evolves.	Presence of nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	A reddish brown gas with fishy odour turning a moist ferrous sulphate paper brown evolves	Presence of nitrate
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.

**Analysis with Sodium carbonate extract****Preparation of Sodium carbonate extract**

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1ml of Lead Acetate	No white ppt is obtained	Absence of sulphate

13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	A brown ring is formed	Presence of nitrate confirmed
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of Phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ommonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of NH <sub>4</sub> Cl and NH <sub>4</sub> OH and shake it well	A gelatinous white ppt is formed	Presence of 3rd group metal ion (Al <sup>3+</sup> )

**Analysis of the 3rd group ppt:**

1	<b>Test for Aluminium:</b> To the ppt add a pinch of sodium peroxide and boil it	A colourless solution is obtained	Presence of Aluminium
2	To the colourless solution add dil.HCl and shake it	A gelatinous white ppt is obtained	Presence of Aluminium is Confirmed

**Result:**

The Anion Present : NITRATE  
The cation Present : ALUMINIUM  
The Given simple salt : ALUMINIUM NITRATE

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- VII [ZINC SULPHATE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	Salt is Yellow when hot, White when cold	May be a zinc salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Charactristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Charactristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.

**Analysis with Sodium carbonate extract****Preparation of Sodium carbonate extract**

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. $\text{HNO}_3$ + 1ml of $\text{AgNO}_3$ , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	A white ppt insoluble in dil $\text{H}_2\text{SO}_4$ is formed	Prsence of sulphate is Confirmed.
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	A whit ppt soluble in excess of ammonium acetate is formed	Presence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. $\text{H}_2\text{SO}_4$ + freshly prepared ferrous sulphate solution then add Conc. $\text{H}_2\text{SO}_4$ along the sides of the test tube.	No brown ring is formed	Absence of Nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil $\text{HNO}_3$ + about 1ml each of ammonium molybdate and Conc. $\text{HNO}_3$	No canary yellow ppt is formed.	Absence of Phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $\text{Pb}^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $\text{H}_2\text{S}$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $\text{Cu}^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $\text{NH}_4\text{Cl}$ and $\text{NH}_4\text{OH}$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $\text{Al}^{3+}$ / $\text{Fe}^{3+}$ )

	<b>GROUP IV</b> To the above solution pass (H <sub>2</sub> S) gas	A dirty white ppt is obtained	Presence of 4 th group metal ion (Zn <sup>2+</sup> )
<b>Analysis of the 4th group ppt:</b>			
1	<b>Test for Zinc:</b> To the ppt add dil HCl and boil it	The ppt dissolves	Presence of Zinc
2	To the 1 ml of Original solution add dil.NaOH in drops to excess	White Ppt Soluble in excess NaOH is Obtained	Presence of Zinc is Confirmed
3	To the 1 ml of Original solution add 2 ml K <sub>4</sub> [Fe(CN) <sub>6</sub> ] solution	White Ppt Soluble in excess NaOH, insoluble in dilute acids, is Obtained	Presence of Zinc is Confirmed
<b>Result:</b> The Anion Present : SULPHATE The cation Present : ZINC The Given simple salt : ZINC SULPHATE			

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- VIII [[ZINC SULPHIDE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	Salt is Yellow when hot, White when cold	May be a zinc salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl ,form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	egg smell turning a paper dipped in lead acetate shining black evolves	Presence of sulphide is Confirmed
5	<b>Action of Conc.H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Charactristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide

7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	A black ppt is formed	Presence of sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ommonia. + few drops of sodium nitro bruside.	A purple or violet colouration appears	Prsence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube, add 3ml of dil.HCl + dil.HNO<sub>3</sub>, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of NH <sub>4</sub> Cl and NH <sub>4</sub> OH and shake it well	No ppt is obtained	Absence of 3rd group metal ions (Al <sup>3+</sup> / Fe <sup>3+</sup> )
	<b>GROUP IV</b> To the above solution pass (H <sub>2</sub> S) gas	A dirty white ppt is obtained	Presence of 4 th group metal ion (Zn <sup>2+</sup> )

**Analysis of the 4th group ppt:**

1	<b>Test for Zinc:</b> To the ppt add dil HCl and boil it	The ppt dissolves	Presence of Zinc
2	To the 1 ml of Original solution add dil.NaOH in drops to excess	White Ppt Soluble in excess NaOH is Obtained	Presence of Zinc is Confirmed
3	To the 1 ml of Original solution add 2 ml K <sub>4</sub> [Fe(CN) <sub>6</sub> ] solution	White Ppt Soluble in excess NaOH, insoluble in dilute acids, is Obtained	Presence of Zinc is Confirmed

**Result:**

The Anion Present : SULPHIDE

The cation Present : ZINC

The Given simple salt : ZINC SULPHIDE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- IX [CALCIUM CARBONATE]**

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A colourless, odourless gas turning lime water milky evolves	Presence of carbonate

3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	Brick red Colour is Observed.	Presence of a calcium salt
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	A colourless, odourless gas evolves as a brisk Effervescence and turns lime water milky	Presence of carbonate is Confirmed
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.

#### Analysis with Sodium carbonate extract

#### Preparation of Sodium carbonate extract

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate



12	<b>Test with leadacetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .aommonia + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of dil.HCl, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of NH <sub>4</sub> Cl, NH <sub>4</sub> OH and shake it well	No ppt is obtained	Absence of 3rd group metal ions (Al <sup>3+</sup> / Fe <sup>3+</sup> )
5	<b>GROUP IV</b> To the above solution pass (H <sub>2</sub> S) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion (Zn <sup>2+</sup> )
6	<b>GROUP V</b> To the salt solution add 1ml each of NH <sub>4</sub> Cl, NH <sub>4</sub> OH and (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> and shake it well.	A white ppt is obtained	Presence of 5th group metal ions (Ba <sup>2+</sup> / Ca <sup>2+</sup> )

Analysis of the 5th group ppt:			
1	To the ppt add about 1ml of dil. acetic acid and gently heat it.	The ppt dissolves.	Presence of (Ba <sup>2+</sup> /Ca <sup>2+</sup> )
2	<b>Test for Calcium</b> To the solution add about 1ml of ammonium sulphate	A white ppt is obtained. Filter. To the residue add a drop of Conc. HCl. Take the residue and introduce near the Bunsen flame. A crimson red colour is seen	Presence of Calcium is Confirmed
		If no ppt is obtained, to the solution add about 1ml of potassium ferrocyanide and shake it. A pale yellow ppt appears.	Presence of Calcium is Confirmed
<b>Result:</b> The Anion Present : CARBONATE The cation Present : CALCIUM The Given simple salt : CALCIUM CARBONATE			

SYSTEMATIC ANALYSIS OF SIMPLE SALT- X [BARIUM CHLORIDE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	No Characteristic Change Occurs	Absence of Zinc, Ammonium, Nitrate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	Apple green Colour is Observed.	Presence of Barium salt
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth	Presence of Chloride

6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and gently heat it	A greenish yellow gas turning starch iodide paper blue evolves	Prsence of Chloride
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of Nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amont of a salt + dil.NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> .Gently heat it. Pass the vapours into dilute sodium hydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and lead acetate	A yellow ppt is obtained	Presence of chloride.

**Analysis with Sodium carbonate extract****Preparation of Sodium carbonate extract**

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter.The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract +dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	A curdy white ppt insoluble in dil. Ammonia is formed	Presence of chloride
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Aceticacid + 1ml of bariumchloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with leadacetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of Nitrate

14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil $\text{HNO}_3$ + about 1ml each of ammonium molybdate and Conc. $\text{HNO}_3$	No canary yellow ppt is formed.	Absence of Phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.
<b>Preparation of salt solution:</b> To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".			
1	<b>GROUP 0</b> 1ml of the original salt solution add about 1mL each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $\text{Pb}^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $\text{H}_2\text{S}$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $\text{Cu}^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $\text{Al}^{3+}$ / $\text{Fe}^{3+}$ )
5	<b>GROUP IV</b> To the above solution pass ( $\text{H}_2\text{S}$ ) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion ( $\text{Zn}^{2+}$ )
6	<b>GROUP V</b> To the salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $(\text{NH}_4)_2\text{CO}_3$ and shake it well.	A white ppt is obtained	Presence of 5th group metal ions ( $\text{Ba}^{2+}$ / $\text{Ca}^{2+}$ )
<b>Analysis of the 5th group ppt:</b>			
1	To the ppt add about 1ml of dil. acetic acid and gently heat it.	The ppt dissolves.	Presence of ( $\text{Ba}^{2+}$ / $\text{Ca}^{2+}$ )

2	<b>Test for Barium.</b> To the solution add about 1ml of potassium chromate	A yellow ppt is obtained. Filter To the residue add a drop of Conc. HCl. Take a portion of the paste and introduce near the Bunsen flame. A transient green is imparted to the flame	Presence of Barium is Confirmed
<b>Result:</b> The Anion Present : CHLORIDE The cation Present : BARIUM The Given simple salt : BARIUM CHLORIDE			

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- XI [MAGNESIUM SULPHA

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	No Characteristic Change Occurs	Absence of Zinc, Ammonium, Nitrate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Charactristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Charactristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amont of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt

9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. $H_2SO_4$ . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. $HNO_3$ + 1ml of $AgNO_3$ , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	A white ppt insoluble in dil $H_2SO_4$ is formed	Prsence of sulphate is Confirmed.
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	A whit ppt soluble in excess of ammonium acetate is formed	Presence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. $H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$ along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil $HNO_3$ + about 1ml each of ammonium molybdate and Conc. $HNO_3$	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.
<b>Preparation of salt solution:</b> To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".			
1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium

2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $Pb^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $H_2S$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $Cu^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $NH_4Cl$ and $NH_4OH$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $Al^{3+} / Fe^{3+}$ )
5	<b>GROUP IV</b> To the above solution pass ( $H_2S$ ) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion ( $Zn^{2+}$ )
6	<b>GROUP V</b> To the salt solution add 1ml each of $NH_4Cl$ , $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well.	No white ppt is obtained	Absence of 5th group metal ions ( $Ba^{2+} / Ca^{2+}$ )
7	<b>GROUP VI</b> To the original salt solution add 1ml each of $NH_4Cl$ , $NH_4OH$ and $NH_4H_2PO_4$ , and scratch the sides of the test tube.	A white ppt is obtained.	Presence of 6th group metal ion ( $Mg^{2+}$ )

**Analysis of the 6th group ppt:**

2	<b>Test for Magnesium:</b> i) To about 1ml of the original salt solution add dil. NaOH in drops with shaking.	White Ppt insoluble in excess NaOH is Obtained	Presence of Magnesium is Confirmed
3	ii) To about 1ml of the original salt solution add about 1ml of Magneson reagent.	A blue ppt is formed.	Presence of Magnesium is Confirmed

**Result:**

The Anion Present : SULPHATE  
 The cation Present : MAGNESIUM  
 The Given simple salt : MAGNESIUM SULPHATE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- XII [MAGNESIUM PHOSPHATE]**

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	No Characteristic Change Occurs	Absence of Zinc, Ammonium, Nitrate

3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate



12	<b>Test with leadacetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	Canary yellow ppt is formed.	Presence of Phosphate is Confirmed
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ommonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1mL each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of NH <sub>4</sub> Cl and NH <sub>4</sub> OH and shake it well	No ppt is obtained	Absence of 3rd group metal ions (Al <sup>3+</sup> / Fe <sup>3+</sup> )
5	<b>GROUP IV</b> To the above solution pass (H <sub>2</sub> S) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion (Zn <sup>2+</sup> )
6	<b>GROUP V</b> To the salt solution add 1ml each of NH <sub>4</sub> Cl, NH <sub>4</sub> OH and (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> and shake it well.	No white ppt is obtained	Absence of 5th group metal ions (Ba <sup>2+</sup> / Ca <sup>2+</sup> )

7	<b>GROUP VI</b> To the original salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $\text{NH}_4\text{H}_2\text{PO}_4$ , and scratch the sides of the test tube.	A white ppt is obtained.	Presence of 6th group metal ion $\text{Mg}^{2+}$
<b>Analysis of the 6th group ppt:</b>			
2	<b>Test for Magnesium:</b> i) To about 1ml of the original salt solution add dil. $\text{NaOH}$ in drops with shaking.	White Ppt insoluble in excess $\text{NaOH}$ is Obtained	Presence of Magnesium is Confirmed
3	ii) To about 1ml of the original salt solution add about 1ml of Magneson reagent.	A blue ppt is formed.	Presence of Magnesium is Confirmed
<b>Result:</b> The Anion Present : PHOSPHATE The cation Present : MAGNESIUM The Given simple salt : MAGNESIUM PHOSPHATE			

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- XIII[MAGNESIUM CARBONATE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A colourless, odourless gas turning lime water milky evolves	Presence of carbonate
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. $\text{HCl}$ , form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. <math>\text{HCl}</math>:</b> Small amount of salt + 1ml of dil. $\text{HCl}$ . Gently heat it	A colourless, odourless gas evolves as a brisk Effervescence and turns lime water milky	Presence of carbonate is Confirmed
5	<b>Action of Conc. <math>\text{H}_2\text{SO}_4</math>:</b> Small amount of a salt in a dry test tube + Conc. $\text{H}_2\text{SO}_4$ and gently heat it	No Charactristic gas evolves	Absence of Chloride, Bromide, Nitrate
6	<b>Action of <math>\text{MnO}_2</math> and Conc. <math>\text{H}_2\text{SO}_4</math>:</b> Small amount of salt in a dry test tube + pinch of $\text{MnO}_2$ + Conc. $\text{H}_2\text{SO}_4$ and gently heat it	No Characteristic Gas is evolved.	Absence of chloride, bromide

7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	No Characteristic gas is Observed.	Absence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.
<b>Analysis with Sodium carbonate extract</b> <b>Preparation of Sodium carbonate extract</b> Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.			
10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	No Characteristic ppt is Obtained.	Absence of chloride, bromide, sulphide
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of Nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of Phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ommonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

<b>Preparation of salt solution:</b>			
To a small amount of salt in a test tube add 2 to 3ml of dil.HCl, shake it and gently heat it. This solution is called "original solution".			
1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	No chocolate brown ppt is obtained.	Absence of ammonium
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $Pb^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $H_2S$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $Cu^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $NH_4Cl$ and $NH_4OH$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $Al^{3+} / Fe^{3+}$ )
5	<b>GROUP IV</b> To the above solution pass ( $H_2S$ ) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion ( $Zn^{2+}$ )
6	<b>GROUP V</b> To the salt solution add 1ml each of $NH_4Cl$ , $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well.	No white ppt is obtained	Absence of 5th group metal ions ( $Ba^{2+} / Ca^{2+}$ )
7	<b>GROUP VI</b> To the original salt solution add 1ml each of $NH_4Cl$ , $NH_4OH$ and $NH_4H_2PO_4$ , and scratch the sides of the test tube.	A white ppt is obtained.	Presence of 6th group metal ion $Mg^{2+}$
<b>Analysis of the 6th group ppt:</b>			
2	<b>Test for Magnesium:</b> i)To about 1ml of the original salt solution add dil. NaOH in drops with shaking.	White Ppt insoluble in excess NaOH is Obtained	Presence of Magnesium is Confirmed
3	ii)To about 1ml of the original salt solution add about 1ml of Magneson reagent.	A blue ppt is formed.	Presence of Magnesium is Confirmed
<b>Result:</b>			
The Anion Present : CARBONATE			
The cation Present : MAGNESIUM			
The Given simple salt : MAGNESIUM CARBONATE			

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- XIV [AMMONIUM CHLORIDE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts
2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A colourless gas with the pungent smell turning red litmus paper into blue evolves. It gives a dense white fumes when a glass rod dipped in Conc. HCl is brought close to its mouth	Presence of an ammonium salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl . Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth	Presence of Chloride
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A greenish yellow gas turning starch iodide paper blue evolves	Presence of Chloride
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	A colourless gas with the pungent smell giving dense white fumes with a glass rod dipped in dil. HCl evolves	Presence of ammonium salt

9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it. Pass the vapours into dilute sodium hydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and lead acetate	A yellow ppt is obtained	Presence of chloride.
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**Analysis with Sodium carbonate extract****Preparation of Sodium carbonate extract**

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.

10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	A curdy white ppt insoluble in dil. Ammonia is formed	Presence of chloride
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitrobruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	A chocolate brown ppt is obtained.	Presence of 0 group metal ion ( $\text{NH}_4^+$ )
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions ( $\text{Pb}^{2+}$ )
3	<b>GROUP II</b> To the above solution pass $\text{H}_2\text{S}$ gas.	No Black ppt is formed	Absence of 2nd group metal ions ( $\text{Cu}^{2+}$ )
4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $\text{Al}^{3+}$ / $\text{Fe}^{3+}$ )
5	<b>GROUP IV</b> To the above solution pass ( $\text{H}_2\text{S}$ ) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion ( $\text{Zn}^{2+}$ )
6	<b>GROUP V</b> To the salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $(\text{NH}_4)_2\text{CO}_3$ and shake it well.	No white ppt is obtained	Absence of 5th group metal ions ( $\text{Ba}^{2+}$ / $\text{Ca}^{2+}$ )
7	<b>GROUP VI</b> To the original salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $\text{NH}_4\text{H}_2\text{PO}_4$ , and scratch the sides of the test tube.	No white ppt is obtained.	Absence of 6th group metal ion ( $\text{Mg}^{2+}$ )

#### Analysis of the Ammonium

1	To 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	A chocolate brown ppt is obtained.	Presence of Ammonium is Confirmed
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#### Result:

The Anion Present : CHLORIDE  
 The cation Present : AMMONIUM  
 The Given simple salt : AMMONIUM CHLORIDE

#### SYSTEMATIC ANALYSIS OF SIMPLE SALT- XV[AMMONIUM BROMIDE]

S NO	Experiment	Observation	Inference
<b>Analysis of anions</b>			
1	<b>Colour:</b> Note the colour of the salt	Colourless	Absence of copper, Iron salts

2.	<b>Action of heat:</b> A small amount of a salt is heated in a test tube	A colourless gas with the pungent smell turning red litmus paper into blue evolves. It gives a dense white fumes when a glass rod dipped in Conc. HCl is brought close to its mouth	Presence of an ammonium salt
3.	<b>Flame test:</b> Small amount of salt + A drop of Conc. HCl, form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame	No Characteristic flame Colour is Observed.	Absence of Copper, Barium, Calcium
4.	<b>Action of dil. HCl:</b> Small amount of salt + 1ml of dil. HCl. Gently heat it	No Characteristic gas evolves	Absence of Carbonate, Nitrate, Sulphide
5	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of a salt in a dry test tube + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A reddish brown gas turning moist fluorescein paper green evolves	Presence of Bromide
6	<b>Action of MnO<sub>2</sub> and Conc. H<sub>2</sub>SO<sub>4</sub>:</b> Small amount of salt in a dry test tube + pinch of MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and gently heat it	A reddish brown gas turning moist fluorescein paper red evolves	Presence of Bromide
7.	<b>Action of Conc. H<sub>2</sub>SO<sub>4</sub> and copper turning:</b> small amount of salt in a dry test tube + few copper turnings + Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it	No reddish brown gas evolves	Absence of nitrate.
8.	<b>Action of dil. NaOH solution:</b> Small amount of a salt + dil. NaOH solution and gently heat it.	A colourless gas with the pungent smell giving dense white fumes with a glass rod dipped in dil. HCl evolves	Presence of ammonium salt
9	<b>Chromyl chloride test:</b> Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H <sub>2</sub> SO <sub>4</sub> . Gently heat it.	No Red Orange Vapour is Observed.	Absence of chloride.

**Analysis with Sodium carbonate extract****Preparation of Sodium carbonate extract**

Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter. The filtrate is called sodium carbonate extract.



10.	<b>Test for halides:</b> 1 ml of sodium carbonate extract + dil. HNO <sub>3</sub> + 1ml of AgNO <sub>3</sub> , and shake it	A pale yellow ppt sparingly soluble in ammonia is formed	Presence of Bromide is Confirmed
11	<b>Test with barium chloride:</b> One ml of the sodium carbonate extract + dil. Acetic acid + 1ml of barium chloride solution and shake	No white ppt is obtained	Absence of sulphate
12	<b>Test with lead acetate:</b> 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate	No white ppt is obtained	Absence of sulphate
13	<b>Brown ring test:</b> 1ml of the sodium carbonate extract + dil. H <sub>2</sub> SO <sub>4</sub> + freshly prepared ferrous sulphate solution then add Conc. H <sub>2</sub> SO <sub>4</sub> along the sides of the test tube.	No brown ring is formed	Absence of nitrate
14	<b>Ammonium molybdate test:</b> 1 ml of the extract + dil HNO <sub>3</sub> + about 1ml each of ammonium molybdate and Conc. HNO <sub>3</sub>	No canary yellow ppt is formed.	Absence of phosphate
15	<b>Test with sodium nitro bruside:</b> 1ml of the sodium carbonate extract + 1ml of dil .ammonia. + few drops of sodium nitro bruside.	No purple or violet colouration appears	Absence of sulphide.

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

1	<b>GROUP 0</b> 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH.	A chocolate brown ppt is obtained.	Presence of 0 group metal ion (NH <sub>4</sub> <sup>+</sup> )
2	<b>GROUP I</b> Take about 1 ml of the salt solution in a test tube Add about 1ml of dil HCl, and shake it	No White ppt is formed.	Absence of 1st group metal ions (Pb <sup>2+</sup> )
3	<b>GROUP II</b> To the above solution pass H <sub>2</sub> S gas.	No Black ppt is formed	Absence of 2nd group metal ions (Cu <sup>2+</sup> )

4	<b>GROUP III</b> To about 1ml of the salt solution add about 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and shake it well	No ppt is obtained	Absence of 3rd group metal ions ( $\text{Al}^{3+}$ / $\text{Fe}^{3+}$ )
5	<b>GROUP IV</b> To the above solution pass ( $\text{H}_2\text{S}$ ) gas	No dirty white ppt is obtained	Absence of 4 th group metal ion ( $\text{Zn}^{2+}$ )
6	<b>GROUP V</b> To the salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $(\text{NH}_4)_2\text{CO}_3$ and shake it well.	No white ppt is obtained	Absence of 5th group metal ions ( $\text{Ba}^{2+}$ , $\text{Ca}^{2+}$ )
7	<b>GROUP VI</b> To the original salt solution add 1ml each of $\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{OH}$ and $\text{NH}_4\text{H}_2\text{PO}_4$ , and scratch the sides of the test tube.	No white ppt is obtained.	Absence of 6th group metal ion ( $\text{Mg}^{2+}$ )

#### Analysis of the Ammonium

1	To 1ml of the original salt solution add about 1ml each of Nessler's reagent and $\text{NaOH}$ .	A chocolate brown ppt is obtained.	Presence of Ammonium is Confirmed
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#### Result:

The Anion Present : BROMIDE  
 The cation Present : AMMONIUM  
 The Given simple salt : AMMONIUM BROMIDE