SALT ANALYSIS

Analysis of anion

S.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Colour of the salt	Blue or bluish green	May be copper or nickel salt
		Green colour Light green	Nickel salt Presence of ferrous salt (Fe^{2+})
		Dark brown	Presence of ferric salt(Fe^{3+})
		Pink violet	May be cobalt salt
		Ligt pink or flesh colour	May be manganese salt
	Carbonate	Colourless/ white	Absence of Cu^{2+} Ni^{2+},Fe^{3+} Mn^{2+} and cobalt
2.	odour	Ammoniacal smell	Presence of ammonium (NH_4^+)
		Rotten egg smell	Presence of sulphide (S^{2-})
		No characteristic smell	Absence of NH_4^+ & S^{2-}
		Vinegar like smell	May be CH_3COO^-
3.	Appearance of salt	crystalline	May be sulphate, nitrate or chloride
		powdery	May be carbonate or sulphide
4.	Solubility: a little of the substance is shaken with water	Soluble	May be sulphate, nitrate or chloride
		insoluble	May be carbonate or sulphide
5.	Flame test: salt is made to a paste with 2 drops of con. HCl in a watch glass. The paste is introduced in a non luminous flame.	Bluish green flame	Presence of cu^{2+}
		Pale green flame	Presence of Ba^{2+}
		Brick red flame	Presence of Ca^{2+}
		Crimson	Presence of sr^{2+}
		No characteristic coloured flame	Absence of cu^{2+}, Ba^{2+}, Ca^{2+}, and sr^{2+}

SYSTEMATIC ANALYSIS OF ANION

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
6	Salt + dil H_2SO_4	1. colourless, odourless gas (CO_2)with brisk effervescence turning lime water milky	Presence of carbonate CO_3^{2-}
		2. colourless rotten egg smelling gas (H_2S)turning lead acetate paper black.	Presence of sulphide S^{2-}
		3. colourless gas (SO_2)turns acidified potassium dichromate paper green	May be SO_3^{2-} (sulphite)
		4. Reddish brown gas(NO_2) turns ferrous sulphate solution black	May be NO_2^-
		5. no characteristic change	Absence of CO_3^{2-} and S^{2-} SO_3^{2-} and NO_2^-
7.	Salt + con H_2SO_4	1. colourless gas (HCl)giving white fumes with ammonium hydroxide taken at the end of the glass rod.	Presence of chloride
		2. Reddish brown gas. (Br_2/ NO_2	Presence of NO_3^- / Br^-
		3. deep violet vapours (I_2)	Presence of iodide
		4 Colourless gas with vinegar like	Presence of acetate ion

		smell turns blue litmus red 5. colourless gas turns pink colour $KMnO_4$ into colourless 6. No characteristic change	Presence of oxalate ion Absence of Cl^-, Br^-, I^-, CH_3COO^-, and oxalate ion
8.	Copper turning test: Salt + con H_2SO_4 + cu turning + heat	Reddish brown gas No brown gas	Presence of Nitrate Absence of NO_3^-
9.	$BaCl_2$ test. Salt solution + barium chloride solution	White precipitate (undissolved in dil. HCl) White PPte dissolved in con. HCl No PPte	Presence of SO_4^{2-} Presence of SO_3^{2-} Absence of SO_4^{2-} & SO_3^{2-}
10	Ammonium molybdate test: Salt + Con.HNO_3 – heated and cooled, then added to excess of Ammonium molybdate	Yellow precipitate soluble in NH_3 No yellow PPte	PO_4^{3-} is present Absence of PO_4^{3-}
	For cation		
12	Nessler's reagent test Salt solution + Nessler's reagent	Reddish brown colour	NH_4^+ ion is present

Preparation of a sodium carbonate extract:

1g of the salt, 3g of sodium carbonate and 20 ml of water are taken in a beaker. Heated to boil and then filtered. The filtrate is sodium carbonate extract.

CONFIRMATORY TEST FOR ANIONS:

Confirmatory test for carbonates:

1	Salt solution + dil.HCl Pass this gas into lime water	Brisk effervescence Milky white precipitate	Carbonate is confirmed
2	Salt solution + magnesium sulphate	White precipitate	Carbonate is confirmed

Confirmatory test for sulphides

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt + dil H_2SO_4 and lead acetate paper is dipped + dil H_2SO_4	Lead acetate paper turns black	Sulphide is confirmed
2.	Salt solution + $CdCO_3$	Yellow precipitate	Sulphide is confirmed

Confirmatory test for sulphite:

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	$BaCl_2$ test. Salt solution + barium chloride solution	White precipitate (dissolved in dil. HCl)	Sulphite is confirmed
2.	Salt solution + $K_2Cr_2O_7$	Green colouration	Sulphite is confirmed

Confirmatory test for NO_2^-:

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt solution + dil aceticacid + $FeSO_4$ solution	A dark brown or black colouration	Nitrite is confirmed
2.	Salt solution + few drops of diPhenyamine	A deep blue colouration	NO_2^- is confirmed

Confirmatory test for-chloride:

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt solution +dil HNO3 boil and cool then add $AgNO_3$	Curdy white precipitate soluble in ammonium hydroxide	chloride is confirmed
2	Salt +solid MnO_2 + con. H_2SO_4	Greenish yellow gas having pungent smell.	chloride is confirmed
3	Chromyl chloride test: Salt + powdered Potassium dichromate + Con H_2SO_4 Heat the mixture and pass red vapours evolved in to NaOH solution To the yellow solution add dil acetic acid and lead acetate.	Yellow ppte	chloride is confirmed

Confirmatory test for bromide:

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt solution +dil HNO_3 boil and cool then add $AgNO_3$	Pale yellow precipitate	bromide is confirmed
2	Salt +solid MnO_2 + con. H_2SO_4	Reddish brown gas	bromide is confirmed

Confirmatory test for iodide:

s.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt solution +dil HNO_3 boil and cool then add $AgNO_3$	yellow precipitate soluble in ammonium hydroxide	iodide is confirmed
2	Salt +solid MnO_2 + con.	violet vapours	iodide is

	H_2SO_4		confirmed

Confirmatory test for nitrate:

S.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Brown ring test Salt solution is treated with a freshly prepared ferrous sulphate and con; sulphuric acid is added in drops along the sides of the test tube.	Brown ring is formed	nitrate is confirmed
2	Copper turning test Salt is heated with cu turnings and con. Sulphuric acid.	Dark brown gas fumes of nitrogen dioxide is evolved	nitrate is confirmed

Confirmatory test for sulphate

S.No.	EXPERIMENT	OBSERVATION	INFERENCE
1	Salt solution + Barium chloride solution	A white precipitate insoluble in acids	Sulphate is confirmed.
2	Salt solution + lead acetate	A white precipitate	Sulphate is confirmed

Confirmatory test for phosphate

S.No.	EXPERIMENT	OBSERVATION	INFERENCE

1	Salt + Con.HNO_3 – heated and cooled, then added to excess of Ammonium molybdate	Yellow precipitate soluble in NH_3	Phosphate is confirmed
2	Salt + Magnesia mixture	White precipitate	Phosphate is confirmed

* Confirmatory test for acetate:

1	Salt+$FeCl_3$ solution heat for 5 min and cool	Blood colour solution	Aectate is confirmed
2.	Ester test: salt + con sulphuric acid add ethyl alcohol. Warm in the water bath.	Fruity smell	Aectate is confirmed

* Confirmatory Test for oxalate:

1.	Salt solution + dil acetic acid + $CaCl_2$ solutrion	White precipitate	Oxalate is confirmed
2	Dissolve the part of white ppte in dil. H_2SO_4 and add $KMnO_4$ solution . Warm	Pink colour disappears	Oxalate is confirmed

X Test for Nitrite

1	Salt solution + dil acetic acid. Boil to expel CO_2 add solid KI and starch solution	Deep blue colour	NO_2^- is confirmed
2			