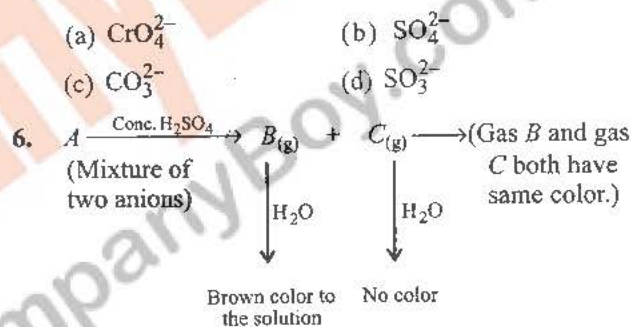


Qualitative Inorganic Analysis

JEE (Main) Exercises

Single Correct Answer Type

- An aqueous solution of gas (X) turns red litmus blue; then gas will be:
 (a) SO_2 (b) SO_3
 (c) NH_3 (d) None of these
- To aqueous solution of X on adding CuSO_4 a brown precipitate is obtained which turns white on adding of excess of $\text{Na}_2\text{S}_2\text{O}_3$ solution; on addition of Ag^+ ion solution, a yellow curdy precipitate is obtained which is insoluble in NH_4OH ; then X will be:
 (a) $\text{Cu}_2\text{I}_2 + \text{I}_3^-$ (b) CuI_2
 (c) Cu_2I_2 (d) KI
- A imparts green color to the flame. Its solution does not give a precipitate on passing H_2S . When it is heated with solid $\text{K}_2\text{Cr}_2\text{O}_7$ and conc. H_2SO_4 , reddish brown gas is evolved. The gas when passed in an aqueous solution of NaOH turns it yellow. Find out A :
 (a) HgCl_2 (b) BaCl_2
 (c) Both (a) and (b) (d) None of these
- Which of the following anions will give same color of gas?
 (a) NO_2^- , NO_3^- , I^- (b) NO_2^- , NO_3^- , CH_3COO^-
 (c) NO_2^- , Br^- , I^- (d) NO_2^- , NO_3^- , Br^-
- Which of the following anion exist in equilibrium condition with other anion depending upon the pH of the solution?



Find out (A):

- (a) I^- , Br^- (b) Br^- , NO_3^-
 (c) $\text{C}_2\text{O}_4^{2-}$, NO_3^- (d) NO_3^- , NO_2^-
- Select the correct statement:
 (a) Cation and anion are also called acidic or basic radicals, respectively
 (b) Classification of anion is systematic as that of cation
 (c) All the anions are deducted by soda extract solution without any exception
 (d) None of these
 - Which of the following anions are identified by dil. H_2SO_4 ?
 (i) CO_3^{2-} (ii) SO_3^{2-} (iii) $\text{S}_2\text{O}_3^{2-}$ (iv) NO_3^-
 (v) I^- (vi) $\text{C}_2\text{O}_4^{2-}$
 (a) CO_3^{2-} , SO_3^{2-} , NO_3^- , $\text{S}_2\text{O}_3^{2-}$
 (b) SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$, I^- , NO_3^-
 (c) CO_3^{2-} , SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$
 (d) CO_3^{2-} , SO_3^{2-} , NO_3^- , $\text{C}_2\text{O}_4^{2-}$

9. Which of the following pair of anions will give same gas on treatment with acid?

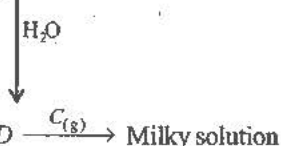
(a) CO_3^{2-} , HCO_3^- (b) SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$
(c) NO_2^- , NO_3^- (d) All are having same gas

10. When a mixture (A) of unknown gases is passed into the dichromate solution, then orange color turns to green; when the solution is boiled and gas passed into lime water, then lime water turns milky. Find out (A).

(a) CO_2 , Cl_2 (b) H_2S , CO_2
(c) Both (a) and (b) (d) None of these

11. $A \xrightarrow{\Delta} B_{(s)} + C_{(g)}$

(Used as a flux in metallurgy)



Find out (A).

(a) $\text{Ca}(\text{HCO}_3)_2$ (b) CaCO_3
(c) Both (a) and (b) (d) Na_2CO_3

12. Which of the following metal will give redox reaction with steam water only?

(a) Zn (b) Mg
(c) Fe (d) Ag

13. Which of the following acid is non-oxidizing acid?

(a) Conc. H_2SO_4 (b) Conc. H_3PO_4
(c) Conc. HNO_3 (d) None of these

14. When Ag reacts with conc. HCl, then products will be:

(a) AgCl, Cl_2 (b) AgCl, H_2
(c) AgCl, H_2 , Cl_2 (d) None of these

15. Which of the following metal will form NH_4NO_3 with dil. HNO_3 (20%)?

(a) Zn (b) Sn
(c) Ag (d) None of these

16. Mixture of two anions $\xrightarrow[\text{excess of BaCl}_2]{\text{Cold}}$ White ppt. $\xrightarrow{\text{Filtered}}$

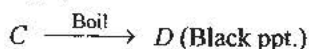
Filtrate ppt. $\xrightarrow{\text{Boil}}$ White ppt.

Find out A:

(a) CO_3^{2-} , HSO_3^- (b) CO_3^{2-} , HCO_3^-
(c) SO_3^{2-} , HSO_3^- (d) SO_3^{2-} , CO_3^{2-}

17. $A \xrightarrow{\text{Boil}} B \text{ (White ppt.)}$

(White ppt.)



(White ppt.)

A and C both have sulphur containing anion; then identify A and C:

(a) CaSO_3 , CaS_2O_3 (b) PbSO_3 , PbS_2O_3

(c) BaSO_3 , BaS_2O_3 (d) PbSO_3 , BaS_2O_3

18. White ppt. of silver gives brown ppt. on boiling, but when it is heated ($> 300^\circ\text{C}$), then a metallic black ppt. is obtained. Identify the compound of silver having white ppt:

(a) Ag_2SO_3 (b) $\text{Ag}_2\text{S}_2\text{O}_3$
(c) Ag_2CO_3 (d) AgCl

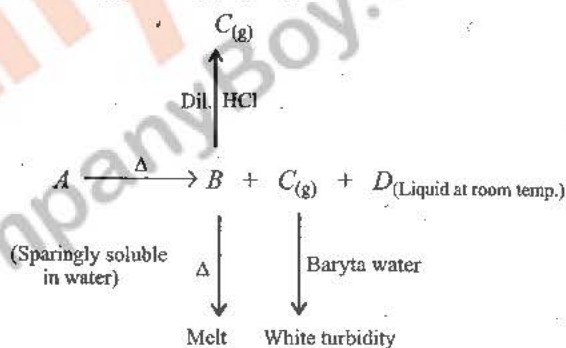
19. Which of the following complex of silver is not allowed on stand?

(a) $[\text{Ag}(\text{NH}_3)_4]^+$ (b) $[\text{Ag}(\text{CN})_2]^-$
(c) $[\text{Ag}(\text{NH}_3)_2]^+$ (d) $\text{Ag}_2\text{S}_2\text{O}_3$

20. When HgCl_2 reacts with CO_3^{2-} anion, then:

(a) Reddish brown precipitate of $\text{HgCO}_3 \cdot 2\text{HgO}$ is formed
(b) Brownish red precipitate of $\text{HgCO}_3 \cdot 3\text{HgO}$ is formed
(c) Reddish brown precipitate of $\text{HgCO}_3 \cdot 3\text{HgO}$ is formed
(d) Blue ppt. of $\text{Hg}_4\text{O}_4\text{CO}_3$ is formed

- 21.



Find out A, B, C, and D.

(a) Na_2CO_3 , NaHCO_3 , CO_2 , H_2O
(b) NaHCO_3 , Na_2O , CO_2 , H_2O
(c) NaHCO_3 , Na_2CO_3 , CO_2 , H_2O
(d) KHCO_3 , K_2CO_3 , CO_2 , H_2O

22. $A \xrightarrow[\text{excess of BaCl}_2]{\text{Cold}}$ White ppt. $\xrightarrow{\text{filtered}}$

filtrate $\xrightarrow{\text{boil}}$ White ppt.

Find out (A).

(a) SO_3^{2-} , HSO_3^- (b) CO_3^{2-} , SO_3^{2-}
(c) SO_3^{2-} , HCO_3^- (d) None of these

23. A salt is made of bivalent ions X and Y, each of which is capable of decolorizing acidified KMnO_4 solution. The salt is likely to be:

(a) Stannic chloride (b) Ferric sulphate
(c) Ferrous sulphate (d) Ferrous oxalate

24. Which of the following salt will evolve sulphur dioxide gas along with formation of yellowish turbidity when treated with dilute H_2SO_4 ?
- (a) Sodium sulphide (b) Sodium sulphite
(c) Sodium thiosulphate (d) Sodium sulphate
25. A colorless salt gives white precipitate with CaCl_2 solution. The salt also decolorizes acidified MnO_4^- with effervescence. On reaction with conc. H_2SO_4 , the salt gives a colorless gaseous mixture containing:
- (a) CO , CO_2 (b) CO_2 , SO_2
(c) CO_2 , H_2S (d) None of these
26. Aqueous solution of a salt + MgSO_4 solution \longrightarrow no ppt. in cold $\xrightarrow{\text{Heating}}$ White ppt. appears
The salt contains the acidic radical:
- (a) CO_3^{2-} (b) HCO_3^-
(c) SO_3^{2-} (d) $\text{C}_2\text{O}_4^{2-}$
27. Which of the following compound is formed when CO_2 gas is passed through an aqueous solution of sodium chromate?
- (a) $\text{Cr}(\text{OH})_3$ is precipitated
(b) Yellow solution of $\text{Cr}_2(\text{CO}_3)_2$ is formed
(c) Orange solution of $\text{Na}_2\text{Cr}_2\text{O}_7$ is formed
(d) No reaction
28. Which of the following ion gives a suffocating gas when treated with dilute HCl ?
- (a) Carbonate (b) Sulphite
(c) Sulphate (d) Borate
29. The acidic solution of a salt produces blue color with KI starch solution. The salt may be:
- (a) Sulphite (b) Bromide
(c) Nitrite (d) Chloride
30. Sulphite on treatment with dil. H_2SO_4 liberates a gas which:
- (a) Turns lead acetate paper black
(b) Burns with blue flame
(c) Smells like vinegar
(d) Turns acidified $\text{K}_2\text{Cr}_2\text{O}_7$ paper green
31. Violet vapors are given out when is treated with conc. H_2SO_4 .
- (a) Bromide (b) Iodide
(c) Chloride (d) Nitrate
32. The color developed when sodium sulphide is added to sodium nitroprusside is:
- (a) Purple (b) Yellow
(c) Red (d) Black
33. Which of the following compound does not gives ppt. with dil HCl ?
- (a) AgNO_3 (b) $\text{Pb}(\text{NO}_3)_2$
(c) $\text{Hg}_2(\text{NO}_3)_2$ (d) $\text{Cu}(\text{NO}_3)_2$
34. A gas is obtained by addition of dil. H_2SO_4 to a mixture which turns lead acetate paper black. It is:
- (a) SO_2 (b) CO_2
(c) H_2S (d) NO_2
35. A mixture when rubbed with organic acid smells like vinegar. It contains:
- (a) Sulphite (b) Nitrate
(c) Nitrite (d) Acetate
36. Soda extract is prepared by:
- (a) Fusing soda and mixture and then extracting with water
(b) Dissolving NaHCO_3 and mixture in dil. HCl
(c) Boiling Na_2CO_3 and mixture, in dil. HCl
(d) Boiling Na_2CO_3 and mixture, in distilled water
37. For the tests of halides, the soda extract is acidified with:
- (a) Conc. H_2SO_4 (b) Dil. HNO_3
(c) Dil. HCl (d) Any of the three
38. When an aqueous solution of gas (X) is added to FeCl_3 solution, a brown precipitate is obtained which is soluble in dil. HNO_3 ; gas (X) will give white fumes with HCl , then gas (X) is:
- (a) SO_2 (b) Cl_2
(c) CO_2 (d) NH_3
39. A white solid is first heated with dilute H_2SO_4 and then with concentrated H_2SO_4 . No action is observed in either case. The solid contains:
- (a) Sulphide (b) Sulphite
(c) Sulphate (d) Thiosulphate
40. A precipitate of calcium oxalate will not dissolve in:
- (a) Acetic acid (b) HCl
(c) HNO_3 (d) Aqua-regia
41. The brown ring test is performed for the qualitative detection of:
- (a) Bromides (b) Iodides
(c) Nitrates (d) Phosphates
42. Which compound does not dissolve in hot dil. HNO_3 ?
- (a) HgS (b) PbS
(c) CuS (d) CdS
43. Which one is not the interfering radical?
- (a) PO_4^{3-} (b) BO_3^{3-}
(c) F^- (d) SO_4^{2-}

44. In the test for iodine, I_2 is treated with sodium thiosulphate ($Na_2S_2O_3$):
 $Na_2S_2O_3 + I_2 \longrightarrow NaI + \dots$
 (a) $Na_2S_4O_6$ (b) Na_2SO_4
 (c) Na_2S (d) Na_2ISO_4
45. Which of the following sulphides is yellow in color?
 (a) CuS (b) CdS
 (c) ZnS (d) CoS
46. Brown ring in the test of NO_3^- is formed due to the formation of:
 (a) $FeSO_4 \cdot NO$ (b) $[Fe(SO_4)_2 \cdot HO] \cdot H_2O$
 (c) $Fe_2(SO_4)_3 \cdot NO$ (d) None of these
47. The brown ring test for nitrates depends on:
 (a) The reduction of nitrate to nitric oxide
 (b) Oxidation of nitric oxide to nitrogen dioxide
 (c) Reduction of ferrous sulphate to iron
 (d) Oxidizing action of sulphuric acid
48. A sodium salt of unknown anion when treated with $MgCl_2$ gives white precipitate only on boiling. The anion is:
 (a) SO_4^{2-} (b) HCO_3^-
 (c) CO_3^{2-} (d) NO_3^-
49. In the brown ring test, the brown color of the ring is due to:
 (a) A mixture to NO and NO_2
 (b) Nitrosoferrous sulphate
 (c) Ferrous nitrate (d) Ferric nitrate
50. S^{2-} and SO_3^{2-} can be distinguished by using:
 (a) $(CH_3COO)_2Pb$ (b) $Na_2[Fe(CN)_5NO]$
 (c) Both (a) and (b) (d) None of these
51. An aqueous solution containing Hg^{2+} , Hg_2^{2+} , Pb^{2+} , and Cd^{2+} ions will give precipitates of with HCl .
 (a) Hg_2Cl_2 only (b) $PbCl_2$ only
 (c) Hg_2Cl_2 and $PbCl_2$ (d) $HgCl_2$ and $PbCl_2$
52. Which one of the following pairs of ions cannot be separated by H_2S in dilute HCl ?
 (a) Bi^{3+} , Sn^{4+} (b) Al^{3+} , Hg^{2+}
 (c) Cu^{2+} , Zn^{2+} (d) Ni^{2+} , Cu^{2+}
53. In qualitative analysis, Cd is under:
 (a) I group (b) II group
 (c) III group (d) IV group
54. Which compound does not dissolve in hot dil. HNO_3 ?
 (a) HgS (b) PbS
 (c) CuS (d) CdS
55. Which of the following metal sulphides has maximum solubility in water?
 (a) HgS , $K_{sp} = 10^{-54}$ (b) CdS , $K_{sp} = 10^{-30}$
 (c) FeS , $K_{sp} = 10^{-20}$ (d) ZnS , $K_{sp} = 10^{-22}$
56. The compound formed in the borax-bead test of Cu^{2+} ion in oxidizing flame is:
 (a) Cu (b) $CuBO_2$
 (c) $Cu(BO_2)_2$ (d) None of these
57. Identify the correct order of solubility of Na_2S , CuS , and ZnS in aqueous medium;
 (a) $CuS > ZnS > Na_2S$ (b) $ZnS > Na_2S > CuS$
 (c) $Na_2S > CuS > ZnS$ (d) $Na_2S > ZnS > CuS$
58. Potassium chromate solution is added to an aqueous solution of a metal chloride. The precipitates thus obtained are insoluble in acetic acid. These are subjected to flame test; the color of the flame is:
 (a) Lilac (b) Apple green
 (c) Crimson red (d) Golden yellow
59. Consider the following observation:
 $M^{n+} + HCl \longrightarrow \text{White precipitate} \xrightarrow{\Delta} \text{Water soluble}$
 The metal ion M^{n+} will be:
 (a) Hg^{2+} (b) Ag^+
 (c) Pb^{2+} (d) Sn^{2+}
60. When H_2S is passed through Hg_2^{2+} , we get:
 (a) HgS (b) $HgS + Hg_2S$
 (c) $HgS + Hg$ (d) Hg_2S
61. In Nessler's reagent for detection of ammonia, the active species is:
 (a) Hg_2Cl_2 (b) Hg^{2+}
 (c) Hg_2I_2 (d) HgI_4^{2-}
62. Precipitation of IV group cations takes place when H_2S passed is:
 (a) Less ionized (b) Highly ionized
 (c) Not ionized (d) None of these
63. Nessler's reagent is:
 (a) $NaHgCl_4$ (b) K_2HgI_4/OH^-
 (c) $Hg(NH_3)_2Cl$ (d) K_2HgI_4
64. To a metal nitrate, when KI solution is added, a black precipitate is produced at first; on adding excess of KI , orange solution is produced. Identify the metal ion:
 (a) Hg^{2+} (b) Bi^{3+}
 (c) Cu^{2+} (d) Pb^{2+}
65. The formula of the compound which gives violet color in Lassaigne's test for sulphur with sodium nitroprusside is:

- (a) $\text{Na}_4[\text{Fe}(\text{CN})_6\text{S}]$ (b) $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NCS}]$
 (c) $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NOS}]$ (d) $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NOS}]$
66. When H_2S gas is passed through HCl containing aqueous solution of CuCl_2 , HgCl_2 , BiCl_3 , and CoCl_2 , it does not precipitate out:
 (a) CuS (b) HgS
 (c) Bi_2S_3 (d) CoS
67. Yellow color solution of FeCl_3 changes to light green when:
 (a) SnCl_2 is added (b) Zn is added
 (c) H_2S gas is passed (d) All are true
68. $\text{Fe}(\text{OH})_3$ and $\text{Cr}(\text{OH})_3$ ppt. are separated by:
 (a) aq. NH_3 (b) HCl
 (c) $\text{NaOH} / \text{H}_2\text{O}_2$ (d) H_2SO_4
69. Turnbull's blue and Prussian's blue, respectively, are:
 $\text{Fe}^{\text{II}} [\text{Fe}^{\text{II}} (\text{CN})_6]^{2-}$ $\text{Fe}^{\text{III}} [\text{Fe}^{\text{III}} (\text{CN})_6]$
 I II
 $\text{Fe}^{\text{II}} [\text{Fe}^{\text{III}} (\text{CN})_6]^{3-}$ $\text{Fe}^{\text{III}} [\text{Fe}^{\text{II}} (\text{CN})_6]^{4-}$
 III IV
 (a) I, II (b) I, III
 (c) III, IV (d) IV, III
70. Ferric alum gives red color with NH_4SCN due to formation of:
 (a) $\text{Al}(\text{SCN})_3$ (b) FeSO_4
 (c) $\text{Fe}(\text{SCN})_3$ (d) $\text{Fe}(\text{SCN})_2$
71. H_2S would separate the following at $\text{pH} < 7$:
 (a) Zn^{2+} , Co^{2+} (b) Cu^{2+} , Cd^{2+}
 (c) Cu^{2+} , Cr^{3+} (d) Cu^{2+} , As^{3+}
72. Solution of (X) in dil. $\text{HCl} + \text{H}_2\text{O} \longrightarrow$ White turbidity
 $(X) \xrightarrow{\text{H}_2\text{S}/\text{HCl}} \text{Brown ppt. (Y)}$
 X is:
 (a) Bi^{3+} (b) Pb^{2+}
 (c) Cd^{2+} (d) Cu^{2+}
73. AgNO_3 gives white ppt. with hypo changing to black after some-time. Black ppt. is of:
 (a) $\text{Ag}_2\text{S}_2\text{O}_3$ (b) Ag_2SO_4
 (c) $\text{Ag}_2\text{S}_4\text{O}_6$ (d) Ag_2S
74. Ag_2S is soluble in NaCN due to formation of:
 (a) $\text{Na}[\text{Ag}(\text{CN})_2]$ (b) $\text{Ag}(\text{CN})_2$
 (c) $\text{Na}_2[\text{Ag}(\text{CN})_3]$ (d) $\text{Na}_2[\text{Ag}(\text{CN})_2]$
75. Cu^{2+} and Ag^+ are both present in the same solution. To precipitate one of the ions and leave the other in solution, add:
 (a) $\text{H}_2\text{S}_{(\text{aq})}$ (b) $\text{HCl}_{(\text{aq})}$
 (c) $\text{HNO}_{3(\text{aq})}$ (d) $\text{NH}_4\text{NO}_{3(\text{aq})}$
76. Of the following solutions, the one that is acidic is:
 (a) $\text{ZnSO}_{4(\text{aq})}$ (b) $\text{NaAl}(\text{OH})_{4(\text{aq})}$
 (c) $\text{NaHCO}_{3(\text{aq})}$ (d) $\text{KNO}_{3(\text{aq})}$
77. With MnO , color of the bead in sodium carbonate-bead test is:
 (a) Pink (b) Black
 (c) Yellow (d) Green
78. With Cr_2O_3 , color of the bead in sodium carbonate-bead test is:
 (a) Red (b) Blue
 (c) Yellow (d) Green
79. KI gives precipitate with all the cations given:
 (a) Ag^+ , Hg_2^{2+} , Pb^{2+} (b) Cu^{2+} , Zn^{2+} , Ni^{2+}
 (c) Na^+ , Ca^{2+} , Mg^{2+} (d) Ag^+ , Ca^{2+} , Sr^{2+}
80. $\text{Aq. (A)} + \text{K}_2\text{CrO}_4 \longrightarrow (\text{B}) \xrightarrow{\text{aq. NH}_3} (\text{C})$
 (Red ppt.) (Black)
 A is:
 (a) AgNO_3 (b) $\text{Pb}(\text{NO}_3)_2$
 (c) $\text{Hg}_2(\text{NO}_3)_2$ (d) $\text{Ca}(\text{NO}_3)_2$
81. The ion most difficult to remove as a precipitate is:
 (a) Ag^+ (b) NH_4^+
 (c) Fe^{3+} (d) Cu^{2+}
82. A colorless gas is dissolved in water and the resulting solution turns red litmus blue; the gas may have been which one of the following?
 (a) HCl (b) H_2S
 (c) SO_2 (d) NH_3
83. What would you observe if you add with shaking, excess dil. NaOH solution to ZnCl_2 solution?
 (a) A white ppt.
 (b) A white ppt. which later dissolves
 (c) A green ppt.
 (d) A green ppt. which later dissolves
84. A mixture is known to contain NO_3^- and NO_2^- . Before performing ring test for NO_3^- , the aqueous solution should be made free of NO_2^- . This is done by heating aqueous extract with:
 (a) Conc. HNO_3 (b) Dil. HNO_3
 (c) Urea (d) Zinc dust
85. A suspension containing insoluble substances HgS and FeS is treated with 2NHCl . On filtering, the filtrate contained appreciable amounts of which one of the following?
 (a) Mercury, iron (b) Only iron
 (c) Only mercury (d) None of these

86. In the separation of Cu^{2+} and Cd^{2+} in 2nd group of qualitative analysis of cations, tetrammine copper(II) sulphate and tetraammine cadmium(II) sulphate react with KCN to form the corresponding cyanide complexes; which one of the following pairs of the complexes and their relative stabilities enables the separation of Cu^{2+} and Cd^{2+} ?
- $\text{K}_3[\text{Cu}(\text{CN})_4]$: less stable and $\text{K}_2[\text{Cd}(\text{CN})_4]$: more stable
 - $\text{K}_3[\text{Cu}(\text{CN})_4]$: more stable and $\text{K}_2[\text{Cd}(\text{CN})_4]$: less stable
 - $\text{K}_2[\text{Cu}(\text{CN})_4]$: less stable and $\text{K}_2[\text{Cd}(\text{CN})_4]$: more stable
 - $\text{K}_2[\text{Cu}(\text{CN})_4]$: more stable and $\text{K}_2[\text{Cd}(\text{CN})_4]$: less stable
87. Which reagent is used to remove SO_4^{2-} or Cl^- from water?
- NaOH
 - $\text{Pb}(\text{NO}_3)_2$
 - BaSO_4
 - KOH
88. AgCl with NH_3 forms a complex:
- $\text{Ag}(\text{NH}_3)_2\text{Cl}$
 - AgNO_3
 - AgNH_2Cl
 - Ag mirror
89. Acidic solution of a salt produced deep blue color with starch and KI. The salt is:
- Chloride
 - Nitrite
 - Acetate
 - Bromide
90. CuSO_4 reacts with NH_4OH to give deep blue complex of:
- Copperammonium sulphate
 - Copperammonium hydroxide
 - Both (a) and (b)
 - None of these
91. Prussian blue is formed when:
- Ferrous sulphate reacts with FeCl_3
 - Ferric sulphate reacts with $\text{K}_4[\text{Fe}(\text{CN})_6]$
 - Ferrous ammonium sulphate reacts with FeCl_3
 - Ammonium sulphate reacts with FeCl_3
92. Which compound will not give positive chromyl chloride test?
- Copper chloride, CuCl_2
 - Mercuric chloride, HgCl_2
 - Zinc chloride, ZnCl_2
 - Anilinium chloride, $\text{C}_6\text{H}_5\text{NH}_3^+\text{Cl}^-$
93. A metal salt solution forms a yellow precipitate with potassium chromate in acetic acid, a white precipitate with dil. sulphuric acid, but gives no precipitate with sodium chloride or iodide. The white precipitate obtained when sodium carbonate is added to the metal salt solution consists of:
- Lead carbonate
 - Basic lead carbonate
 - Barium carbonate
 - Strontium carbonate
94. An inorganic salt solution gives a yellow precipitate with silver nitrate. The precipitate dissolves in dil. nitric acid as well as in ammonium hydroxide. The solution contains:
- Bromide
 - Iodide
 - Phosphate
 - Chromate
95. Which cation is detected by the flame test?
- NH_4^+
 - K^+
 - Mg^{2+}
 - Al^{3+}
96. Strongly acidified solution of barium nitrate gives a white precipitate with.....which did not dissolve even after large addition of water:
- Sodium phosphate
 - Sodium carbonate
 - Sodium sulphate
 - Sodium chloride
97. A substance on treatment with dil. H_2SO_4 liberates a colorless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green. The reaction indicates the presence of:
- CO_3^{2-}
 - S^{2-}
 - SO_3^{2-}
 - NO_2^-
98. Ca, Ba, and Sr ions are precipitated in fifth group as their:
- Oxides
 - Sulphates
 - Carbonates
 - Sulphides
99. Conc. H_2SO_4 on addition to dry KNO_3 gives brown fumes of:
- SO_2
 - SO_3
 - NO
 - NO_2
100. Ferric ion forms a prussian blue colored ppt. due to the formation of:
- $\text{K}_4[\text{Fe}(\text{CN})_6]$
 - $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
 - KMnO_4
 - $\text{Fe}(\text{OH})_3$
101. In the precipitation of the iron group in qualitative analysis, ammonium chloride is added before adding ammonium hydroxide to:
- Decrease concentration of OH^- ions
 - Prevent interference by phosphate ions
 - Increase concentration of Cl^- ions
 - Increase concentration of NH_4^+ ions

102. H_2S gas, on passing through an alkaline solution, forms a white precipitate. The solution contains ions of:
(a) Pb (b) Zn
(c) Cu (d) Ni
103. Which gives violet color with borax?
(a) Fe (b) Pb
(c) Co (d) Mn
104. Yellow ammonium sulphide solution is a suitable reagent used for the separation of:
(a) HgS and PbS (b) PbS and Bi_2S_3
(c) Bi_2S_3 and CuS (d) CdS and As_2S_3
105. An orange red precipitate obtained by passing H_2S through an acidified solution of an inorganic salt indicates the presence of:
(a) Cadmium (b) Tin
(c) Antimony (d) Bismuth
106. The presence of NH_4^+ radical in solution can be detected by:
(a) Fehling's solution (b) Benedict's solution
(c) Schiff's reagent (d) Nessler's reagent
107. Excess of concentrated sodium hydroxide can separate a mixture of:
(a) Al^{3+} and Cr^{3+} (b) Cr^{3+} and Fe^{3+}
(c) Al^{3+} and Zn^{2+} (d) Zn^{2+} and Pb^{2+}
108. Potassium thiocyanate solution reacts with ferric chloride to give:
(a) Pink color (b) Deep blue color
(c) Green color (d) Blood-red color
109. A green mass is formed in the charcoal cavity test when a colorless salt (X) is fused with cobalt nitrate. (X) may contain:
(a) Aluminium (b) Copper
(c) Barium (d) Zinc
110. Which of the following sulphides has the maximum solubility product?
(a) HgS (b) PbS
(c) CuS (d) MnS
111. A white metal sulphide soluble in water is:
(a) CuS (b) Na_2S
(c) PbS (d) ZnS
112. Lead has been placed in qualitative group analysis 1st and 2nd because:
(a) It shows the valency one and two
(b) It forms insoluble PbCl_2
(c) It forms lead sulphide
(d) PbCl_2 is partially soluble in water
113. As_2S_3 is:
(a) Black (b) Yellow
(c) Orange (d) White
114. A black sulphide is formed by the action of H_2S on:
(a) CuCl_2 (b) CdCl_2
(c) ZnCl_2 (d) NaCl
115. $\text{Pb}(\text{CH}_3\text{COO})_2$ gives.....color with H_2S :
(a) Black (b) White
(c) Red (d) Orange
116. Acidified $\text{K}_2\text{Cr}_2\text{O}_7$ turns green by:
(a) CO_2 (b) SO_3
(c) SO_2 (d) HNO_3
117. Chemical volcano is produced on heating:
(a) $\text{K}_2\text{Cr}_2\text{O}_7$ (b) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
(c) ZnCr_2O_7 (d) K_2CrO_4
118. Which gives blood red color with ammonium thiocyanate?
(a) Fe^{3+} (b) Fe^{2+}
(c) Cu^{2+} (d) Cd^{2+}
119. A salt having BO_3^{3-} on burning with alcohol and conc. H_2SO_4 gives edge flame:
(a) Green (b) Yellow
(c) Red (d) White
120. Carbonates of Ba, Sr, and Ca are:
(a) White (b) Blue
(c) Green (d) Yellow
121. The II group precipitates soluble in yellow ammonium sulphide may be:
(a) As, Sb, Sn (b) Cu, Hg, Bi, Cd
(c) Both (a) and (b) (d) None of these
122. CaC_2O_4 isin water:
(a) Insoluble (b) Soluble
(c) Complex (d) None of these
123. Nitric acid is generally not used for preparation of original solution in analysis of basic radicals, because it:
(a) Is oxidizing agent (b) Is reducing agent
(c) Forms insoluble nitrates
(d) Forms soluble nitrates
124. When dimethyl glyoxime solution is added to an aqueous solution of nickel chloride in presence of ammonium hydroxide:
(a) A black ppt. is formed
(b) A blue ppt. is formed
(c) A rose red ppt. is formed
(d) No ppt. is formed

125. A white salt soluble in NH_4OH but insoluble in water is:
 (a) BaSO_4 (b) CuSO_4
 (c) PbSO_4 (d) AgCl
126. The sulphide not soluble in hot dilute nitric acid is:
 (a) CuS (b) ZnS
 (c) CdS (d) HgS
127. KBr , on reaction with conc. H_2SO_4 , gives red-brown gas:
 (a) Bromine
 (b) Mixture of bromine and HBr
 (c) HBr (d) NO_2
128. Formation of a green-edged flame on igniting the vapors evolved by heating a given inorganic salt with a few mL of ethyl alcohol and conc. H_2SO_4 indicates the presence of a:
 (a) Tartrate (b) Oxalate
 (c) Acetate (d) Borate
129. The compound which turns black with NH_4OH is:
 (a) Lead chloride (b) Mercurous chloride
 (c) Mercuric chloride (d) Silver chloride
130. Formation of a rosy-red precipitate when a slightly alkaline solution of an inorganic salt is treated with dimethyl glyoxime confirms the presence of:
 (a) Cobalt (b) Zinc
 (c) Iron (d) Nickel
131. The metal that does not give the borax bead test is:
 (a) Cr (b) Ni
 (c) Pb (d) Mn
132. H_2S will precipitate the sulphides of all the metals from the solution of chlorides of Cu , Zn , and Cd if:
 (a) The solution is aqueous
 (b) The solution is acidic
 (c) The solution is dilute acidic
 (d) Any of the above solutions is present
133. To a solution of a substance, gradual addition of ammonium hydroxide results in a black precipitate which does not dissolve in excess of NH_4OH . However, when HCl is added to the original solution, a white precipitate is formed. The solution contained:
 (a) Lead salt (b) Silver salt
 (c) Mercurous salt (d) Copper salt
134. A compound is soluble in water. If ammonia is added to aqueous solution of the compound, a brown precipitate appears which is soluble in dil. HCl . The compound has:
 (a) Aluminium (b) Zinc
 (c) Iron (d) Cadmium
135. A light green colored salt soluble in water gives black precipitate on passing H_2S which dissolves readily in HCl . The metal ion present is:
 (a) Co^{2+} (b) Fe^{2+}
 (c) Ni^{2+} (d) Ag^+
136. An inorganic salt when heated evolves colored gas which bleaches moist litmus paper. The evolved gas is:
 (a) NO_2 (b) SO_2
 (c) N_2O (d) I_2
137. All ammonium salts liberate ammonia when:
 (a) Heated with HCl (b) Heated with caustic soda
 (c) Heated with H_2SO_4 (d) Heated with NaNO_2
138. Silver, mercury, and lead are grouped together in a scheme of qualitative analysis because they form:
 (a) Nitrates
 (b) Carbonates which dissolve in dil. HNO_3
 (c) Insoluble chlorides (d) Colorless compounds
139. Manganese salt + PbO_2 + conc. $\text{HNO}_3 \longrightarrow$ The solution has purple color.
 The color is due to:
 (a) HMnO_4 (b) A lead salt
 (c) $\text{Mn}(\text{NO}_3)_2$ (d) H_2MnO_4
140. An orange precipitate of II group is dissolved in conc. HCl ; the solution when treated with excess of water turns milky due to formation of:
 (a) $\text{Sn}(\text{OH})\text{Cl}$ (b) $\text{Sb}(\text{OH})\text{Cl}_2$
 (c) SbOCl (d) $\text{Sb}(\text{OH})_2\text{Cl}$

JEE (Advanced) Exercises

Single Correct Answer Type

- Which of the following sulphide is not soluble in dil. HNO_3 ?
 (a) PbS (b) HgS
 (c) ZnS (d) Bi_2S_3
- Which of the following solutions gives precipitate with $\text{Pb}(\text{NO}_3)_2$ but not with $\text{Ba}(\text{NO}_3)_2$?
 (a) Sodium chloride (b) Sodium sulphate
 (c) Sodium nitrate
 (d) Sodium hydrogen phosphate

3. The color developed when sodium sulphide is added to sodium nitroprusside is:
 - (a) Violet
 - (b) Yellow
 - (c) Red
 - (d) Black
4. A white powder when strongly heated gives off brown fumes. A solution of this powder gives a yellow precipitate with a solution of KI. When a solution of barium chloride is added to a solution of powder, a white precipitate results. This white powder may be:
 - (a) A soluble sulphate
 - (b) KBr or NaBr
 - (c) $\text{Ba}(\text{NO}_3)_2$
 - (d) AgNO_3
5. In qualitative analysis, Cd^{2+} is under:
 - (a) I group
 - (b) II group
 - (c) III group
 - (d) IV group
6. The ion that cannot be precipitated by both HCl and H_2S is:
 - (a) Pb^{2+}
 - (b) Ba^{2+}
 - (c) Ag^+
 - (d) Sn^{2+}
7. Which sulphide is insoluble in dilute acids but soluble in alkalis:
 - (a) PbS
 - (b) CdS
 - (c) FeS
 - (d) As_2S_3
8. An aqueous solution of a substance gives a white precipitate on treatment with dilute hydrochloric acid, which dissolves on heating. When hydrogen sulphide is passed through the hot acidic solution, a black precipitate is obtained. The substance is a/an:
 - (a) Hg_2^{2+} salt
 - (b) Cu^{2+} salt
 - (c) Ag^+ salt
 - (d) Pb^{2+} salt
9. When $\text{S}_2\text{O}_3^{2-}$ ion reacts with X cation, then first redox reaction takes place and after this ppt. reaction; then X may be:
 - (a) Cu^{2+}
 - (b) Fe^{3+}
 - (c) Hg^{2+}
 - (d) Bi^{3+}
10. Which is soluble in water?
 - (a) AgF
 - (b) AgCl
 - (c) AgBr
 - (d) AgI
11. Using dil. HCl, which of the following radical cannot be confirmed:
 - (a) S^{2-}
 - (b) $\text{S}_2\text{O}_3^{2-}$
 - (c) CO_3^{2-}
 - (d) NO_2^-
12. When $\text{K}_2\text{Cr}_2\text{O}_7$ is heated with conc. H_2SO_4 and soluble chloride such as KCl:
 - (a) Red vapors of CrO_2Cl_2 are evolved
 - (b) Cl^- ion is oxidized to Cl_2 gas
 - (c) CrCl_3 is formed
 - (d) $\text{Cr}_2\text{O}_7^{2-}$ ion is reduced to green Cr^{3+} ion
13. A salt on heating with dilute H_2SO_4 and subsequently treatment with a few drops of dilute $\text{K}_2\text{Cr}_2\text{O}_7$ turns into green solution. The salt may be a:
 - (a) Sulphate
 - (b) Nitrate
 - (c) Sulphide
 - (d) Chromate
14. The reagents NH_4Cl and aqueous NH_3 will precipitate:
 - (a) Ca^{2+}
 - (b) Al^{3+}
 - (c) Mg^{2+}
 - (d) Zn^{2+}
15. In a mixture of PbS, ZnS, and FeS_2 , each component is separated from the other by using the reagents in which of the following sequence in froth floatation process?
 - (a) Potassium ethyl xanthate, KCN, NaOH, copper sulphate, acid
 - (b) KCN, CuSO_4 , acid
 - (c) Potassium ethyl xanthate, KCN
 - (d) None of these
16. A doctor by mistake administers a $\text{Ba}(\text{NO}_3)_2$ solution to a patient for radiography investigations. Which of the following should be given as the best to prevent the absorption of soluble barium?
 - (a) Na_2SO_4
 - (b) NaCl
 - (c) NH_4Cl
 - (d) Na_2CO_3
17. Which of these is the correct group reagent for group cations?
 - (a) Mn^{2+} Co^{2+} Zn^{2+} Ni^{2+} ; dil. HCl
 - (b) Mn^{2+} Co^{2+} Zn^{2+} Ni^{2+} ; $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH} + \text{H}_2\text{S}$
 - (c) Mn^{2+} Co^{2+} Zn^{2+} Ni^{2+} ; $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$
 - (d) Mn^{2+} Co^{2+} Zn^{2+} Ni^{2+} ; $\text{HCl} + \text{H}_2\text{S}$
18. A white solid imparts a violet color to a Bunsen flame. On being heated with concentrated H_2SO_4 , the solid gives violet vapors that turn starch paper blue. The salt may be:
 - (a) KI
 - (b) NaI
 - (c) MgI_2
 - (d) CaBr_2
19. Thenard blue is:
 - (a) $\text{Cu}(\text{NH}_3)_4 \text{SO}_4$
 - (b) CoAl_2O_4
 - (c) $\text{K}_2\text{Fe}[\text{Fe}(\text{CN})_6]$
 - (d) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
20. The chocolate colored precipitate is:
 - (a) $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})] \text{SO}_4$
 - (b) $\text{Fe}_2[\text{Fe}(\text{CN})_6]$
 - (c) $\text{Cu}_2[\text{Fe}(\text{CN})_6]$
 - (d) HgSO_4

21. Among the species A (CrCl_3), B (CuS), C (AlCl_3), D (ZnCl_2), which will be soluble in excess of NaOH ?

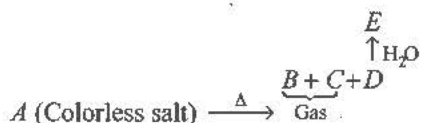
(a) A , C , and D (b) C and D only
(c) B and C only (d) A and D only

22. $2\text{Ag}^+(\text{excess}) + \text{S}_2\text{O}_3^{2-} \xrightarrow{\Delta} \text{Ag}_2\text{S}_2\text{O}_3 \xrightarrow{\text{H}_2\text{O}} \text{X} + \text{H}_2\text{SO}_4$

$2\text{NO}_2^- + 2\text{I}^- \xrightarrow{\text{acidic medium}} \text{Y} + \text{I}_2 + 2\text{H}_2\text{O}$
Suggest the formula of the products X and Y .

(a) $X = \text{Ag}_2\text{O}$, $Y = \text{N}_2$ (b) $X = \text{Ag}_2\text{S}$, $Y = \text{N}_2$
(c) $X = \text{Ag}_2\text{O}$, $Y = 2\text{NO}_2$ (d) $X = \text{Ag}_2\text{S}$, $Y = 2\text{NO}$

23.



Gas (C) turns solution (E) milky. (B) burns with blue flame. (A) also decolorizes $\text{MnO}_4^-/\text{H}^+$.

Thus (A), (B), (C), (D), and (E) are:

(a) $A = \text{CaC}_2\text{O}_4$, $B = \text{CO}_2$, $C = \text{CO}$, $D = \text{CaO}$, $E = \text{Ca}(\text{OH})_2$

(b) $A = \text{CaCO}_3$, $B = \text{CaO}$, $C = \text{CO}$, $D = \text{CO}_2$, $E = \text{Ca}(\text{OH})_2$

(c) $A = \text{CaCl}_2$, $B = \text{Cl}_2$, $C = \text{O}_2$, $D = \text{CaO}$, $E = \text{Ca}(\text{OH})_2$

(d) $A = \text{CaC}_2\text{O}_4$, $B = \text{CO}$, $C = \text{CO}_2$, $D = \text{CaO}$, $E = \text{Ca}(\text{OH})_2$

24. Which acid forms salts of any metal usually water soluble?

(a) HClO_4 (b) CH_3COOH
(c) HNO_3 (d) H_2CO_3

25. During the presence of SO_3^{2-} and S^{2-} in a mixture, with addition of dil. H_2SO_4 , one can notice:

(a) SO_2 and H_2S are not formed
(b) SO_2 and H_2S formed undergo a redox change forming colloidal sulphur and thus no smell
(c) A smell of rotten egg
(d) A smell of burning sulphur

26. Which of the following is not a protonic acid?

(a) $\text{PO}(\text{OH})_3$ (b) $\text{B}(\text{OH})_3$
(c) $\text{SO}(\text{OH})_2$ (d) $\text{SO}_2(\text{OH})_2$

27. Which of the following will be precipitates when H_2S gas is passed through their solutions at $\text{pH} = 10.0$?

(a) Na^+ (b) Ba^{2+}
(c) Zn^{2+} (d) Ca^{2+}

28. $\text{A} \xrightarrow{\Delta} \text{B} + \text{C}_{(\text{g})} + \text{D}_{(\text{g})}$
(Solid) (Brown residue)

Aqueous
 NaOH

E (dirty green precipitate) $\xrightarrow[\text{to air}]{\text{on exposure}}$ F
Find out A .

(a) FeCl_3 (b) $\text{Fe}_2(\text{SO}_4)_3$
(c) FeSO_4 (d) All are correct

29. $(D) \xleftarrow[\text{presence of HCl}]{\text{BaCl}_2 \text{ in}}$ $(A) \xrightarrow[\text{with } \text{K}_2\text{HgI}_4]{\text{aq. solution}}$ (B)
white ppt. (Light green) Brown ppt.
crystalline compound

Aqueous solution with $\text{K}_4[\text{Fe}(\text{CN})_6]$
 \downarrow
(C) Blue

Find out (A):

(a) FeSO_4 (b) $(\text{NH}_4)_2\text{SO}_4$
(c) $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
(d) None of these

30. $\text{Fe} + \text{conc. HNO}_3 \longrightarrow \text{X}$
($> 80\%$)

Then X will be:

(a) Fe_2O_3 (b) FeO
(c) Fe_3O_4 (d) None of these

31. Select the incorrect statement:

(a) When SO_3^{2-} reacts with $\text{Pb}(\text{NO}_3)_2$, then a white ppt. is formed; on boiling, the precipitate is oxidized by atmospheric oxygen and lead sulphate is formed.

(b) White ppt. of PbSO_3 is soluble in dil. HNO_3 , and excess of NaOH solution.

(c) When white ppt. of Ag_2SO_3 is boiled, then brown and metallic black ppt. is formed

(d) Ag_2SO_3 is insoluble in excess of Na_2SO_3 solution

32. When an aqueous solution of gas (X) is added in excess to a copper sulphate solution, a deep blue color is obtained; then gas is:

(a) CH_3COOH (b) NH_3
(c) SO_2 (d) None of these

33. When a mixture containing phosphate is heated with conc. HNO_3 and ammonium molybdate solution, a canary yellow precipitate is formed. The formula of the yellow precipitate is:

(a) $(\text{NH}_4)_3\text{PO}_4$ (b) $(\text{NH}_4)_3\text{PO}_4 \cdot 12\text{MoO}_4$
(c) $(\text{NH}_4)_3\text{PO}_4 \cdot 12\text{MoO}_3$
(d) $(\text{NH}_4)_3\text{PO}_4 \cdot (\text{NH}_4)_2\text{MoO}_4$

34. A solution of a metal ion when treated with KI gives a red precipitate which dissolves in excess of KI to give a colorless solution. Moreover, the solution of metal

ion on treatment with a solution of cobalt(II)thiocyanate gives rise to deep blue crystalline precipitate. The metal ion is:

- (a) Pb^{2+} (b) Hg^{2+}
(c) Cu^{2+} (d) Co^{2+}

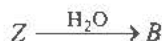
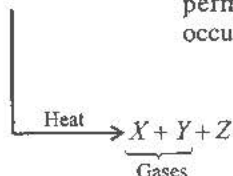
35. $[X] + \text{dil. H}_2\text{SO}_4 \longrightarrow [Y]$ colorless gas with suffocating smell

$[Y] + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \longrightarrow$ green solution

$[X]$ and $[Y]$ are:

- (a) SO_3^{2-} and SO_2 (b) Cl^- and HCl
(c) S^{2-} and H_2S (d) CO_3^{2-} and CO_2

36. A colorless salt $A \xrightarrow{\text{MnO}_4^-/\text{H}^+}$ Decolorization of permanganate sol. occurs

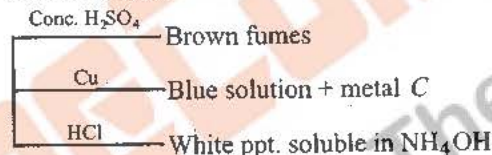


Gas $\text{Y} + \text{B} \longrightarrow$ milkiness

Gas X burns with blue flame. Mark the correct choice.

A	X	Y	Z	B
(a) CaCO_3	CO	CO_2	CaO	Ca(OH)_2
(b) CaC_2O_4	CO	CO_2	CaO	Ca(OH)_2
(c) CaC_2O_4	CO_2	CO	CaO	Ca(OH)_2
(d) CaOCl_2	Cl_2	O_2	CaO	Ca(OH)_2

37. Colorless salt A



The salt A is:

- (a) $\text{Cu(NO}_3)_2$ (b) $\text{Pb(NO}_3)_2$
(c) AgNO_3 (d) $\text{Zn(NO}_3)_2$

38. $\text{NaCl} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{conc. H}_2\text{SO}_4 \xrightarrow{\text{Heat}}$ Red colored



The formula and color of X is:

- (a) CrO_2Cl_2 , red (b) $\text{Cr}_2(\text{SO}_4)_3$, green
(c) PbO , yellow (d) PbCrO_4 , yellow

39. $[C] \xleftarrow{\text{CaCl}_2} [A] \xrightarrow[\Delta]{\text{KOH}}$ [B]
Colorless salt Gas, giving white fumes with HCl

White ppt. $[C]$ decolorizes pink color of acidified KMnO_4 , then $[A]$ is:

- (a) NH_4ClO_4 (b) NH_4NO_2

- (c) $(\text{NH}_4)_2\text{C}_2\text{O}_4$ (d) $(\text{NH}_4)_2\text{SO}_4$

40. A colorless salt A decolorizes the brown color of I_3^- . Solution of A on treatment with AgNO_3 gives white precipitate. The compound A turns FeCl_3 solution (yellow) to FeCl_2 solution (green). Identify A :

- (a) Na_2S (b) $\text{Na}_2\text{S}_2\text{O}_3$
(c) Na_2CO_3 (d) Na_2SO_4

41. A gas X is passed through water to form saturated solution. The aqueous solution on treatment with AgNO_3 gives a white precipitate. The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colorless gas Y . Identify X and Y :

- (a) $X = \text{CO}_2$, $Y = \text{Cl}_2$ (b) $X = \text{Cl}_2$, $Y = \text{CO}_2$
(c) $X = \text{Cl}_2$, $Y = \text{H}_2$ (d) $X = \text{H}_2$, $Y = \text{Cl}_2$

42. MgSO_4 on reaction with NH_4OH and Na_2HPO_4 forms a white crystalline precipitate. What is its formula?

- (a) $\text{Mg(NH}_4\text{)PO}_4$ (b) $\text{Mg}_3(\text{PO}_4)_2$
(c) $\text{MgCl}_2 \cdot \text{MgSO}_4$ (d) MgSO_4

43. $\text{KCl} + \text{conc. H}_2\text{SO}_4 + \text{K}_2\text{Cr}_2\text{O}_7 \xrightarrow{\Delta} (X) \xrightarrow{\text{NaOH}} (Y)$

(X) is reddish brown colored gas soluble in NaOH forming (Y) . (X) and (Y) are:

- (a) Cr_2OCl_2 , Na_2CrO_3 (b) $\text{Cr}_2\text{O}_2\text{Cl}_2$, Na_2CrO_3
(c) CrO_2Cl , Na_2CrO_4 (d) CrO_2Cl_2 , Na_2CrO_4

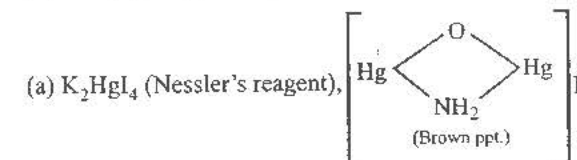
44. $\text{K}_2\text{Cr}_2\text{O}_7 + \text{conc. H}_2\text{SO}_4 + \text{H}_2\text{O}_2 + \text{ether} \longrightarrow$ blue perchromic anhydride (in ethereal layer)

Blue color is due to:

- (a) CrO_3 (b) H_2CrO_4
(c) $\text{H}_2\text{Cr}_2\text{O}_3$ (d) CrO_5

45. $\text{HgCl}_2 + \text{excess of KI} \longrightarrow (A) \xrightarrow{\text{NH}_3/\text{NaOH}} (B)$.

(A) and (B) , respectively, are:



(Iodide of Millon's base) (Y)

- (b) (Y) , (X)
(c) Both (X) (d) Both (Y)

46. To increase significantly the concentration of free Zn^{2+} ion in a solution of the complex ion $[\text{Zn}(\text{NH}_3)_4]^{2+}$, $\text{Zn}^{2+}_{(\text{aq})} + 4\text{NH}_3 \rightleftharpoons [\text{Zn}(\text{NH}_3)_4]^{2+}_{(\text{aq})}$ add to the solution some:

- (a) H_2O (b) $\text{HCl}_{(\text{aq})}$

- (c) $\text{NH}_3(\text{aq})$ (d) $\text{NH}_4\text{Cl}(\text{aq})$
47. Three test tubes A, B, C contain Pb^{2+} , Hg_2^{2+} , and Ag^+ (but unknown). To each, aqueous solution NaOH is added in excess. Following changes occur.
A: Black ppt. B: Brown ppt
C: White ppt. but dissolves in excess of NaOH
A, B, and C contain, respectively:
(a) Pb^{2+} , Hg_2^{2+} , Ag^+ (b) Hg_2^{2+} , Ag^+ , Pb^{2+}
(c) Ag^+ , Pb^{2+} , Hg_2^{2+} (d) Ag^+ , Hg_2^{2+} , Pb^{2+}
48. Consider the following equilibrium:
 $\text{AgCl} \downarrow + 2\text{NH}_3 \rightleftharpoons [\text{Ag}(\text{NH}_3)_2]^+ + \text{Cl}^-$
Soluble
White ppt. of AgCl appears on adding:
(a) NH_3 (b) Aq. NaBr
(c) Aq. HNO_3 (d) Aq. NH_4I
49. Borax on heating strongly above its melting point melts to a liquid, which then solidifies to a transparent mass commonly known as borax-bead. The transparent glassy mass consists of:
(a) Sodium pyroborate
(b) Boric anhydride
(c) Sodium meta-borate
(d) Boric anhydride and sodium metaborate
50. If CO_2 gas is passed into aq. Na_2CrO_4 yellow solution:
(a) Aq. $\text{Na}_2\text{Cr}_2\text{O}_7$ (orange) solution is formed
(b) Aq. $\text{Cr}_2(\text{CO}_3)_2$ is formed
(c) $\text{Cr}(\text{OH})_3$ is precipitated
(d) No action
51. Four test tubes contain dil. HCl, BaCl_2 , CdCl_2 , and KNO_3 solution. Which of the following will identify BaCl_2 ?
(a) Dil. HCl (b) K_2CrO_4
(c) NaF (d) AgNO_3
52. A yellow solid known to be a single compound is completely insoluble in hot water but dissolves in hot dilute HCl to give an orange solution. When this solution is cooled, a white crystalline ppt. is formed. This white ppt. redissolves on heating the solution. The compound is:
(a) $\text{Fe}(\text{OH})_3$ (b) PbCrO_4
(c) K_2CrO_4 (d) $\text{Co}(\text{OH})_2$
53. A mixture upon adding conc. H_2SO_4 gives orange red fumes. It may contain the anion pair:
(a) $\text{CrO}_4^{2-} + \text{Cl}^-$ (b) $\text{Br}^- + \text{Cl}^-$
(c) $\text{NO}_3^- + \text{Cl}^-$ (d) $\text{CrO}_4^{2-} + \text{NO}_3^-$
54. $\text{AgNO}_3(\text{aq})$ gives yellow ppt. with:
(a) $\text{KIO}_3(\text{aq})$ (b) $\text{KI}(\text{aq})$
(c) CHI_3 (d) CH_2I_2
55. The solution of a chemical compound X reacts with AgNO_3 solution to form a white precipitate of Y which dissolves in NH_4OH to give a complex Z. When Z is treated with dil. HNO_3 , Y reappears. The chemical compound X can be:
(a) NaCl (b) CH_3Cl
(c) NaBr (d) NaI
56. The presence of magnesium is confirmed in the qualitative analysis by the formation of a white crystalline precipitate of:
(a) $\text{Mg}(\text{HCO}_3)_2$ (b) MgNH_4PO_4
(c) $\text{MgNH}_4(\text{HCO}_3)_3$ (d) MgCO_3
57. In qualitative inorganic analysis, phosphate, if present, is to be eliminated in the appropriate group in order to detect the radical:
(a) Pb^{2+} (b) As^{3+}
(c) Ca^{2+} (d) Cd^{2+}
58. Al^{3+} , Fe^{3+} , and Cr^{3+} , are grouped together for qualitative analysis because their:
(a) Carbonates are insoluble in NH_3
(b) Hydroxides are insoluble in NH_3
(c) Sulphides are soluble in acid
(d) None of these
59. SnS is:
(a) Black (b) Brown
(c) Orange (d) Yellow
60. Na_2CO_3 cannot be used in place of $(\text{NH}_4)_2\text{CO}_3$ for the precipitation of V group because:
(a) Na^+ interferes in the detection of V group
(b) Conc. of CO_3^{2-} is very low
(c) Na will react with acid radicals
(d) Mg will be precipitated
61. CoCl_2 is:
(a) Pink (b) Black
(c) Green (d) Colorless
62. Which on mixing gives deep brown color?
(a) $\text{N}_2\text{O} + \text{O}_2$ (b) $\text{NO} + \text{O}_2$
(c) $\text{N}_2\text{O}_3 + \text{O}_2$ (d) None of these
63. NaCl, NaBr, NaI mixture on adding conc. H_2SO_4 gives gases, respectively:
(a) HCl, Br_2 , I_2 (b) HCl, HBr, HI
(c) Cl_2 , Br_2 , I_2 (d) None of these