Exercise-1

ONLY ONE OPTION CORRECT TYPE

Section (A) : Dry test

1. When a metal sulphate is heated in dry test tube, the colour change from blue to white. Then metal sulphate may be :
(1) $BaSO_4$ (2) $CuSO_4.5H_2O$ (3) Na_2SO_4 (4) None of these

2. Which of the following can not evolve more than one gas (vapour) if heated in dry test tube.
(1) $NaNO_3(s)$ (2) $MgCO_3(s)$ (3) $FeSO_4(s)$ (4) $(NH_4)_2Cr_2O_7(s)$

3. On heating, a white amorphous inorganic compound becomes yellow and on cooling, turns white again.The salt may be
(1) $PbCO_3$ (2) $MgCO_3$ (3) $ZnCO_3$ (4) K_2CO_3

4. Which of the following metal carbonates liberate. $CO_2(g)$ on heating :
(1) Na_2CO_3 (2) K_2CO_3 (3) Rb_2CO_3 (4) Ag_2CO_3

5. In which of the following reactions a brown coloured gas is evolved ?
(1) $KBr\ (s) + dil.H_2SO_4 \longrightarrow$ (2) $NH_4NO_2 \xrightarrow{\Delta}$
(3) $NaNO_3 \xrightarrow[800\,^oC]{\Delta}$ (4) $AgNO_3(s) + conc.\ H_2SO_4 \longrightarrow$

Section (B) : Flame and borax bead test

1. Why is concentracted HCl used to dissolve the given metal salt in the flame test ?
(1) strong acids produce better flame test.
(2) HCl is volatile
(3) Volatile metal chloride produce better flame test.
(4) sharper coloured are seen in the flame in presence of Cl^- ions.

2. The hottest part of the flame of a Bunsen burner is the
(1) Blue Zone (2) Zone of complete combustion
(3) Zone fo partial combustion (4) All parts of the flame are equally hot.

3. Metal (M) shows crimson red colour in flame test and its halide is deliquescent then metal (M) could be
(1) Li (2) Mg (3) Ca (4) Ba

4. In Borax bead test, metal oxides react with B_2O_3 and form a coloured bead. This bead contains.
(1) orthoborate ion (2) metaborate ion (3) double oxide (4) tetraborate ion

5. Which one of the following ion does not give borax bead test :
(1) Cr^{3+} (2) Cu^{2+} (3) Mn^{2+} (4) Zn^{2+}

6. In the Borax bead test test of Co^{2+}, the blue colour of bead is due to the formation of :
(1) B_2O_3 (2) Co_3B_2 (3) $Co(BO_2)_2$ (4) CoO

Section (C) : Dilute H_2SO_4 group

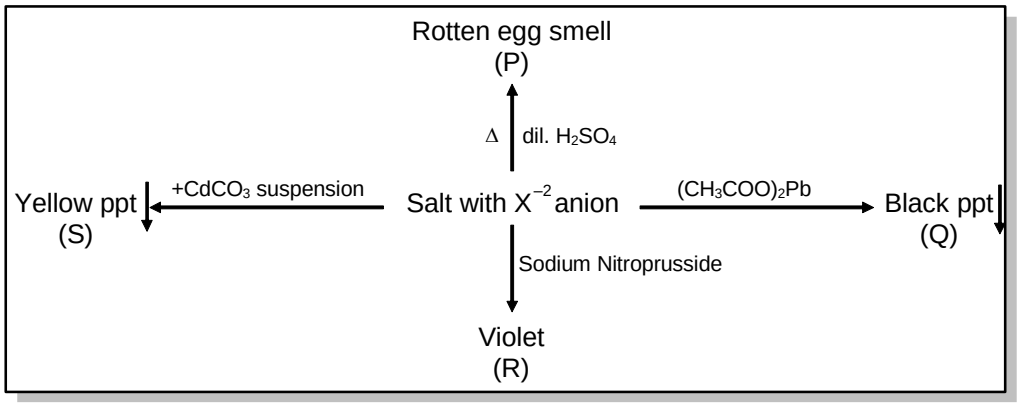
1. The carbonate of which of the following cation is insoluble in water ?
(1) Cs^+ (2) K^+ (3) NH_4^+ (4) Ba^{2+}

2. A substance on treatment with dilute H_2SO_4 liberates a colourless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green. The reaction indicates the presence of :
(1) CO_3^{2-} (2) S^{2-} (3) SO_3^{2-} (4) NO_2^-

3. A mixture when rubbed with dilute acid smells like vinegar. It contains :
(1) sulphite (2) nitrate (3) nitrite (4) acetate

4. When a salt is heated with dilute H_2SO_4 and $KMnO_4$ solution, the pink colour of $KMnO_4$ is discharged, the salt is :
(1) a sulphite (2) a carbonate (3) a nitrate (4) a bicarbonate

5.



Anion (X^{-2}) is:
(1) CO_3^{2-} (2) SO_3^{2-} (3) S^{2-} (4) $S_2O_3^{2-}$

Section (D) : Concentrated H_2SO_4 group

1. When a mixture of solid NH_4Cl, solid $K_2Cr_2O_7$ is heated with concentrated H_2SO_4, deep red vapours are obtained. This is due to the formation of :
(1) chromous chloride (2) chromyl chloride (3) chromic chloride (4) chromic sulphate

2. AgCl dissolves in ammonia solution giving :
(1) Ag^+, NH_4^+ and Cl^- (2) $Ag(NH_3)^+$ and Cl^- (3) $Ag_2(NH_3)^{2+}$ and Cl^- (4) $Ag(NH_3)_2^+$ and Cl^-

3. A solution of a salt with concentrated H_2SO_4 acid produces violet colour vapours which turns starch paste blue. The salt may be :
(1) chloride (2) nitrate (3) bromide (4) iodide

4. Nitrate is confirmed by ring test. The brown colour of the ring is due to formation of :
(1) ferrous nitrite (2) nitroso ferrous sulphate
(3) ferrous nitrate (4) $FeSO_4.NO_2$.

5. An inorganic salt when heated with concentrated H_2SO_4 evolves a colourless pungent smelling gas but with concentrated H_2SO_4 and MnO_2 evolves a coloured pungent smelling gas which bleaches moist litmus paper. The coloured gas is :
(1) NO_2 (2) Cl_2 (3) Br_2 (4) I_2

6. Chromyl chloride vapours are dissolved in water and acetic acid and barium acetate solution is added, then:
(1) the solution will remain colourless. (2) the solution will become dark green.
(3) a yellow solution will be obtained. (4) a yellow precipitate will be obtained.

7. When CS_2 layer containing both Br_2 and I_2 (2 : 1) is shaken with excess of chlorine (Cl_2) water, the violet colour due to I_2 disappears and a pale yellow colour appears in the solution. The disappearance of violet colour and appearance of pale yellow colour is due to the formation of :
(1) I_3^- and Br_2 respectively. (2) HIO_3 and BrCl respectively.
(3) ICl and BrCl respectively. (4) I^- and Br^- respectively.

Section (E) : Precipitation Reactions

1. Which one of the following reagents gives white precipitated with SO_4^{2-} ions?
(1) $Ba(NO_3)_2$ (2) NH_4NO_3 (3) $NaNO_3$ (4) $Be(NO_3)_2$

2. A metal salt solution gives a yellow ppt. with silver nitrate. The ppt. dissolves in dil. Nitric acid as well as in ammonium hydroxide. The solution contains.
(1) Br^- (2) I^- (3) PO_4^{3-} (4) SO_4^{2-}

Section (F) : zero Group

1. Nessler's reagent is :
(1) K_2HgI_4 (2) K_2HgI_4 + KOH (3) $K_2Hg\ I_2$ + KOH (4) K_2HgI_4 + KI

2. NH_4Cl + Nessler's reagent $\xrightarrow{KOH}$ Brown precipitate (X).
Chemical composition of (X) is :
(1) $Hg(NH_2)Cl$ (2) $Hg(NH_2)Cl$ + Hg (3) $HgO.Hg(NH_2)I$ (4) $HgO.Hg(NH_2)NO_3$

3. Ammonium salts on heating with slaked lime liberates a colourless gas (X). Identify the incorrect statement for gas (X).
(1) (X) turns red litmus blue and produces dense white fumes in contact with dilute HCl.
(2) (X) turns filter paper moistened with mercurous nitrate black.
(3) (X) when passed through Nessler's reagent produces a black colour precipitate.
(4) (X) gives intense blue coloured solution with aqueous solution of $CuSO_4$.

Section (G) : Ist Group

1. Group reagent for Ist group radicals is :
(1) KCl (concentrated) (2) HCl (concentrated) (3) HCl (dilute) (4) none of these

2. Cu^{2+} and Ag^+ both are present in the same solution . To precipitate one of the ions and leaves the other in solution, add :
(1) H_2S (aq) (2) HCl (aq) (3) HNO_3(aq) (4) NH_4NO_3(aq)

3. Consider the following observation :
M^{n+} + HCl (dilute) $\longrightarrow$ white precipitate $\xrightarrow{\Delta}$ water soluble $\xrightarrow{CrO_4^{2-}}$ Yellow precipitate.
The metal ion M^{n+} will be :
(1) Hg^{2+} (2) Ag^+ (3) Pb^{2+} (4) Sn^{2+}

4. Identify the compound which turns black with ammonia solution.
(1) Lead chloride (2) Mercurous chloride (3) Mercuric chloride (4) Silver chloride

5. Three separate samples of a solution of a single salt gave these results. One formed a white precipitate with excess ammonia solution, one formed a white precipitate with dilute NaCl solution and one formed a black precipitate with H_2S. The salt could be
(1) $AgNO_3$ (2) $Pb(NO_3)_2$ (3) $Hg(NO_3)_2$ (4) $Mn(NO_3)_2$

6. A metal nitrate solution does not give white precipitate with concentrated hydrochloric acid but on dilution with water produces a white precipitate. The metal nitrate solution with K_2CrO_4 and Na_2HPO_4 reagents gives red and yellow precipitates respectively which are soluble in ammonia solution. The cation of the metal nitrate is :
(1) Pb^{2+} (2) Ag^+ (3) Cu^{2+} (4) Bi^{3+}

Section (H) : IInd Group

1. H_2S in the presence of HCl precipitates II group but not IV group because
(1) HCl activates H_2S (2) HCl increases concentration of Cl^-
(3) HCl decreases concentration of S^{2-} (4) HCl lowers the solubility of H_2S in solution

2. Which of the following metal ions is precipitated when H_2S gas is passed in presence of HCl?
(1) Co^{2+} (2) Al^{3+} (3) Bi^{3+} (4) Mn^{2+}

3. Which compound does not dissolve in hot 50% HNO_3?
(1) AgS (2) CuS (3) Bi_2S_3 (4) HgS

4. A metal chloride original solution (i.e. O.S) on mixing with K_2CrO_4 solution gives a yellow precipitate soluble in aqueous sodium hydroxide. The metal may be :
(1) mercury (2) Iron (3) silver (4) lead

5. When small amount of $SnCl_2$ is added to a solution of Hg^{2+} ions, a silky while precipitate is obtained. The silky white precipitate is due to the formation of :
(1) Hg_2Cl_2 (2) $SnCl_4$ (3) Sn (4) Hg

6. When excess of dilute NH_4OH is added to an aqueous solution of copper sulphate an intense blue colour is developed. This is due to the formation of :
(1) $[Cu(NH_3)_6]^{2+}$ (2) $Cu(OH)_2$ (3) $[Cu(NH_3)_4]^{2+}$ (4) $(NH_4)_2SO_4$

7. Precipitation of II group cations takes place when H_2S gas passed is : (in presence of dilute HCl)
(1) highly ionised (2) not ionised (3) less ionised (4) none of these

8. Which one among the following pairs of ions can not be separated by H_2S in presence of dilute hydrochloric acid ?
(1) Cd^{2+}, Sn^{2+} (2) Al^{3+}, Hg^{2+} (3) Zn^{2+}, Cu^{2+} (4) Ni^{2+}, Bi^{3+}

9. Which of the following metal cation is reduced from its higher oxidation state (+2) to (+1) by both KI solution and excess of KCN solution ?
(1) Zn^{2+} (2) Hg^{2+} (3) Cu^{2+} (4) None

10. A metal nitrate solution (X) responds to the following tests.
(I) It gives blue precipitate with cold solution of sodium hydroxide.
(II) It gives brown precipitate with potassium ferrocyanide.
(III) It gives intense brown colour solution containing white precipitate with potassium iodide solution.
The cation of metal nitrate (X) is :
(1) Fe^{3+} (2) Cu^{2+} (3) NH_4^+ (4) Ni^{2+}

Section (I) : IIIrd Group

1. When NH_4Cl is added to a solution of NH_4OH :
(1) the dissociation of NH_4OH increases.
(2) the concentration of OH^- increases.
(3) the concentrations of both OH^- and NH_4^+ increase.
(4) the concentration of OH^- ion decreases.

2. The solution of sodium meta aluminate on diluting with water and then boiling with ammonium chloride gives:
(1) $[Al(H_2O)_5OH]^{2+}$ (2) $AlCl_3$ (3) $Al(OH)_3$ (4) $NaAl(OH)_4$

3. Which one among the following is insoluble in excess of NaOH solution?
(1) $Al(OH)_3$ (2) $Zn(OH)_2$ (3) $Fe(OH)_3$ (4) $Pb(OH)_2$

4. Prussian blue is a ..... .
(1) Ferricyanide (2) Ferrous ferricyanide (3) Ferrous cyanide (4) Ferri ferrocyanide

5. Concentrated nitric acid is added before proceeding to test for group III members. This is to :
(1) oxidise any remaining H_2S.
(2) convert ferrous ions to ferric ions as K_{sp} of Fe (II) hydroxide is higher.
(3) form nitrates which gives granular precipitate.
(4) increase ionisation of ammonium hydroxide.

6. Concentrated sodium hydroxide can separate a mixture of :
(1) Al^{3+} and Cr^{3+} (2) Cr^{3+} and Fe^{3+} (3) Al^{3+} and Zn^{2+} (4) Cu^{2+} and Mn^{2+}

7. Which one of the following is not correctly matched?
(1) $[Fe(H_2O)_5SCN]^{2+}$ – deep blue solution (2) $[Cu(NH_3)_4]^{2+}$ – deep blue solution
(3) $Fe[Fe(CN)_6]$ – brown solution (4) $[Ni(CN)_4]^{2-}$ – yellow solution

8. What product is formed by mixing the solution of K_4 $[Fe(CN)_6]$ with the solution of $FeCl_2$ in complete absence of air ?
(1) Ferro ferricyanide (2) Ferric ferrocyanide (3) Ferric ferricyanide (4) None

9. An original solution of an inorganic salt in dilute HCl gives a brown colouration with potassium hexacyanidoferrate (III) and reddish brown colouration with sodium acetate solution. The cation of the salt is :
(1) Ni^{2+} (2) Fe^{3+} (3) Cu^{2+} (4) none

10. Select the correct statement with respect to Fe^{3+} ions.
(1) Iron (III) ions react with H_2S in acidic solution to give a black precipitate of Fe_2S_3.
(2) Iron (III) ions react with ammonium sulphide to give the black precipitate of Fe_2S_3.
(3) Iron (III) ions react with ammonium thiocyanate solution to produce deep red colouration.
(4) All of these

Section (J) : IVth Group

1. In qualitative analysis Ni is under :
(1) IInd group (2) IIIrd group (3) IVth group (4) VIth group

2. Which of the following sulphides is buff coloured i.e. light pink coloured?
(1) ZnS (2) MnS (3) NiS (4) CdS

3. Which one of the following sulphide is white?
(1) MnS (2) ZnS (3) HgS (4) CdS

4. HgS can be separated from ZnS by treating with :
(1) HCl (2) NaOH (3) aqua-regia (4) NH_3

5. A metal salt solution when treated with potassium cyanide solution, a green precipitate is obtained. The metal is :
(1) Ni (2) Zn (3) Co (4) Mn.

6. An aqueous solution of colourless metal sulphate M, gives a white precipitate with NH_4OH. This was soluble in excess of NH_4OH. On passing H_2S through this solution a white precipitate is formed. The metal M in the salt is :
(1) Ca (2) Ba (3) Al (4) Zn

7. Which one of the following cation will give a green coloured ash when a piece of filter paper dipped in a solution containing its salt and $Co(NO_3)_2$ is burned ?
(1) Cu^{2+} (2) Mg^{2+} (3) Al^{3+} (4) Zn^{2+}

8. $Zn(OH)_2\downarrow$ is soluble in :
(1) excess of sodium hydroxide (2) excess of ammonia solution
(3) solutions of ammonium salts (4) all of these

9. A dilute solution of manganese(II) nitrate and lead dioxide is boiled with a little concentrated nitric acid. A coloured compound (X) is formed. Compound (X) is :
(1) H_2MnO_4 (2) $HMnO_4$ (3) Pb_3OH (4) MnO_2

10. An aqueous solution of a substance (X) gives a black precipitate on treatment with H_2S gas in presence of NH_4OH and NH_4Cl which dissolves in aqua regia on heating. The ammonical solution of substance (X) gives red precipitate with dimethylglyoxime. The substance (X) is :
(1) Cu^{2+} salt (2) Fe^{3+} salt (3) Ni^{2+} salt (4) Pb^{2+} salt

11. Concentrated solution of sodium hydroxide in water can separate a mixture of :
(1) Zn^{2+} and Pb^{2+} (2) Al^{3+} and Pb^{2+} (3) Pb^{2+} and Ni^{2+} (4) Al^{3+} and Zn^{2+}

12. $NiCl_2 + KCN \underset{\text{excess}}{\longrightarrow}$ [Yellow colour solution] $\xrightarrow{NaOH+Br_2 \text{ water}}$ " X " ppt
Colour of precipitate of " X " is :
(1) green (2) black (3) yellow (4) Redidish Brown

Section (K) : Vth and VIth Group

1. In fifth group, $(NH_4)_2CO_3$ is added to precipitate out the carbonates in presence of NH_4Cl. We do not add Na_2CO_3 because :
(1) $CaCO_3$ is soluble in Na_2CO_3
(2) Na_2CO_3 increases the solubility of fifth group carbonates
(3) $MgCO_3$ will be precipitated out in fifth group
(4) $Mg(OH)_2$ will be precipitated

2. $K_4[Fe(CN)_6]$ can be used to detect one or more out of Fe^{2+} , Fe^{3+}, Zn^{2+}, Cu^{2+}, Ag^+ , Ca^{2+} :
(1) Only Fe^{2+}, Fe^{3+} (2) Only Fe^{3+},Zn^{2+},Cu^{2+} (3) All but not Ca^{2+} (4) All of these.

3. If crimson flame is given when an inorganic mixture is tested by flame test, it may be due to the presence of
(1) potassium (2) strontium (3) barium (4) calcium

4. A brick red colour is imparted to Bunsen flame by a :
(1) Ca salt (2) Sr salt (3) Na salt (4) Co salt

5. The presence of magnesium is confirmed in the qualitative analysis by :
(1) titan yellow solution + 2M NaOH solution (2) disodium hydrogen phosphate +NH_4Cl + NH_3 (aq.)
(3) magneson(I) reagent (4) all of these

6. Which of the following solution gives white precipitate with $Pb(NO_3)_2$ as well as with $Ba(NO_3)_2$?
(1) Sodium chloride (2) Sodium sulphate (3) Potassium iodide (4) All of these

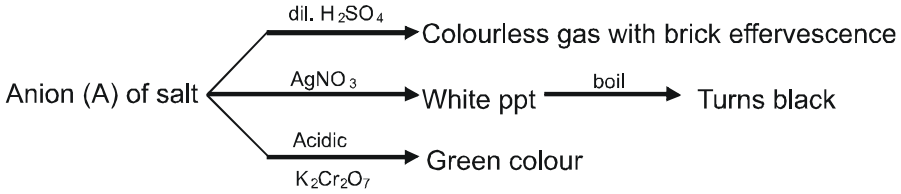
7. An aqueous solution of salt gives white precipitate with $AgNO_3$ solution as well as with dilute H_2SO_4. It may be :
(1) $Pb(NO_3)_2$ (2) $Ba(NO_3)_2$ (3) $BaCl_2$ (4) $CuCl_2$

8. Select the correct statement with respect to Ca^{2+} ions.
(1) K_2CrO_4 gives white precipitate in the presence of acetic acid.
(2) Potassium hexacyanidoferrate (II) solution gives white precipitate.
(3) Ammonia solution gives white precipitate.
(4) Prolonged passage of carbon dioxide gas through its aqueous solution produces white precipitate.

9. Potassium chromate solution is added to an aqueous solution of a metal chloride. The precipitate thus obtained is insoluble in acetic acid. The precipitate is subjected to flame test, the colour of the flame is :
(1) lilac (2) apple green (3) crimson red (4) brick red

Exercise-2

1.



Shape of anion A will be :
(1) Tetrahedral (2) Trigonal planner
(3) Trigoanl pyramidal (4) Linear

2. A substance responds to the following reactions :
(i) substance + Hg^{2+} ions $\longrightarrow$ red precipitate
(ii) substance + Pb^{2+} ions $\longrightarrow$ yellow precipitate
(iii) substance + Bi^{3+} ions $\longrightarrow$ black precipitate
(iv) substance + Cu^{2+} ions $\longrightarrow$ white precipitate in brown solution
The anion present in the substance is :
(1) Br^- (2) I^- (3) NO_3^- (4) SO_3^{2-}

3. How do we differentiate between Br^- and I^- ?
(1) By adding silver nitrate solution.
(2) By adding lead acetate solution.
(3) By adding first silver nitrate solution and then sodium arsenite solution.
(4) By adding dilute H_2SO_4.

4. Match column-I with column-II and select the correct answer using the codes given below :

	Column-I (Basic radicals)		**Column-II (Group number)**
(1)	Pb^{2+}	(p)	II
(2)	Cu^{2+}	(q)	III
(3)	Al^{3+}	(r)	I
(4)	Zn^{2+}	(s)	IV

	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
(1)	(q)	(p)	(r)	(s)	(2)	(p)	(q)	(r)	(s)
(3)	(p)	(r)	(q)	(s)	(4)	(r)	(p)	(q)	(s)

5. Match column-I with column-II and select the correct answer using the codes given below.

	Column-I (Salts)		**Column-II (Colour of flame)**
(1)	Cu^{2+} salts	(p)	Brick red
(2)	Ca^{2+} salts	(q)	Apple green or yellowish-green
(3)	Ba^{2+} salts	(r)	Bluish green or green
(4)	Sr^{2+} salts	(s)	Crimson

	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
(1)	(q)	(p)	(r)	(s)	(2)	(r)	(p)	(q)	(s)
(3)	(p)	(r)	(q)	(s)	(4)	(p)	(q)	(r)	(s)

6. Which of the following compound is formed in borax bead test ?
(1) Orthoborate (2) Metaborate (3) Double oxide (4) Tetraborate

7. An inorganic compound 'A' is dissolved in dilute hydrochloric acid and is then warmed. A colourless gas 'B' is produced. When a filter paper moistened with potassium iodate and the starch solution is exposed to the gas it turns blue. The gas B and the compound A are :
(1) SO_2 and Na_2SO_3 (2) SO_3 and Na_2SO_4 (3) H_2S and Na_2S (4) H_2S and Na_2SO_3

8. Consider following reaction ; Nitrite + Acetic acid + Thiourea $\longrightarrow$ $N_2\uparrow + SCN^- + 2H_2O$. Formation of the product in the above reaction can be identified by :
(1) $FeCl_3$ / dilute HCl when blood red colour appears.
(2) $FeCl_3$ / dilute HCl when blue colour appears.
(3) $K_2Cr_2O_7$ / HCl when green colour appear.
(4) $KMnO_4$ / HCl when colourless solution is formed.

9. A mixture of two colourless substances was dissolved in water. When gaseous Cl_2 was passed through the solution, containing small quantity of CCl_4 a violet colour developed in organic layer. Addition of $BaCl_2$ to the original solution give a white precipitate. The mixture contains :
(1) salts of nitrate and chloride. (2) salts of bromide and chloride.
(3) salts of iodide and sulphate. (4) salts of sulphate and chloride.

10. Which one among the following pairs of ions cannot be separated by H_2S in dilute hydrochloric acid ?
(1) Bi^{3+}, Sn^{4+} (2) Al^{3+}, Hg^{2+} (3) Zn^{2+}, Cu^{2+} (4) Ni^{2+}, Cu^{2+}

11. Sometimes yellow turbidity appears while passing H_2S gas even in slightly acidic medium the absence of II group radicals. This is because of :
(1) sulphur is present in the mixture as impurity.
(2) IV group radicals are precipitated as sulphides.
(3) the oxidation of H_2S gas by some acid radicals.
(4) III group radicals are precipitated as hydroxides.

12. The reagents, NH_4Cl and aqueous NH_3 will precipitate :
(1) Ca^{2+} (2) Al^{3+} (3) Mg^{2+} (4) Zn^{2+} .

13. A suspension containing insoluble substances ZnS, MnS, HgS, Ag_2S and FeS, is treated with 2N HCl. On filtering, the filtrate contains appreciable amounts of which one of the following?
(1) zinc and mercury (2) silver and iron
(3) manganese and mercury (4) zinc, manganese and iron

14. A metal salt solution forms a yellow precipitate with potassium chromate in acetic acid, a white precipitate with dilute sulphuric acid, but gives no precipitate with sodium chloride or iodide, it is :
(1) lead carbonate (2) basic lead carbonate
(3) barium carbonate (4) strontium carbonate

15. Mg is not precipitated in V group because :
(1) $MgCO_3$ is soluble in water. (2) K_{sp} of $MgCO_3$ is high.
(3) $MgCO_3$ is soluble in NH_4OH. (4) None.

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

1. In the separation of Cu^{2+} and Cd^{2+} in 2nd group qualitative analysis of cations, tetrammine copper (II) sulphate and tetrammine cadmium (II) sulphate react with KCN to form the coresponding cyano complexes. Which one of the following pairs of the complexes and their relative stability enables the separation of Cu^{2+} and Cd^{2+} ? **[AIPMT 2000]**

(1) $K_3[Cu(CN)_4]$ more stable and $K_2[Cd(CN)_4]$ less stable

(2) K_2 $[Cu(CN)_4]$ less stable and K_2 $[Cd(CN)_4]$ more stable

(3) $K_2[Cu(CN)_4]$ more stable and $K_2[Cd(CN)_4]$ less stable

(4) $K_3[Cu(CN)_4]$ less stable and $K_2[Cd(CN)_4]$ more stable

2. The metal ion which is precipitated when H_2S is passed with HCl : **[AIPMT 2001]**

(1) Zn^{2+} (2) Ni^{2+} (3) Cd^{2+} (4) Mn^{2+}

3. In boraxs bead test which compound is formed ? **[AIPMT 2002]**

(1) Orthoborate (2) Metaborate (3) Doubleoxide (4) Tetraborate

4. When H_2S gas is passed in a metal sulphate solution in presence of NH_4OH, a white precipitate is produced. The metal is identified as : **[AIPMT 2003]**

(1) Zn (2) Fe (3) Pb (4) Hg

5. H_2S gas when passed through a solution of cations containing HCl precipitates the cations of second group of qualitative analysis but not those belonging to the fourth group. It is because : **[AIPMT 2005]**

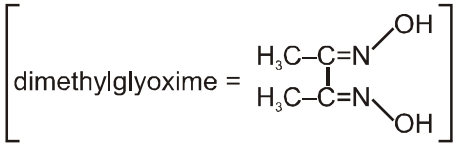
(1) presence of HCl decreases the sulphide ion concentration.

(2) presence of HCl increases the sulphide ion concentration.

(3) solubility product of group II sulphides is more than that of group IV sulphides.

(4) sulphides of group IV cations are unstable in HCl.

6. Red precipitate is obtained when ethanol solution of dimethylglyoxime is added to ammoniacal Ni(II). Which of the following statements is not true ? **[AIPMT 2012]**



(1) Red complex has a square planar geometry.

(2) Complex has symmetrical H-bonding

(3) Red complex has a tetrahedral geometry.

(4) Dimethylglyoxime functions as bidentate ligand.

7. In Duma's method for estimation of nitrogen 0.25g of an organic compound gave 40 mL of nitrogen collected at 300 K temperature and 725 mm pressure. If the aqueous tension at 300 K is 25 mm, the percentage of nitrogen in the compound is : **[AIPMT 2015]**

(1)18.20 (2) 16.76 (3) 15.76 (4) 17.36

8. $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed is **[NEET 2017]**

(1) HgI_2, I_3^- (2) HgI_2, I^- (3) HgI_4^{2-}, I_3^- (4) Hg_2I_2, I^-

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

1. Which of the following metal sulphides has maximum solubility in water ? **[AIIMS 2001]**
(1) HgS $K_{SP} = 10^{-54}$ (2) CdS $K_{SP} = 10^{-30}$ (3) FeS $K_{SP} = 10^{-20}$ (4) ZnS $K_{SP} = 10^{-22}$

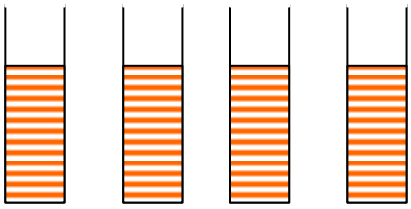
2. When H_2S gas is passed through the HCl containing aqueous solution of $CuCl_2$, $HgCl_2$, $BiCl_3$ and $CoCl_2$, it does not precipitate out : **[AIIMS 2007]**
(1) CuS (2) HgS (3) Bi_2S_3 (4) CoS

3. With $K_4[Fe(CN)_6]$, Cu^{2+} ions gives : **[AIIMS 2007]**
(1) a blue ppt. (2) a bluish green ppt. (3) a blood red ppt. (4) a reddish brown ppt.

4. S^{2-} and S_3^{2-} can be distinguished by using : **[AIIMS 2008]**
(1) $(CH_3COO)_2Pb$ (2) $Na_2[Fe(CN)_5NO]$ (3) both (1) and (2) (4) None of these

5. **Assertion :** In the third group of qualitative analysis, NH_4Cl is added to NH_4OH medium. **[AIIMS 2014]**
Reason : This is to convert the ions of group into their respective chlorides.
(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is not correct explanation of A
(3) A is true but R is false
(4) A and R are false

6. H_2S gas passed in all the following test tube so that precipitation is observed so which is correct match :



Yellow Black Orange Brown

Cu, Sb Zn, Cd, Pb, Sn, Ni **[AIIMS 2018]**
(1) Cd – Black (2) Sb – orange (3) Ni – Yellow (4) Zn – Brown

7. **Assertion :** Fe^{+3} is not valid for Brown Ring Test. **[AIIMS 2018]**
Reason : Because NO_3^- first convert into NO_2^-
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If both assertion and reason are false.

8. $KMnO_4$ is added to KOH, which of the following colour is observed **[AIIMS 2018]**
(1) Pale pink (2) Brown (3) Black (4) Green

9. Which compound do not react in dilute HCl at high temperature. **[AIIMS 2018]**
(1) $SnSO_4$ (2) $PbSO_4$ (3) BioCl (4) $CdSO_4$

10. Blue colour disappears in which solution by passing SO_2 **[AIIMS 2018]**
(1) CrO_4^{2-} , + H_2SO_4 (2) I_2 + Starch (3) $CuSO_4$ (4) I_2

PART - III : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

1. How do we differentiate between Fe^{3+} and Cr^{3+} in group IIIrd ? **[AIEEE 2002]**

(1) By adding excess of NH_4OH solution. (2) By increasing NH_4^+ ion concentration.

(3) By decreasing OH^- ion concentration. (4) Both (2) and (3).

2. Which one of the following statement is correct ? **[AIEEE 2003]**

(1) From a mixed precipitate of AgCl and AgI, ammonia solution dissolves only AgCl.

(2) Ferric ions gave a deep green precipitate on adding potassium ferrocyanide solution.

(3) On boiling a solution having K^+, Ca^{2+} and HCO_3^- ions we get a precipitate of $K_2Ca(CO_3)_2$.

(4) Manganese salts give a violet borax bead test in the reducing flame .

3. A red solid is insoluble in water. However it becomes soluble if some KI is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of a metal appear on the cooler parts of the test tube. The red solid is : **[AIEEE 2003]**

(1) $(NH_4)_2 Cr_2O_7$ (2) HgI_2 (3) HgO (4) Pb_3O_4.

4. Which of the following compounds is **not** colored yellow ? **[JEE-Main 2015]**

(1) $Zn_2[Fe(CN)_6]$ (2) $K_3[Co(NO_2)_6]$ (3) $(NH_4)_3[As(Mo_3O_{10})_4]$ (4) $BaCrO_4$

5. Sodium salt of an organic acid 'X' produces effervescence with conc. H_2SO_4. 'X' reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. 'X' is : **[JEE-Main 2017]**

(1) HCOONa (2) CH_3COONa (3) $Na_2C_2O_4$ (4) C_6H_5COONa

Answers

EXERCISE - 1

SECTION (A)

1.	(2)	**2.**	(2)	**3.**	(3)	**4.**	(4)	**5.**	(4)			

SECTION (B)

1.	(3)	**2.**	(2)	**3.**	(1)	**4.**	(2)	**5.**	(4)	**6.**	(3)	

SECTION (C)

1.	(4)	**2.**	(3)	**3.**	(4)	**4.**	(1)	**5.**	(3)			

SECTION (D)

1.	(2)	**2.**	(4)	**3.**	(4)	**4.**	(2)	**5.**	(2)	**6.**	(4)	**7.**	(2)

SECTION (E)

1.	(1)	**2.**	(3)									

SECTION (F)

1.	(2)	**2.**	(3)	**3.**	(3)							

SECTION (G)

1.	(3)	**2.**	(2)	**3.**	(3)	**4.**	(2)	**5.**	(2)	**6.**	(2)	

SECTION (H)

1.	(3)	**2.**	(3)	**3.**	(4)	**4.**	(4)	**5.**	(1)	**6.**	(3)	**7.**	(3)
8.	(1)	**9.**	(3)	**10.**	(2)							

SECTION (I)

1.	(4)	**2.**	(3)	**3.**	(3)	**4.**	(2)	**5.**	(2)	**6.**	(2)	**7.**	(1)
8.	(4)	**9.**	(2)	**10.**	(3)							

SECTION (J)

1.	(3)	**2.**	(2)	**3.**	(2)	**4.**	(1)	**5.**	(1)	**6.**	(4)	**7.**	(4)
8.	(4)	**9.**	(2)	**10.**	(3)	**11.**	(3)	**12.**	(2)				

SECTION (K)

1.	(3)	**2.**	(4)	**3.**	(2)	**4.**	(1)	**5.**	(4)	**6.**	(2)	**7.**	(3)
8.	(2)	**9.**	(2)									

EXERCISE - 2

1.	(3)	**2.**	(2)	**3.**	(2)	**4.**	(4)	**5.**	(2)	**6.**	(2)	**7.**	(1)
8.	(1)	**9.**	(3)	**10.**	(1)	**11.**	(3)	**12.**	(2)	**13.**	(4)	**14.**	(3)
15.	(2)												

EXERCISE - 3

PART-I

1.	(1)	**2.**	(3)	**3.**	(2)	**4.**	(1)	**5.**	(1)	**6.**	(3)	**7.**	(2)
8.	(3)												

PART-II

1.	(3)	**2.**	(4)	**3.**	(4)	**4.**	(3)	**5.**	(3)	**6.**	(2)	**7.**	(3)
8.	(4)	**9.**	(2)	**10.**	(2)							

PART-III

1.	(4)	**2.**	(1)	**3.**	(2)	**4.**	(1)	**5.**	(3)