

SYSTEMATIC ANALYSIS OF GIVEN INORGANIC SIMPLE SALT(XI STD)**A. PRELIMINARY TESTS**

	EXPERIMENT	OBSERVATION	INFERENCE
1.	a)Colour: The Colour of given salt is noted.	Blue /Green	May be Copper salts
		Brown	May be an iron(ferric) salt
		Colorless	Absence of Copper and Iron Salts
	b)Appearance: The appearance of the given salt is noted.	a) Powder	May be carbonate or Sulphide.
		b) Crystalline	May be Sulphate, Nitrate, Chloride, Bromide or Phosphate.
	c) Solubility in water A little of the given salt is dissolved in distilled water in a test tube	a) Insoluble	May be Carbonate and Sulphide.
		b) Soluble	May be Sulphate, Nitrate, Chloride, Bromide or Phosphate.
2.	Action of heat : Little of the salt is heated in a dry test tube.	i) Reddish brown gas	May be Nitrate
		ii) Pungent smelling gas giving dense white fumes with glass rod dipped in conc. HCl	May be Ammonium
		iii) Yellow when hot, white when cooled.	May be Zinc
		No characteristic change	Absence of Nitrate, Ammonium and Zinc
3.	Flame test : Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the nonluminous part of the Bunsen flame using a glass rod.	i) Brick red flame	Presence of Calcium
		ii) Apple green flame	Presence of Barium
		iii) Bluish green flame	Presence of copper
		No characteristics flame	Absence of Calcium, Barium and Copper
4.	Action of dil.HCl: Take a small amount of salt in a test tube and add about 1mL of dil. HCl to it. Gently heat it in the Bunsen flame.	i) A colourless gas with brisk effervescence turning lime water milky is evolved.	Carbonate is confirmed
		ii) Rotten egg smelling gas turning lead acetate paper black.	Sulphide is confirmed
		iii) Reddish brown gas with the fishy odour turning a moist ferrous sulphate paper brown	Presence of Nitrate
		No characteristic change	Absence of Nitrate, Carbonate & Sulphide
5.	Action of Conc.H₂SO₄: Take a small amount of a salt in a dry test tube, add about 0.5mL of Conc. H ₂ SO ₄ and gently heat it in the Bunsen flame.	i) 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

		ii) A reddish brown gas turning moist fluorescein paper green evolves.	Presence of bromide
		Reddish brown gas turning acidified ferrous sulphate paper green evolves.	Presence of nitrate
		No characteristic change.	Absence of Chloride, Bromide, & Nitrate
6.	Action of MnO₂ and Conc. H₂SO₄: Take a small amount of salt in a test tube, add pinch of MnO ₂ and about 0.5mL of Conc. H ₂ SO ₄ and gently heat it in the Bunsen flame	i) A greenish yellow gas turning starch iodide paper blue evolves.	Presence of chloride
		ii) A reddish brown gas turning moist fluorescein paper red	Presence of Bromide
		No characteristic change.	Absence of Chloride, Bromide
7.	Action of Conc.H₂SO₄ Copper turning test: Take a small quantity of salt in a dry test tube and add few copper turnings and about 1mL of Conc. H ₂ SO ₄ . Gently heat it	Reddish brown gas	Presence of Nitrate
		No reddish brown gas	Absence of Nitrate
8.	Action of dil.NaOH: To a small quantity of a salt add about 1mL of dil. NaOH solution and gently heat it.	Pungent smelling gas giving dense white fumes with glass rod dipped in conc. HCl	Presence of Ammonium salt
		No pungent smelling gas	Absence of Ammonium salt
9.	Chromyl chloride test: Take a small quantity of salt in a test tube, add a pinch of potassium dichromate and three drops Conc. H ₂ SO ₄ . Gently heat it. Pass the vapours to enter another test tube containing about 0.5mL of sodium hydroxide. If a yellow solution is obtained, add about 1mL each of dil. acetic acid and lead acetate.	Red orange vapours evolved is passed through Lead acetate solution, yellow precipitate is formed.	Presence of Chloride is Confirmed
		No red orange vapours Evolved	Absence of Chloride

C. REACTIONS USING SODIUM CARBONATE EXTRACT

Preparation of Sodium Carbonate extract: A mixture of one part of given salt and three part of sodium carbonate is boiled with distilled water and filtered. The clear filtrate is called sodium carbonate extract.

S.N	EXPERIMENT	OBSERVATION	INFERENCE
10.	Test for halides: To about one mL of the sodium carbonate extract add dil. HNO_3 in drops with shaking until the effervescence ceases, and then add about 1mL of AgNO_3 , and shake it well.	i) Curdy white precipitate	Chloride is confirmed
		ii) A pale yellow precipitate	Bromide is confirmed
		iii) Black precipitate	Presence of Sulphide
		No characteristic precipitate	Absence of Chloride, Bromide and sulphide
11.	BaCl₂ test: To about one mL of the sodium carbonate extract, add dil. acetic acid in drops with shaking until the effervescence ceases, then add 1mL of barium chloride solution and shake it.	White precipitate insoluble in Conc.HCl	Sulphate is confirmed
		No white precipitate	Absence of Sulphate
12.	Lead acetate test: To about 1mL of the sodium carbonate extract, add 1mL of dil acetic acid and heat it , until the effervescence ceases, and then add 1mL of lead acetate	White precipitate soluble in ammonium acetate.	Presence of Sulphate
		No White precipitate	Absence of Sulphate
		No White precipitate	Absence of Chloride
13.	Brown Ring test: To about 1mL of the sodium carbonate extract add dil. H_2SO_4 in drops with shaking until the effervescence ceases and about 0.5mL of freshly prepared ferrous sulphate solution. Then keeping the test tube in a slanting position add Conc. H_2SO_4 along the sides of the test tube.	Brown ring is formed at the junction of the two liquids	Nitrate is confirmed
		No Brown ring	Absence of nitrate
14.	Ammonium molybdate test: To one portion of the extract , add dil HNO_3 until the effervescence ceases, then add about 1mL each of ammonium molybdate and Conc. HNO_3	A canary yellow precipitate is formed.	Phosphate is confirmed
		No yellow precipitate	Absence of Phosphate
15.	Test with sodium nitro bruside: To about 1mL of the sodium carbonate extract add 1mL of dil ammonia. Then add about few drops of sodium nitro bruside..	A purple or violet colouration appears	Sulphide is confirmed.
		No purple or violet colouration	Absence of Sulphide

ANALYSIS OF BASIC RADICALS.

Preparation of original solution:

The given salt is dissolved in distilled water. The solution obtained is known as original solution.

OR

The given salt is dissolved in dil.HCl or dil. HNO_3 . The solution obtained is known as original solution. (Only for CaCO_3 , MgCO_3 , CuCO_3 and ZnS)

GROUP SEPARATION

S.NO	EXPERIMENT	OBSERVATION	INFERENCE
1.	To about 1mL of the original salt solution, add about 1mL of Nessler's reagent and NaOH.	A chocolate brown ppt is obtained.	Presence of ammonium (0 Group)
2.	To about 1mL of the original salt solution, add about 1mL of dil. HCl and Shake it.	White precipitate is obtained.	Presence of I group Lead
		No White precipitate is obtained.	Absence of I group Lead
3.	To about 1mL of the original salt solution, add about 1mL of dil. HCl and H ₂ S gas is passed.	Black precipitate is obtained.	Presence of II group Cu
		No Black precipitate is obtained.	Absence of II group Cu
4.	To about 1mL of the original salt solution, add about 1mL of NH ₄ Cl and NH ₄ OH.	White precipitate is obtained.	Presence of III group Aluminium or Ferric iron
		No White precipitate is obtained.	Absence of III group Al, Fe
5.	To about 1mL of the original salt solution, add about 1mL of NH ₄ Cl, NH ₄ OH followed by H ₂ S gas is passed	Dirty white precipitate is obtained.	Presence of IV group Zinc
		No dirty white precipitate is obtained.	Absence of IV group Zinc
6.	To about 1mL of the original salt solution, add about 1mL each of NH ₄ Cl, NH ₄ OH and (NH ₄) ₂ CO ₃ .	White precipitate is obtained.	Presence of V group Barium or Calcium
		No White precipitate is obtained.	Absence of V group Ba, Ca
7.	To about 1mL of the original salt solution, add about 1mL each of NH ₄ Cl, NH ₄ OH and Na ₂ HPO ₄ (disodium hydrogen phosphate)	White precipitate is obtained.	Presence of VI group Mg
		No White precipitate is obtained.	Absence of VI group Mg

CONFIRMATORY TEST FOR BASIC RADICALS

S.NO	EXPERIMENT	OBSERVATION	INFERENCE
1.	Ammonium (Group 0) To about 1mL of the original salt solution add about 1mL each of Nessler's reagent and NaOH.	Brown precipitate is obtained.	Ammonium is confirmed
2.	Lead (Group I) To about 1mL of the original salt solution and 1mL of KI solution is added	Yellow precipitate is obtained.	Lead is confirmed
3.	Copper (Group II) To about 1mL of the original salt solution, add 1 ml of dil HCl and K ₄ [Fe(CN) ₆].	Red brown precipitate is obtained.	Copper is confirmed
4.	Aluminium (Group III) To about 1mL of the original salt solution add 1mL of aluminon reagent.	Red lake is obtained	Aluminium is confirmed

5. i)	Ferric (Group III) To about 1mL of the original salt solution add 1mL of potassium ferrocyanide ($K_4[Fe(CN)_6]$) is added.	Prussian blue is obtained.	Ferric iron is confirmed
ii)	Ferrous (Group III) To about 1mL of the original salt solution add 1mL of potassium ferricyanide ($K_3[Fe(CN)_6]$) is added.	Blue coloration is obtained.	Ferrous is confirmed
6.	Zinc (Group IV) To about 1mL of the original salt solution and add 1mL of $K_4[Fe(CN)_6]$	White precipitate is obtained.	Zinc is confirmed
7.	Barium (Group V) To about 1mL of the original salt solution and add 1mL of potassium chromate (K_2CrO_4) solution.	Yellow precipitate is obtained.	Barium is confirmed
8.	Calcium (Group V) To about 1mL of the original salt solution, add 1mL of NH_4OH and 1mL of $(NH_4)_2C_2O_4$ (Ammonium oxalate).	White precipitate is obtained.	Calcium is confirmed
9.	Magnesium (Group VI) To about 1mL of the original salt solution, add 1mL of $NaOH$ and Magneson Reagent.	Blue precipitate is obtained.	Magnesium is confirmed

Result: The given simple salt contains **Acid radical** _____

Basic radical _____

The given **simple salt** is _____