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AIM OF THE EXPERIMENT :-

To test the known acid radicals present in the given salt.

APPARATUS REQUIRED :-

1. Test tubes 2. Test tube holder 3. Bunsen burner 4. Watch glass

CHEMICALS REQUIRED :-

1. Given salts 2. Various reagent 3. Litmus paper

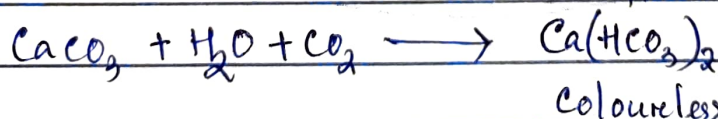
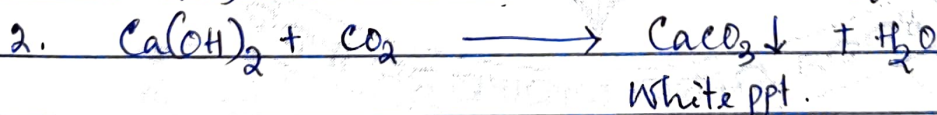
THEORY AND PROCEDURE :-

TEST FOR ACID RADICALS :

Test for Carbonate (CO_3^{2-}) :-

Experiment	Observation	Inference
1. 2 ml of dil. HCl was taken in a clean test tube. It was warmed and a little of the salt was added into it.	1. Effervescence took place with the evolution of a colourless, odourless gas.	1. It may be CO_2 from CO_3^{2-}
2. The above reaction mixture was warmed to get more gas and the gas was passed slowly through lime water.	2. First, lime water turned milky and with excess of the gas milkiness disappears.	2. CO_3^{2-} is confirmed.

Explanation for Carbonate Test :-



Test for Sulphide (S^{2-}) :-

Experiment	Observation	Inference
1. 2 ml of dil. HCl was taken in a clean test tube. It was warmed and a little of the salt was added into it.	1. Effervescence took place with the evolution of a colourless gas with rotten egg smell.	1. It may be H_2S from S^{2-} .

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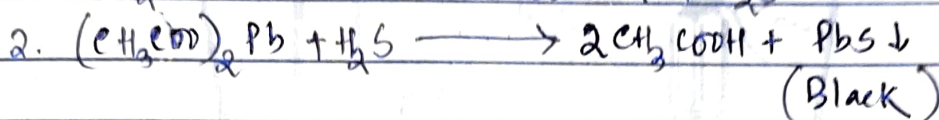
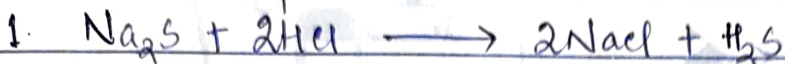
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2. The above reaction mixture was warmed and a filter paper soaked with lead acetate was shown to the evolved gas.

2. The filter paper turned black.

2. S^{2-} is confirmed.

Explanation for Sulphide Test :-



Test for Chloride (Cl^-) :-

Experiment	Observation	Inference
1. A pinch of salt was taken in a clean and dry test tube and 2 to 3 drops of conc. H_2SO_4 was added to it.	1. Effervescence took place with the evolution of a colourless gas which fumed in moist air.	1. It may be HCl from Cl^- .
2. The above reaction mixture was warmed and a glass rod dipped in conc. NH_4OH was shown to the mouth of test tube.	2. Dense white fumes were produced and white solid deposited on the tip of the glass rod.	2. It is due to the formation of NH_4Cl . Cl^- may be present.
3. A pinch of salt was taken in a clean and dry test tube, a little MnO_2 was added and 2 to 3 drops of conc. H_2SO_4 was added to it and then the reaction mixture was heated.	3. Greenish yellow gas was evolved which turned the filter paper soaked in starch iodide solution blue.	3. Chlorine gas comes out from chloride which liberates iodine from iodide.
4. 1-2 ml of the supplied salt solution was taken. It was acidified with 1-2 ml of dilute HNO_3 and few drops of $AgNO_3$	4. A curdy white ppt. was formed.	4. It is due to the formation of $AgCl$. Cl^- may be present.

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solution was added to it. 5. The above precipitate was washed with distilled water and divided into two parts. Part-I - dil. HNO_3 was added and was shaken well. Part-II - dil. NH_4OH was added and was shaken well.	5. Part-I - The precipitate did not dissolve Part-II - The precipitate dissolved.	5. AgCl is not soluble in dil. HNO_3 . AgCl is soluble in dil. NH_4OH due to the formation of silver diamine complex. Cl^- may be present.

Explanation for Chloride test :-

1. $\text{NaCl} + \text{H}_2\text{SO}_4 \longrightarrow \text{NaHSO}_4 + \text{HCl} \uparrow$
 $\text{NaCl} + \text{NaHSO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{HCl} \uparrow$
(Colourless gas)
2. $\text{NH}_4\text{OH} + \text{HCl} \longrightarrow \text{NH}_4\text{Cl} + \text{H}_2\text{O}$
(White fumes)
3. $2\text{NaCl} + \text{MnO}_2 + 2\text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{MnSO}_4 + \text{Cl}_2 \uparrow + 2\text{H}_2\text{O}$
(Greenish yellow gas)
4. $2\text{KI} + \text{Cl}_2 \longrightarrow 2\text{KCl} + \text{I}_2$
 $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{NaNO}_3 + \text{AgCl} \downarrow$
(White ppt.)
5. $\text{AgCl} + 2\text{NH}_4\text{OH} \longrightarrow [\text{Ag}(\text{NH}_3)_2]\text{Cl} + 2\text{H}_2\text{O}$
Diamino Silver(I) Chloride
Water soluble complex

Test for Nitrate (NO_3^-) :-

Experiment	Observation	Inference
1. A pinch of salt was taken in a clean and dry test tube. Few pieces of copper turnings was added and 4 to 5 drops of conc. H_2SO_4 was added & it was heated.	1. Copious brown fumes were evolved and the solution turned into green or bluish green.	1. Brown fume is due to NO_2 from NO_3^- salt.

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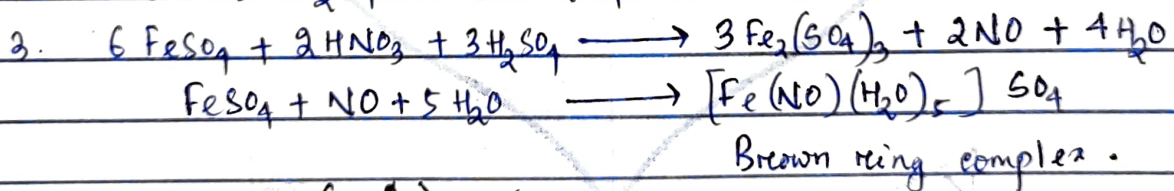
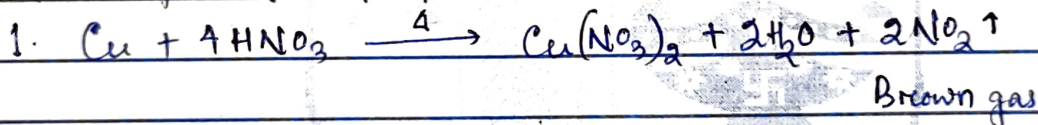
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2. A filter paper soaked in freshly prepared $FeSO_4$ solution was shown to the above brown gas.	2. The paper turned black.	2. May be NO_2^-
3. Brown Ring Test: 1-2 ml of the salt solution was taken. Equal volume of conc. H_2SO_4 was added slowly into the test tube. The test tube was cooled perfectly under tap. Then 2-3 ml of freshly prepared $FeSO_4$ solution was added slowly through the sides of test tube.	3. A brown ring was formed at the junction of the two liquid layers.	3. The brown ring is due to the formation of $[Fe(NO)]SO_4$. NO_2^- is confirmed.

Explanation for Nitrate Test:-



Test for Sulphate (SO_4^{2-}):

Experiment	Observation	Inference
1. About 1-2 ml of salt solution was taken. It was acidified with 1-2 ml of dil. HCl and about 1 ml of $BaCl_2$ solution was added.	1. A white precipitate was obtained.	1. SO_4^{2-} is confirmed
About 1 ml of conc. HCl was added to the above solution and warmed.	The ppt. was not soluble.	

Explanation for Sulphate Test:-

