



## CHEMISTRY

### BOOKS - VK JAISWAL CHEMISTRY (HINGLISH)

### QUALITATIVE INORGANIC ANALYSIS

#### LEVEL 1

1.  $Fe(OH)_3$  can be separated from  $Al(OH)_3$  by addition of:

A.  $BaCl_2$

B. Dil. HCl

C. NaOH solution

D.  $NH_4Cl$  &  $NH_4OH$

**Answer: C**



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2. Cations present in slightly acidic solution are  $Al^{3+}$ ,  $Zn^{3+}$  and  $Cu^{3+}$ .

The reagent which when added in excess to this solution would identify and separate  $Cu^{2+}$  in one step is:

A. HCl acid

B.  $NH_3$  solution

C. NaOH solution

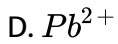
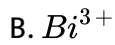
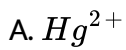
D.  $Na_2CO_3$  solution

**Answer: C**

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3. When a KI solution is added to a metal nitrate, a black precipitate is produced which dissolves in an excess of KI to give an orange solution.

The metal ion is:



**Answer: B**



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4. Which is not easily precipitated for aqueous solution ?



**Answer: C**



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5. Soda extract is useful when given mixture has any insoluble salt, it 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

**Answer: D**



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6. An aqueous solution of a substance, on treatment with dilute HCl, gives a white precipitate soluble in hot water. When  $H_2S$  is passed through the hot acidic solution, a black precipitate is formed. The substance is:

- A.  $Hg_2^{2+}$  salt

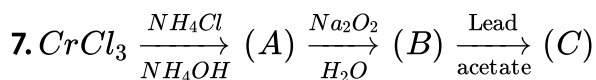
B.  $Cu^{2+}$  salt

C.  $Ag^+$  salt

D.  $Pb^{2+}$  salt

**Answer: D**

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In this reaction sequence, the compound (C) is:

A.  $Na_2CrO_4$

B.  $Na_2Cr_2O_7$

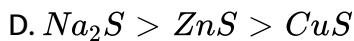
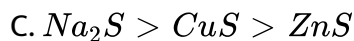
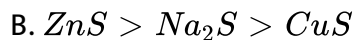
C.  $Cr(OH)_3$

D.  $PbCrO_4$

**Answer: D**

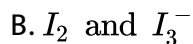
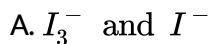
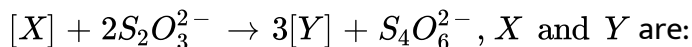
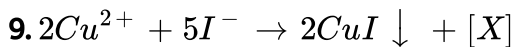
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8. Identify the correct order of solubility of  $Na_2S$ ,  $CuS$  and  $ZnS$  in aqueous solution



**Answer: D**

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C.  $I_2$  and  $I^-$

D.  $I_3^-$  and  $I_2$

**Answer: A**

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10. In Nessler's reagent, the ion present is

A.  $HgI^{2-}$

B.  $HgI_4^{2-}$

C.  $Hg^+$

D.  $Hg^2$

**Answer: B**

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11. A reddish pink substance on heating gives off a vapour which condenses on the sides of the test tube and the substance turns blue. It on cooling water is added to the residue it turns to its original colour.

The substance is:

- A. Iodine crystals
- B. Copper sulphate crystals
- C. Cobalt chloride crystals
- D. Zinc oxide

**Answer: C**

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12. Oxalate +  $MnO_2$  + dil.  $H_2SO_4$  → Gas. The gas evolved is

- A.  $CO_2$
- B.  $CO$



C.  $SO_2$

D.  $O_2$

**Answer: A**



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**13.** Which of the following reagents can used to identify bromide and iodide ions in the presence of organic layer?

A. Chlorine water

B. Silver nitrate solution

C. Starch solution

D. Concentrated sulphuric acid

**Answer: A**



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14. To avoid the precipitation of hydroxides of  $Ni^{2+}$ ,  $Co^{2+}$ ,  $Zn^{2+}$  and  $Mn^{2+}$  along with those of  $Fe^{3+}$ ,  $Al^{3+}$  and  $Cr^{3+}$  the third group solution should be:

- A. Heated with a few drops of conc.  $HNO_3$
- B. Treated with excess of  $NH_4Cl$
- C. Concentrated
- D. None of these

**Answer: B**



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15. Which set gives yellow ppt.?

- A.  $KO_3$ ,  $Sb_2S_3$ ,  $CdS$
- B.  $Sb_2S_3$ ,  $CdS$ ,  $PbCrO_4$
- C.  $PbCrO_4$ ,  $As_2S_3$ ,  $SnS_2$

D.  $SnS_2$ ,  $As_2S_3$ ,  $PbCrO_4$ ,  $PbO$

**Answer: C**

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16. Which of the following reagents can separate a mixture of  $AgCl$  and  $AgI$ ?

A.  $KCN$

B.  $Na_2S_2O_3$

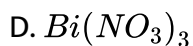
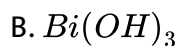
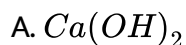
C.  $HNO_3$

D.  $NH_3$

**Answer: D**

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17. Brown ppt.(A) dissolve in  $HNO_3$  gives (B) which gives white ppt. (C) with  $NH_4OH$ . (C) on reaction with HCl gives solution (D) which gives white turbidity on addition of water. What is (D)?

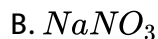
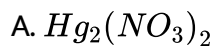


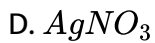
**Answer: C**



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18. Which nitrate on decomposition will give metal?

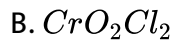
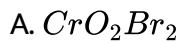




Answer: A::D

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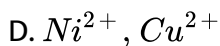
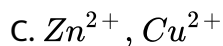
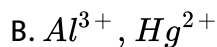
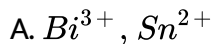
19. Which of the followingg compounds does not exist?



Answer: A

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20. Which one among the following pairs of ions cannot be separated by  $H_2S$  in dilute HCl?

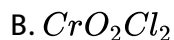
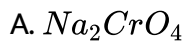


**Answer: A**



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21. Salt (A) gives brick red fumes (B) with conc.  $H_2SO_4$  and  $K_2Cr_2O_7$  which gives yellow solution (C) with NaOH and it gives yellow ppt. (D) with acetic acid and lead acetate. What is (C)?



C.  $PbCrO_4$

D.  $NaCl$

**Answer: A**



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22. When a nitrate is warmed with zinc powder and an NaOH solution, a gas is evolved. Which of the following reagents will be turned brown by the gas?

A. Sodium nitroprusside

B. Sodium cobaltinitrite

C. Nessler's reagent

D. Barium chloride

**Answer: C**



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23. To avoid the precipitation of hydroxides of  $Ni^{2+}$ ,  $Co^{2+}$ ,  $Zn^{2+}$  and  $Mn^{2+}$  along with those of  $Fe^{3+}$ ,  $Al^{3+}$  and  $Cr^{3+}$  the third group solution should be:

- A. Heated with a few drops of conc.  $HNO_3$
- B. Treated with excess of  $NH_4Cl$
- C.  $H_2S$  gas is passed into solution
- D. None of these

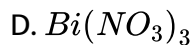
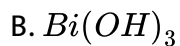
**Answer: B**

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24. Brown ppt.(A) dissolve in  $HNO_3$  gives (B) which gives white ppt. (C) with  $NH_4OH$ . (C) on reaction with HCl gives solution (D) which gives white turbidity on addition of water. What is (D)?

A.  $BiCl_3$





**Answer: A**

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25. What is the oxidation number of iron in the brown ring complex compound ?

A. 0

B. 1

C. +2

D. +3

**Answer: B**

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26. On adding KI solution in excess to a solution of  $CuSO_4$  we get a precipitate 'P' and another liquor 'M'. Select the correct pairs:

- A. P is  $CuI$  and M is  $I_2$  solution
- B. P is  $CuI_2$  and M is  $I_2$  solution
- C. P is  $CuI$  and M is  $KI_3$  solution
- D. P is  $CuI_2$  and M is  $KI_3$  solution

**Answer: C**

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27. On heating a mixture of NaBr and conc.  $H_2SO_4$  we obtain:

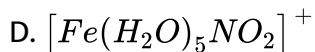
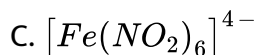
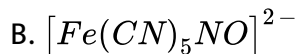
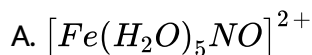
- A.  $HOBr$
- B.  $HBr$
- C.  $Br_2$



Answer: B::C

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28. Which of the following complexes is responsible for the brown colour of the ring formed in the ring test for the nitrates?



Answer: A

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29. There is mixture of Cu(II) chloride and Fe(II) sulphate. The best way to separate the metal ions from the mixture in qualitative analysis is:

A. hydrogen sulphide in acidic medium, where only Cu(II) sulphide will be precipitated

B. ammonium hydroxide buffer, where only Fe(II) hydroxide will be precipitated

C. hydrogen sulphide in acidic medium, where only Fe(II) sulphide will be precipitated

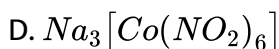
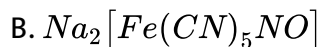
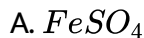
D. ammonium hydroxide buffer, where only Cu(II) hydroxide will be precipitated

**Answer: A**



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30. Which of the following reagents can be used to distinguish between a sulphite and a sulphate in solution?

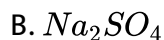


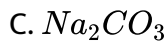
**Answer: C**



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31. A doctor by mistake administers a  $Ba(NO_3)_2$  solution to a patient for radiography investigations. Which of the following should be given as the best to prevent to adsorption of soluble barium?



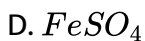
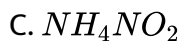


**Answer: B**



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32. A colourless water soluble solid (X) on heating gives equimolar quantities of (Y) and (Z). Y gives dense white fumes with HCl and Z does so with  $NH_3$ . Y gives brown ppt. with  $K_2HgI_4$  (Nesslers reagent) and Z gives white precipitate with nitrates of  $Ag^+$ ,  $Pb^{2+}$  and  $Hg^+$ . What is X ?



**Answer: A**



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33. The colour of the iodine solution is discharged by shaking with

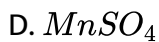
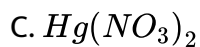
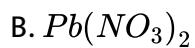
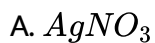
- A. sodium sulphate
- B. sodium sulphide
- C. aqueous sulphur dioxide
- D. sodium bromide

**Answer: B::C**



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34. 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 dil. NaCl solution and one formed a black precipitate with  $H_2S$ . The salt could

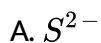


**Answer: B**

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**35.** In an alkaline solution, sodium nitroprusside gives a violet colour with

:



**Answer: A**



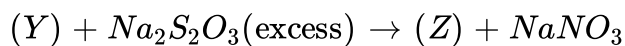
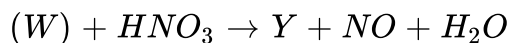
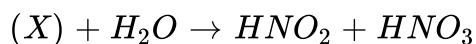
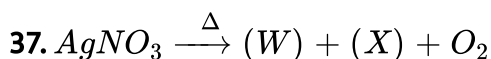
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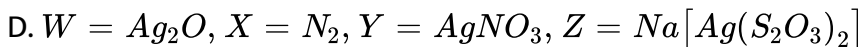
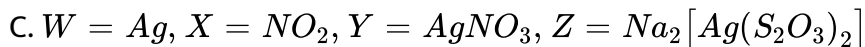
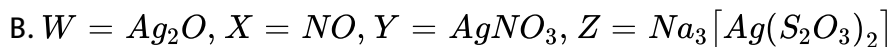
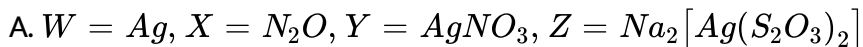
36. A pale yellow precipitate and a gas with pungent odour are formed on warming dilute hydrochloric acid with an aqueous solution containing

- A. sulphate ion
- B. sulphide ion
- C. thiosulphate ion
- D. sulphite ion

**Answer: C**

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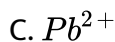
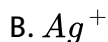
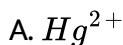
**Answer: C**

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**38.** Consider the following sequence of tests,



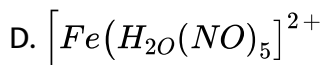
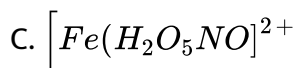
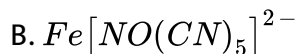
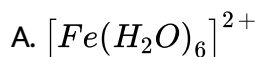
The metal ion ( $M^{n+}$ ) would be:



**Answer: C**

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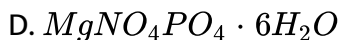
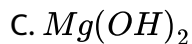
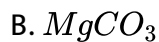
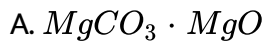
**39.** The brown ring test for  $NO_3^-$  is due to the formation of the complex ion with formula:



**Answer: C**

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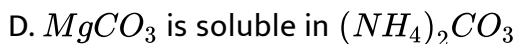
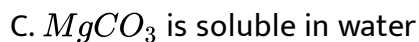
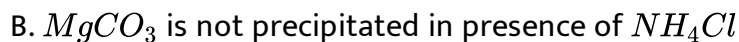
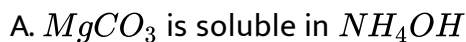
**40.** Which of the following compounds does magnesium precipitate when you test for it?



**Answer: D**

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**41.**  $MgCO_3$  is not precipitated with the carbonates of Vth group radicals in presence of  $NH_4Cl$  and  $NH_4OH$  because:



**Answer: B**

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42. Which of the following salt gives green colour mass in cobalt nitrate charcoal cavity test?

A. Zn salts

B. Al salts

C. Alumns

D. Copper salts

**Answer: A**

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43. Yellow coloured compound is:

A.  $NH_4CNS$

B.  $PbCrO_4$

C.  $\text{NaOH}$

D.  $\text{K}_4[\text{Fe}(\text{CN})_6]$

**Answer: B::D**



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**44.** Which of the following tests can you identify  $\text{K}^+$  in a salt?

A. Flame test (violet) and precipitation (yellow) with sodium cobaltinitrite

B. Flame test (violet) and precipitation (violet) with sodium cobaltinitrite

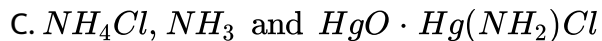
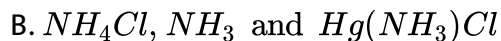
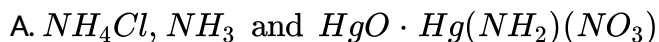
C. Flame test (crimson) and precipitation (yellow) with sodium cobaltinitrite

D. Flame test (golden) and precipitation (violet) with sodium cobaltinitrite

**Answer: A**

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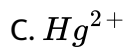
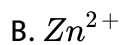
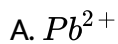
**45.** A chloride salt on addition of alkali solution gives gas B which gives brown ppt. with nessler's reagent. What is A, B and C?



**Answer: D**

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**46.** An inorganic salt is strongly heated. The residue is yellow when hot and white when cold. The salt contains:

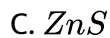


**Answer: B**



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**47.** Which of the following sulphides is white?



**Answer: C**



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48. The gas evolved in which of the following reactions forms the iodide of Millon's base on being passed through a solution of  $[HgI_4]^{2-}$  in KOH?

- A.  $CaSO_4$  treated with dilute HCl
- B.  $NH_4Cl$  boiled with NaOH
- C.  $ZnS$  treated with dilute  $H_2SO_4$
- D.  $MgCO_3$  heated alone

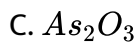
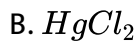
**Answer: B**



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49. A white, sublimable inorganic substance gives a brown precipitate on treatment with nessler's reagent and a white precipitate (soluble in  $NH_3$ ) with an  $AgNO_3$  solution. The substance is :

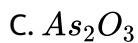
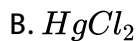
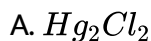
- A.  $Hg_2Cl_2$



**Answer: D**

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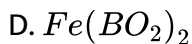
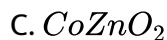
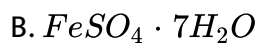
**50.** A white sublimable substance, that turns black on treatment with an  $NH_3$  solution can be:



**Answer: A**

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51. Rinman's green is:

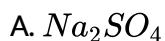


**Answer: C**



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52. A white crystalline salt imparts a violet colour to a Bunsen flame, and with hot concentrated  $H_2SO_4$ , forms a pungent gas. On treatment with an  $AgNO_3$  solution, this gas forms a white precipitate readily soluble in  $NH_3$ . The white crystalline salt may be:



B.  $KCl$

C.  $CaCl_2$

D.  $SrCl_2$

**Answer: B**



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53. A which solid gives a green residue on being subjected to the cobalt nitrate test. on being warmed with concentrated  $H_2SO_4$ , the solid gives a brown gas, which evolves vigorously on the addition of Cu turnings. The solid may be:

A.  $Zn(NO_3)_2$

B.  $Al(NO_3)_3$

C.  $ZnBr_2$

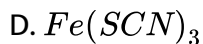
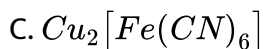
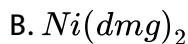
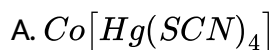
D.  $Mg(NO_3)_2$

**Answer: A**



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**54.** Which of the following is blue?

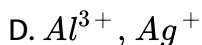
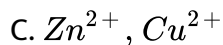
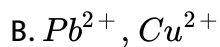
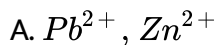


**Answer: A**



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**55.** Which of the following pairs of cations cannot be separated by using an  $NH_3$  solution?

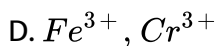
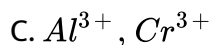
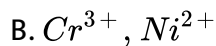
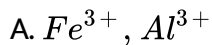


**Answer: C**



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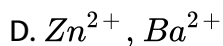
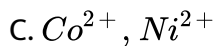
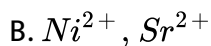
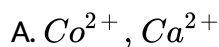
**56.** Which of the following pairs of cations can be separated by adding  $NH_4Cl$  and  $NH_4OH$  to the mixture?



**Answer: B**

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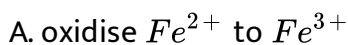
57. Which of the following pairs of cations cannot be separated by adding  $NH_4Cl$  and  $NH_4OH$  to the mixture and then passing  $H_2S$  through it?



**Answer: C**

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58. Before adding the reagents of group III, the solution is heated with some concentrated  $HNO_3$  in order to :



B. oxidise  $Cr^{3+}$  to  $Cr_2O_7^{2-}$

C. lower than pH

D. increase the  $NO_3^-$

**Answer: A**

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**59.** Which of the following pairs of sulphides are insoluble in dilute HCl?

A. CoS and NiS

B. CoS and MnS

C. NiS and MnS

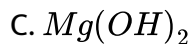
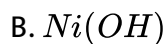
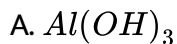
D. NiS and ZnS

**Answer: A**

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60. If a solution containing  $Al^{3+}$ ,  $Ni^{3+}$  and  $Mg^{3+}$  is first created with  $NH_4Cl$  and then with  $NH_4OH$ , which of the following will precipitate?

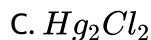
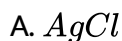


**Answer: A**



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61. Which of the following leaves a black residue on the addition of  $NH_3$  ?



D.  $HgCl_2$

**Answer: C**



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62. Which of the following is not soluble in hot an conc.  $HNO_3$  ?

A. PbS

B. NiS

C. CuS

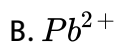
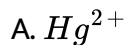
D. HgS

**Answer: D**



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63. Which of the following cations will form an insoluble red-brown compound with  $[Fe(CN)_6]^{4-}$  ?

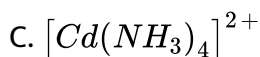
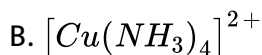
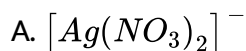


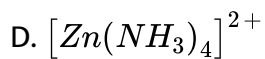
**Answer: C**



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64. Which of the following, on treatment with KCN, will give cyanogen gas?



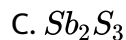
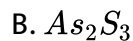


**Answer: B**



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65. Which of the following is insoluble in yellow ammonium polysulphide?

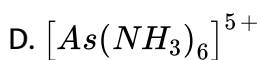
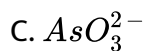
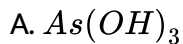


**Answer: A**



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66. Which of the following is formed when  $As_2S_3$  is warmed with  $NH_4OH$  and  $H_2O_2$  ?



**Answer: B**



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67. The role of  $NH_4Cl$  in the precipitation of the hydroxides of group III cations is to:

A. increase the  $Cl^-$

B. facilitate the dissociation of  $NH_4OH$

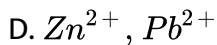
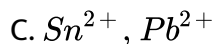
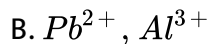
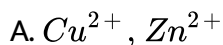
C. suppress the dissociation of  $NH_4OH$  by the common ion effect

D. render the solution weakly acidic

**Answer: C**

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**68.** Which of the following pairs of cations can be separated by using on adding NaOH solution?



**Answer: A**

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69. On heating, a salt gives a gas which turns lime water milky and an acidified dichromate solution green. The salt may be:

- A. carbonate
- B. sulphide
- C. sulphate
- D. sulphite

**Answer: D**



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70. Reaction of  $Zn(OH)_2$  with NaOH produces:

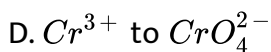
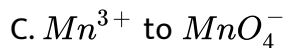
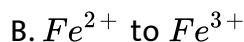
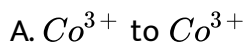
- A.  $Na_2ZnO_2$
- B.  $ZnO$
- C.  $Na_2O$
- D. None of these

**Answer: A**



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71. In group separation, before precipitating out group III metal ions as hydroxides, it is necessary to boil then solution of the salt mixture with a few drops of concentrated  $HNO_3$  is treated. This is done to convert:



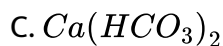
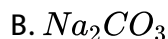
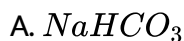
**Answer: B**



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72. A compound X on heating gives a colourless gas. This residue is dissolved in water to obtain Y. excess  $CO_2$  is bubbled through aqueous solution of Y, Z is formed. Z on gentle heating give back X. the X is

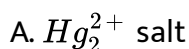


**Answer: D**



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73. An aqueous solution of a substance gives a white precipitate on treatment with dil  $HCl$ , which dissolve on heating. On passing  $H_2S$  in hot acidic solution a black precipitate is formed. The substance is:



B.  $Hg^{2+}$  salt

C.  $Ag^+$  salt

D.  $Pb^{2+}$  salt

**Answer: D**

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74. A solid mixture of  $AgCl$  and  $K_2Cr_2O_7$  is heated with conc.  $H_2SO_4$  and produces:

A. greenish yellow gas

B. colourless gas

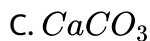
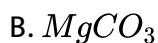
C. red coloured gas

D. no gas

**Answer: D**

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75. Which of the following has the highest value of  $K_p$ ?

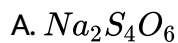


**Answer: A**



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76. When copper sulphate solution is treated with potassium iodide and excess of hypo solution is added in resulting solution, a white precipitate is formed. The white ppt. is due to formation of:



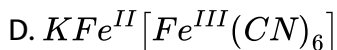
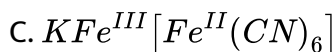
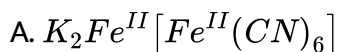
C.  $CuI$

D.  $NaI$

**Answer: C**

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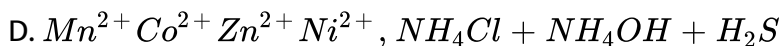
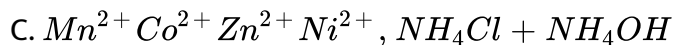
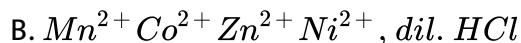
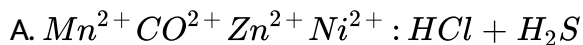
77. The ferrous ion in a given sample is detected by the formation of a white precipitate on the addition of a potassium ferrocyanide solution to it. The precipitate has the constitutional formula:



**Answer: A**

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78. Which one is correct group reagent for group cations?



Answer: D



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79. Cobalt salt +  $KNO_2 + CH_3COOH \rightarrow$  yellow ppt. the yellow precipitate is:

A. Potassium cobaltantrate

B. Potassium cobaltinitrite

C. Cobalt nitrite

D. Cobalt nitrate

**Answer: B**

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80. Sulphide ions react with  $Na_{20}[Fe(NO)(CN)_5]$  to form a purple coloured compound  $Na_4[Fe(CN)_5(NOS)]$ . In the reaction, the oxidation state of iron:

- A. Changes from +2 to +3
- B. Changes from +3 to +2
- C. Changes from +2 to +4
- D. does not change

**Answer: D**

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81. White crystal (A) on treatment with  $AgNO_3$  gives white crystalline precipitate. (A) discharge the colour of  $KMnO_4$  solution but no gas is evolved. Probable radical present in (A) is:

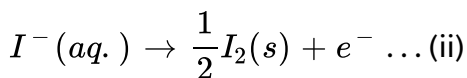
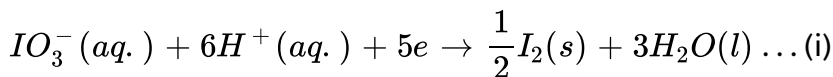


Answer: C



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82. Iodate ions ( $IO_3^-$ ) can be reduced to iodine by iodide ions. The half equation which represent the redox reaction are:



How many moles of iodine are produced for every mole of iodate ions consumed in the reaction?

A. 0.5

B. 1

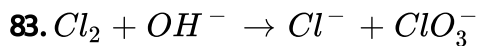
C. 2.5

D. 3

**Answer: D**



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What is the coefficient for  $OH^-$  when this equation is balanced with the smallest interger coefficients ?

A. 2

B. 3

C. 4

D. 6



**Answer: D**



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**84.** A solution of metal hydroxide ( $MOH$ ) with copper sulphate and mixed tartarate of metal  $M$  with another metal  $M_1$  of the same group is used in the detection of  $-CHO$  group. Metal  $M$  and  $M_1$  are respectively

A.  $K, Na$

B.  $K, Rb$

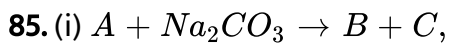
C.  $Na, Li$

D.  $Rb, Na$

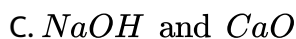
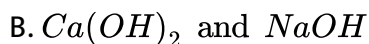
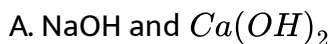
**Answer: A**



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(ii)  $A \xrightarrow{CO_2}$  (Milky) C. Itbr. The chemical formula of A and B are respectively:



**Answer: B**



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86. Sometimes yellow turbidity appears while passing  $H_2S$  gas even in the absence of II group radicals. This is because of

A. sulphur is present in the mixture as impurity

B. (IV) group radicals are precipitated as sulphides

C. the oxidation of  $H_2S$  gas by some acid radicals

D. III group radicals are precipitated as hydroxides

**Answer: C**

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87. Incorrect order of solubility product ( $K_{sp}$ ) of given precipitated compound is:

A.  $AgCl < PbCl_2$

B.  $Al(OH)_3 < Zn(OH)_2$

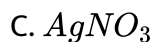
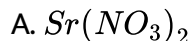
C.  $BaCO_3 < MgCO_3$

D.  $MnS < Ag_2S$

**Answer: D**

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88. On adding KI to a metal salt solution, no precipitate was observed but the salt solution gives yellow precipitate with  $K_2CrO_4$  in the presence of  $CH_3COOH$ . Then the salt is:

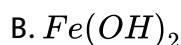
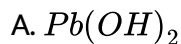


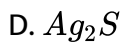
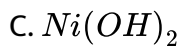
**Answer: D**



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89. Which of the following precipitate is soluble in excess of  $NH_3$  solution?

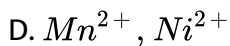
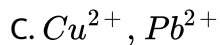
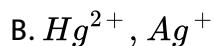
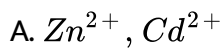




**Answer: C**

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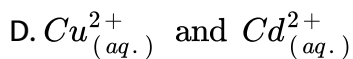
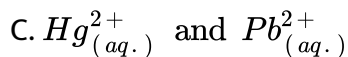
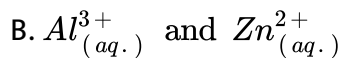
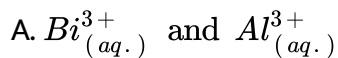
90. When of the following precipitate is soluble in excess of  $NH_3$  solution?



**Answer: A**

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91. Which of the following mixtures can be separated by using excess  $NH_3$  solution?

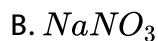


Answer: B



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92. Which of the following salt on heating with concentrated  $H_2SO_4$ , coloured vapours do not evolve?



D.  $KI$

**Answer: C**

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**LEVEL 2**

1. When a reagent (X) reacts with  $Fe^{3+}$  salt solution turns red due to the formation of a compound (Y). This reagent cause no change in colour with  $Fe^{2+}$  salt solution. Compound (X) and (Y) are respectively:

A.  $NH_4SCN$  and  $Fe(SCN)_3$

B.  $K_4[Fe(CN)_6]$  and  $FeSO_4$

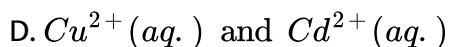
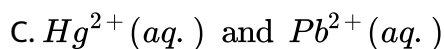
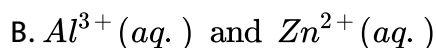
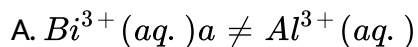
C.  $Na_2HPO_4$  and  $FeSO_4$

D.  $K_3[Fe(CN)_6]$  and  $K_2Fe[Fe(CN)_6]$

**Answer: A**

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2. Which of the following mixtures can be separated by using excess  $NH_3$  solution?

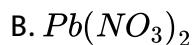
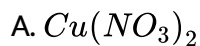


Answer: B

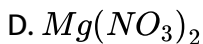
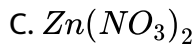


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3. Which of the following salt will not give positive brown ring test?





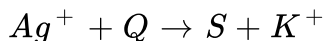
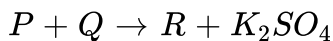


**Answer: B**

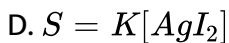
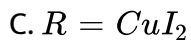
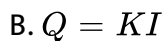
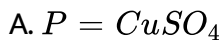


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4. Consider the following reactions



Then according to given information the incorrect match is:



**Answer: D**



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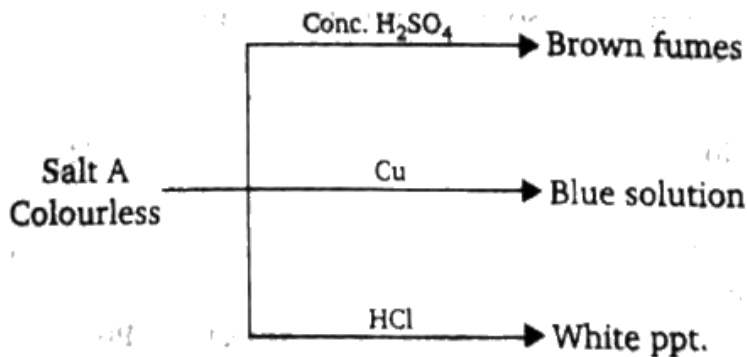
5. A very dilute acidic solution of  $Cd^{2+}$  and  $Ni^{2+}$  gives only yellow ppt. of CdS on passing  $H_2S$ , this is due to

- A. Solubility product ( $K_{sp}$ ) of CdS is more than that of NiS
- B. Solubility product ( $K_{sp}$ ) of CdS is less than that of NiS
- C.  $Cd^{2+}$  belong to IIB group while  $Ni^{2+}$  belongs to  $IV^{th}$  group
- D. CdS is insoluble in yellow ammonium sulphide (YAS)

**Answer: B**



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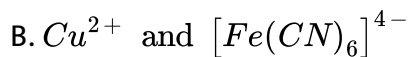
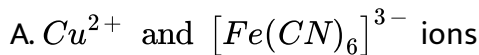
6. Identify salt (A) satisfying above chemical property:

- A.  $Cu(NO_3)_2$
- B.  $NaNO_3$
- C.  $AgNO_3$
- D.  $Pb(NO_3)_2$

Answer: C

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7. Reddish brown (chocolate) precipitate is formed by mixing solutions containing:



**Answer: B**



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8. Water soluble mixture  $\xrightarrow[\text{(ii) . dil .HCl}]{\text{(i) . } BaCl_2}$  White ppt.

Filtrate+(Hot and conc.) $HNO_3 + BaCl_2 \rightarrow$  White ppt.

The mixture contains:



C. both (a) and (b)

D. none of these

**Answer: C**



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9. Which of the following compounds after mixing can produce blue colouration?

(I)  $K_4[Fe(CN)_6]$  and  $FeCl_3$  solution

(II)  $NH_4OH$  and  $CuSO_4$  solution

(III) Adding anhydrous  $CuSO_4$  to water

(IV)  $NH_4OH + NiSO_4$  solution

Choose the correct code:

A. I,II,III

B. II,III

C. I,III

D. I,II,III,IV

**Answer: D**

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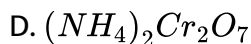
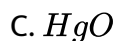
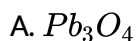
10. A bromide ion does not interfere with the chromyl chloride test because when a bromide is present:

- A.  $Br_2$  is liberated, which leaves the NaOH solution colourless
- B.  $CrO_2Br_2$  formed does not volatilise as  $CrO_2Cl_2$  does
- C.  $CrO_2Br_2$  does not react with NaOH
- D. no gaseous substance containing bromine is produced

**Answer: A**

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11. A red solid is insoluble in water. However, it becomes soluble if some KI is added to water. Heating red solid in a test tube produces violet coloured fumes and droplets of metal appear on the cooler parts of test tube. The red solid is

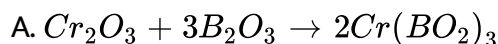


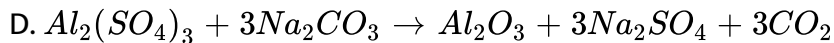
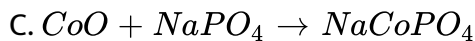
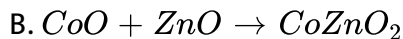
**Answer: B**



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12. Which of the following reaction(s) relevant to the microcosmic salt bead test?





**Answer: C**

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13. Solid KCl, when heated with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , gives red vapours (a) that turn NaOH solution yellow (b). The yellow solution, when acidified with acetic acid and treated with lead acetate, gives a yellow precipitate (c). which of the following is true with respect to a, b and c?

A. a and b contain  $CrO_4^{2-}$

B. a and c contain  $CrO_4^{2-}$

C. a, b and c contain  $CrO_4^{2-}$

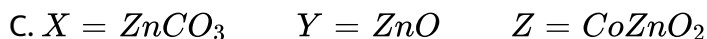
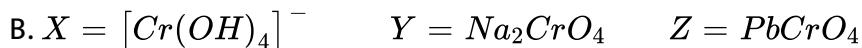
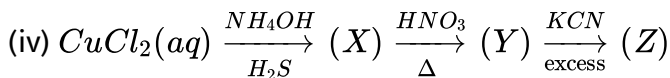
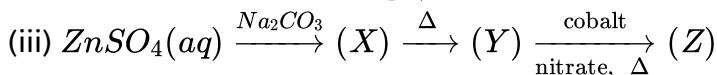
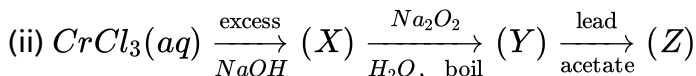
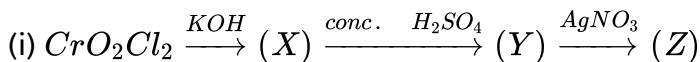
D. a, b and c contain Cr(VI)



Answer: D

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14. Choose the correct code by identifying (X), (Y) and (Z) in each case for the changes indicated:



Answer: D

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15. A salt, when warmed with zinc powder and an NaOH solution, gives a gas that turns a filter paper soaked with an alkaline solution of  $K_2[HgI_4]$  brown. The salt responds to the brown ring test when acetic acid is used in place of sulphuric acid. The anion present in the salt is:



D. None of these

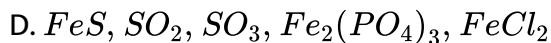
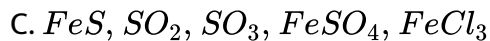
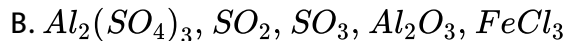
**Answer: B**



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16. A sulphate of a metal (A) on heating evolves two gases (B) and (C) and an oxide (D). Gas (B) turns  $K_2Cr_2O_7$  paper green while gas (C) forms a trimer in which there is no  $S - S$  bond. Compound (D) with HCl, forms a

Lewis acid (E) which exists as a dimer. Compounds (A), (B), (C), (D) and (E) are respectively:

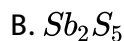
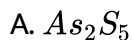


**Answer: A**



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17.  $X + HNO_3 \rightarrow Y + NO_2 + H_2O + S$ , Y+Ammonium molybdate  $\rightarrow$  yellow ppt. identify X:



D.  $CdS$

**Answer: A**

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18.  $X \xrightarrow{\text{Dil. } H_2SO_4} Y \xrightarrow{\text{Dil. } HNO_3}$  Colloidal sulphur identify X?  
(Black) (gas)

A.  $CuS$

B.  $FeS$

C.  $PbS$

D.  $NiS$

**Answer: B**

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19. A mixture of  $Na_2CO_3$  and  $Na_2SO_3$  is treated with dilute  $H_2SO_4$  in a setup such that the gaseous mixture emerging can pass first through a solution of  $BaCl_2$  and then the gaseous mixture passed through acidified  $K_2Cr_2O_7$ . Which of the following will you observe?

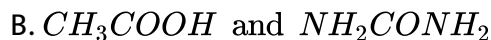
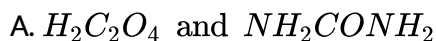
- A. The  $BaCl_2$  solution remains unaffected and the acidified dichromate solution turns green
- B. The  $BaCl_2$  solution gives a white precipitate and the acidified dichromate solution remains unaffected
- C. The  $BaCl_2$  solution gives a white precipitate and the acidified dichromate solution turns green
- D. Both the solutions remain unaffected

**Answer: B**



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20. An organic compound (A) on heating produces two gases (B) and (C) and neutral oxide (D) which turns cobalt chloride paper pink. Gas (B) turns lime water milky and produces an acidic solution with water. Gas (C) produces a poisonous gas (E) with chlorine gas, the gas, this gas with ammonia gives an organic compound (F) which on further reaction with (D) gives  $NH_3$  gas. Then, compound (A) and (F) can be found as:

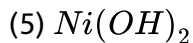
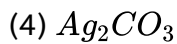
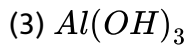
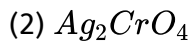
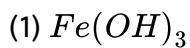


**Answer: A**



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21. Which of the following compounds is/are partially soluble or insoluble in  $NH_4OH$  solution:



A. 1,3,5

B. 2,3,4

C. 1,3

D. 2,3,5

**Answer: C**



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**22.** Which of the following will be precipitated when a solution containing calcium acetate, strontium acetate and barium acetate is treated with  $(NH_4)_2SO_4$  ?

A.  $CaSO_4$  and  $SrSO_4$

B.  $SrSO_4$  and  $BaSO_4$

C.  $BaSO_4$  and  $CaSO_4$

D.  $SrSO_4$  only

**Answer: B**

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**23.** Give the correct order of initials T or F for following statements. Use T iff statement is true and F if it is false.

(i)  $Cu^+$  undergoes disproportionation to Cu and  $Cu^{2+}$  in aqueous solution.

(ii)  $Hg_2Cl_2$  does not impart chromyl chloride test

(iii) Sulphide ions react with sodium nitroprusside to form a purple coloured complex. in this reaction, oxidation state of iron changes.

A. TFF



B. FTT

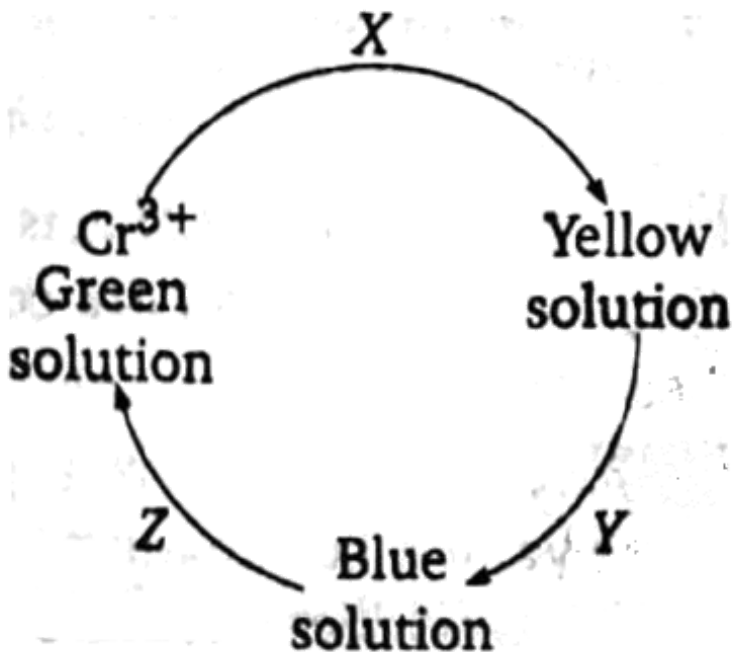
C. TFT

D. TTF

Answer: D

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24. In this sequence X, Y, Z are respectively:



A. Acidified  $H_2O_2$ , alkaline  $H_2O_2$ , acidified  $H_2O_2$

B. Alkaline  $H_2O_2$ , acidified  $H_2O_2$ , Zn/HCl

C. Acidified  $H_2O_2$ , Heat, alkaline  $H_2O_2$

D. Alkaline  $H_2O_2$ , acidified  $H_2O_2$ , on standing

**Answer: D**

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25. What will be the colour of the solution when  $Mn(OH)_2$  is treated with concentrated  $HNO_3$  and sodium bismuthate (or red lead or lead dioxide)?

A. Yellow

B. Purple

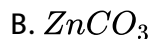
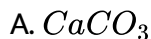
C. Green

D. Blue

**Answer: B**

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26. A white powder "A" on heating gave a non-combustible gas and a white residue. The residue on heating turns yellow. The residue dissolves in dil. HCl and the solution gives a white ppt. with  $K_4[Fe(CN)_6]$ . "A" would be:



**Answer: B**

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27. An aqueous solution of  $FeSO_4 \cdot Al_2(SO_4)_3$  and chromium alum is heated with excess of  $Na_2O_2$  and filtered. The material obtained are:

- A. a colourless filtrate and green residue
- B. a yellow filtrate and brown residue
- C. a yellow filtrate and a green residue
- D. a green filtrate and a brown residue

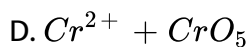
**Answer: B**



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28. When a solution of  $Na_2Cr_2O_7$  is treated with amyl alcohol and acidified  $H_2O_2$ , the layer of amyl alcohol turns blue. What is the blue colouration?

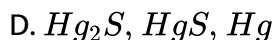
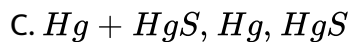
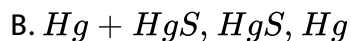
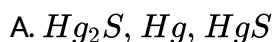
- A.  $Cr^{2+}$
- B.  $CrO_5$



**Answer: B**

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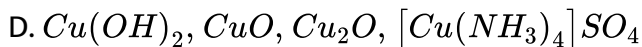
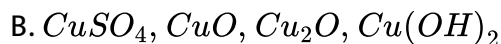
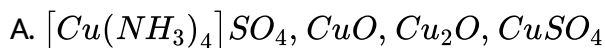
29.  $Hg_2^{2+}$  when reacts with  $H_2S$ , black ppt. (A) formed which when reacts with  $Na_2S$  followed by filtration leaving behind black ppt. (B). The filtrate with  $H^+$  gives black ppt. (C). A, B and C are:



**Answer: C**

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30. (A) light blue coloured compound on heating will convert into black (B) which reacts with glucose gives red compound (C) and (A) reacts with ammonium hydroxide in excess in presence of ammonium sulphate give blue compound (D). What is (A), (B), (C) and (D)?



**Answer: D**



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31. A mixture of ferric alum, chrome alum and potash alum is dissolved in water and treated with an excess of  $NH_3$  solution and warmed with a mixture of  $NaOH$  and  $H_2O_2$  and filtered. We will get:

- A. a green residue and a yellow filtrate
- B. a brown residue and a yellow filtrate
- C. a brown residue and a green filtrate
- D. a blue residue and a green filtrate

**Answer: B**

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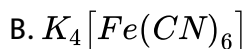
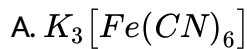
**32.** When KCN is added to  $CuSO_4$  solution:

- A. KCN acts as a reducing agent
- B. KCN acts as a complexing agent
- C.  $K_3[Cu(CN)_4]$  is formed
- D. All are correct

**Answer: D**

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33.  $Fe^{2+}$  and  $Fe^{3+}$  can be distinguished by



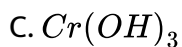
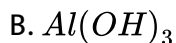
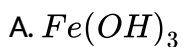
D. All are correct

**Answer: D**

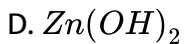


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34. Which of the following will not dissolve in a hot mixture of NaOH and  $H_2O_2$  ?





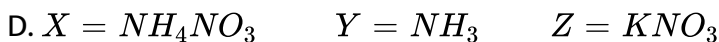
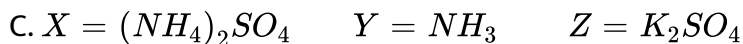
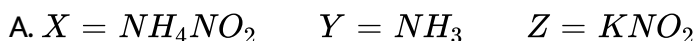


Answer: A

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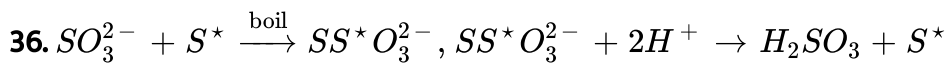


$(X) \xrightarrow{\Delta}$  gas (does not support combustion) identify (X) to (Z):



Answer: A

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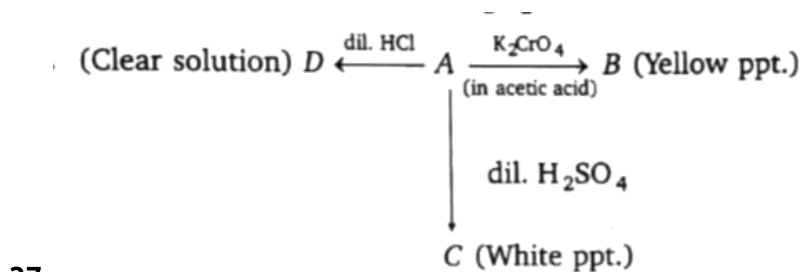


The above reaction sequence proves:

- A. Two sulphur atoms of thiosulphate are not equivalent
- B. Both are equivalent
- C. Both of the above are correct
- D. None of these

Answer: A

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Compound(s) is/are:

- A. lead carbonate
- B. red lead
- C. barium carbonate
- D. calcium carbonate

**Answer: C**

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**38.** Which of the following is precipitated when an arsenate reacts with a magnesium mixture?

- A.  $MgHASO_3$
- B.  $Mg_2AsO_3$
- C.  $MgNH_4AsO_4 \cdot 6H_2O$
- D.  $Mg_2NH_4AsO_4 \cdot 6H_2O$

**Answer: C**

39. A coloured solution known to contain two metal ions, was treated with excess cold sodium hydroxide solution. When filtered a whitish solid, slowly changing to brown, was retained on the filter paper and a colourless solution collected as the filtrate. Dropwise addition of hydrochloric acid to the filtrate produced a white ppt. which dissolved in excess acid. Treatment of the residue on filter paper with a solution of strong oxidiser produced a reddish-violet solution. Indicate any pairs of ions:

- A.  $Zn^{2+}$  and  $Mn^{2+}$  ions
- B.  $Mg^{2+}$  and  $Zn^{2+}$  ions
- C.  $Mn^{2+}$  and  $Mg^{2+}$  ions
- D.  $Fe^{2+}$  and  $Zn^{2+}$  ions

**Answer: A**

40. Which of the following statement is incorrect?

(I) In  $S_2O_3^{2-}$  both sulphur are different in nature.

(II) Sodium acetate and lead acetate on heating giving same type of product. Whereas Mn, Sn, Fe oxalate salt giving different type of products.

(III) Aqueous solution  $OCl^-$ ,  $S^{2-}$  and  $CO_3^{2-}$  basic in nature

(IV)  $NO_2^-$  oxidises  $I^-$  whereas  $Br_2$  and  $Cl_2$  oxidises  $NO_2^-$

A. II only

B. II, III, IV

C. II, IV

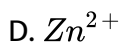
D. I, II, IV

**Answer: A**



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41. On strongly heating, a blue salt leaves a black residue. Which of the following cations can be present in the salt?

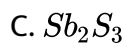
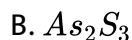
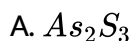


**Answer: C**



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42. Which of the following, when dissolved in yellow ammonium sulphide, forms a thiocomplex containing the metal in the oxidation state +IV?



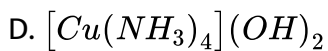
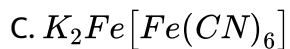
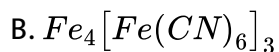
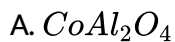
D.  $SnS$

**Answer: D**



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**43.** Thenard's blue is



**Answer: A**



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44. A salt imparts a yellow colour to a borax bead in an oxidising flame.

What would be the colour of the bead in a reducing flame?

A. Green

B. Blue

C. Red

D. Violet

**Answer: A**



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45.  $BiCl_3$  can be reduced to metallic bismuth by:

A.  $H_2S$

B.  $SO_2$

C.  $FeSO_4$

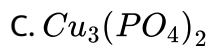
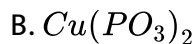
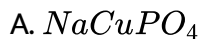
D.  $Na_2[Sn(OH)_4]$



**Answer: D**

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46. The blue colour in an oxidising flame of a microcosmic bead containing  $Cu^{2+}$  is due to:

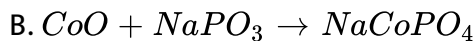
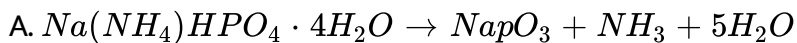


D. None of these

**Answer: A**

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47. Which of the following reaction(s) relevant to the microcosmic salt bead test?

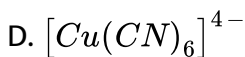
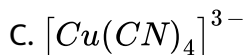
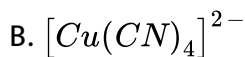
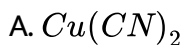


D. all of these

**Answer: D**

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**48.** Which of the following is formed in solution when  $[Cu(NH_3)_4]^{2+}$  is treated with KCN till the colour of the complex is discharged?



**Answer: C**

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49. A white solid forms Rinmann's green in the charcoal cavity test in an oxidising flame. On treatment with dilute  $H_2SO_4$ , this solid produces a gas that turns an acidified dichromate paper green and lead acetate paper black. The white solid is:

A.  $PbS$

B.  $ZnSO_3$

C.  $ZnS$

D.  $Na_2S$

**Answer: C**

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50. A white solid imparts a violet colour to a Bunsen flame. On being heated with concentrated  $H_2SO_4$ , the solid gives violet vapours that turn

starch paper blue. The salt may be :

A.  $\text{NaI}$

B.  $\text{KI}$

C.  $\text{CaBr}_2$

D.  $\text{MgI}_2$

**Answer: B**



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51. Which of the following is soluble in boiling water, but less soluble in cold water?

A.  $\text{PbCl}_2$

B.  $\text{PbCr}_2$

C.  $\text{PbI}_2$

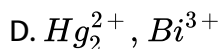
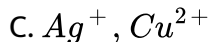
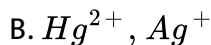
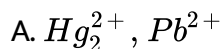
D. all of these

**Answer: D**



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**52.** Which of the following pairs of cations cannot be separated by using dilute HCl?



**Answer: A**



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**53.** If  $NH_4OH$  in presence of  $NH_4Cl$  is added to a solution containing  $Al_2(SO_4)_2$  and  $MgSO_4$ , which of the following will precipitate?

A.  $Al(OH)_3$  only

B.  $Mg(OH)_2$  only

C.  $Al(OH)_3$  and  $Mg(OH)_2$

D. None of these

**Answer: A**

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54. Which of the following pairs of cations can be separated by adding  $NH_4Cl$ ,  $NH_4OH$  and then  $(NH_4)_2CO_3$  to the mixture?

A.  $Ca^{2+}$ ,  $Mg^{2+}$

B.  $Ba^{2+}$ ,  $Sr^{2+}$

C.  $Sr^{2+}$ ,  $Ca^{2+}$

D.  $Ba^{2+}$ ,  $Ca^{2+}$

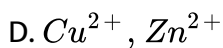
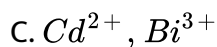
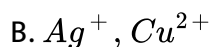
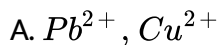
**Answer: A**

55.  $H_2S$  is passed through the solution in an acidic medium to precipitate the sulphides of group II cations, but in an alkaline medium to precipitate the sulphides of group IV cations because:

- A. the sulphides of group II cations are more soluble than those of group IV cations
- B. the sulphides of group II cations have lower solubility products than those of group IV cations
- C. the sulphides of group II cations are soluble in an acidic medium, but those of group IV cations are not
- D. The sulphides of group IV cations are soluble in an alkaline medium but those of group II cations are not

**Answer: B**

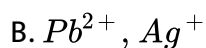
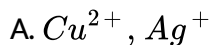
56. Which of the following pairs of cations can be separated by passing  $H_2S$  through the mixture in the presence of 0.2 M HCl?



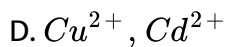
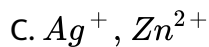
**Answer: D**

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57. Which of the following pairs of cations can be separated by using an  $NH_3$  solution?



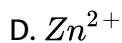




**Answer: B**

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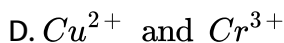
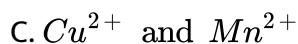
58. Which of the following ions cannot be detected by the borax bead or microcosmic bead test?



**Answer: D**

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59. Which of the following pairs of cations will turn borax beads blue in an oxidising flame?

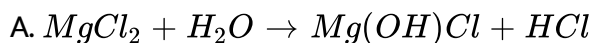


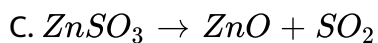
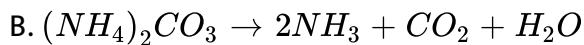
Answer: B



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60. A colourless crystalline salt, on being heated, gives a coloured gas with a pungent smell. On being passed through an  $AgNO_3$  solution, this gas forms a white precipitate insoluble in  $HNO_3$  but readily soluble in an  $NH_3$  solution. Which of the following reaction can lead to the above observation?

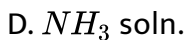
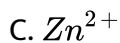




**Answer: A**

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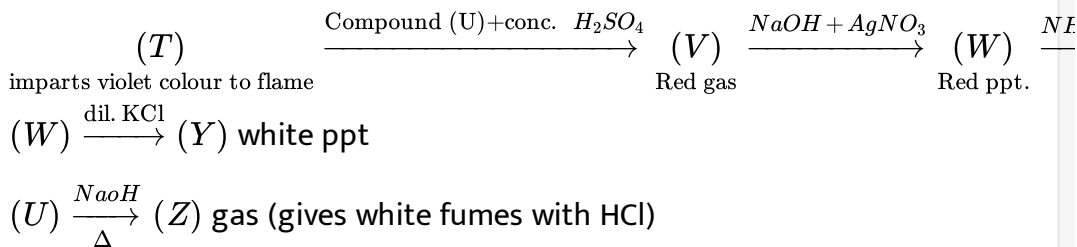
61. When  $NH_4Cl$  is not used together with  $NH_4OH$  in group-III reagent which of the following cation will not be precipitated?



**Answer: D**

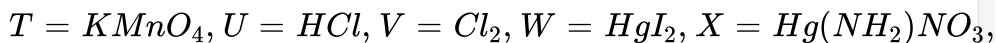
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62.

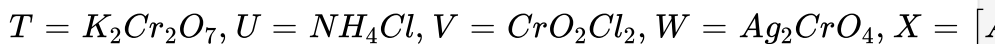


Identify (T) to (Z).

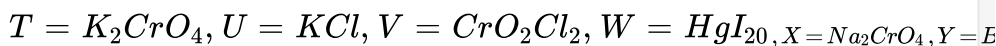
A.



B.



C.



D.



Answer: B



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63. In the separation of  $Cu^{2+}$  and  $Cd^{2+}$  in II group qualitative analysis of cations tetramine copper (II) sulphate and tetramine cadmium (II) sulphate react with KCN to form the corresponding cyano complexes. Which one of the following pairs of the complexes and their relative stability enables the separation of  $Cu^{2+}$  and  $Cd^{2+}$ ?

- A.  $K_3[Cu(CN)_4]$  is perfect and  $K_2[Cd(CN)_4]$  is imperfect complex
- B.  $K_3[CN)_4]$  and  $K_2[Cd(CN)_4]$  is perfect complex
- C.  $K_2[Cu(CN)_4]$  imperfect and  $K_2[Cd(CN)_4]$  perfect complex
- D.  $K_3[Cu(CN)_4]$  imperfect and  $K_2[Cd(CN)_4]$  is perfect complex

Answer: A



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64. The only cations present in the slightly acidic solution are  $Fe^{3+}$ ,  $Zn^{2+}$  and  $Cu^{2+}$ . The reagent that when added in excess to this solution would identify and separate  $Fe^{3+}$  in one step is:

A. 2M HCl

B. 6M  $NH_3$

C. 6M NaOH

D.  $H_2S$  gas

**Answer: B**



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65. When conc.  $H_2SO_4$  was treated with  $K_4[Fe(CN)_6]$ , CO gas was evolved. By mistake, somebody used dilute  $H_2SO_4$  instead of conc.  $H_2SO_4$  then the gas evolved was

A. CO

B.  $HCN$

C.  $N_2$

D.  $CO_2$

**Answer: B**



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66. Unknown salt 'A' +  $K_2Cr_2O_7$  + conc.  $H_2SO_4$  → Reddish brown fumes. Which is the correct statement regarding the above observation?

A. it confirms the presence of  $Cl^-$  ion

B. confirms the presence of  $Br^-$  ion

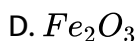
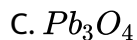
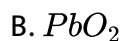
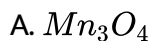
C. It confirms the presence of both

D. it neither confirms  $Cl^-$  nor  $Br^-$  unless it is passed through NaOH solution

**Answer: D**

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67. An inorganic red coloured compound (A) on heating gives a compound (B) and a gas (C). (A) on treatment with dil.  $HNO_3$  gives compound (D), brown colour substance (E) and a neutral oxide (F). Compound (D) on warming gives off again gas (C). Then, (E) will be



**Answer: B**

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68. Select correct statement(s):

(I) When excess  $FeCl_3$  solution is added to  $K_4[Fe(CN)_6]$  solution, in



addition to  $Fe^{III}[Fe^{II}(CN)_6]^-$ ,  $Fe^{II}[Fe^{III}(CN)_6]^-$  is also formed due to side redox reaction

(II) When  $FeCl_2$  is added to  $K_3[Fe(CN)_6]$  solution, in addition to  $Fe^{II}[Fe^{III}(CN)_6]^-$ ,  $Fe^{III}[Fe^{II}(CN)_6]^-$  is also formed due to side redox reaction.

(III)  $Fe^{III}[Fe^{II}(CN)_6]^-$  is paramagnetic while  $Fe^{II}[Fe^{III}(CN)_6]^-$  is diamagnetic.

(IV)  $Fe^{III}[Fe^{II}(CN)_6]^-$  is diamagnetic while  $Fe^{II}[Fe^{III}(CN)_6]^-$  is paramagnetic

A. I,II

B. III,IV

C. both (a) and (b)

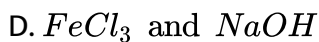
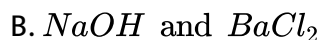
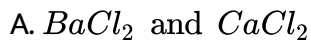
D. none of these

**Answer: A**



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69. Which of the following reagents are used for the detection of acetate and oxalate ions respectively?

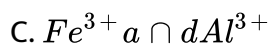


**Answer: C**



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70. Which of the following mixtures of ions can be separated by using an excess of an NaOH solution?



D.  $\text{Sn}^{2+}$  and  $\text{Pb}^{2+}$

**Answer: C**

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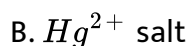
71. A metal carbonate, on being heated strongly gives a solid that forms a green solid with  $\text{CoO}$ . In which analytical group will the cation be precipitate and what will be the colour of the precipitate ?

- A. Group I, white
- B. Group II, yellow
- C. Group III, white
- D. Group IV, white

**Answer: D**

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72. A solution of a metal ion when treated with  $KI$  gives a red precipitate which dissolves in excess  $KI$  to give a colourless solution. Moreover, the solution of metal ion on treatment with a solution of cobalt (II) thiocyanate gives rise to a deep blue crystalline precipitate. The metal ion is



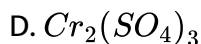
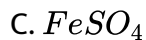
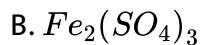
**Answer: B**



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73. A white powder solid A forms a light green solution with water, which on treatment with potassium hexacyanoferrate (III) gives a blue precipitate. On being strongly heated, A leaves a brown residue and forms a mixture of two gaseous oxides, which turns a dichromate

solution green and forms a white precipitate with a  $BaCl_2$  solution containing concentrated HCl. A is:

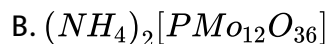
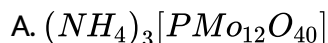


**Answer: C**



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**74.** Which of the following is the composition of the yellow precipitate obtained in the test for phosphates using ammonium molybdate?





**Answer: A**

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75. Which of the following mixtures can be separated by using excess  $NH_3$  solution?



**Answer: B**

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1. A pale yellow inorganic compound K is insoluble in hot and dil.  $HNO_3$  but dissolves in concentrated ammonia solution and compound L is formed, on treatment with dil.  $HNO_3$  compound L produces a metal cation which gives white precipitate M with hypo solution. when an aqueous solution of (M) is boiled, a black precipitate of (N) is formed which dissolves in hot dil.  $HNO_3$  and on adding HCl gives a white precipitate. when the compound (K) is heated with concentrated  $H_2SO_4$  and  $MnO_2$  brown fumes are observed.

Q. The compound (K) is:

- A. AgI
- B. AgBr
- C.  $AgNO_2$
- D.  $PbI_2$

**Answer: B**



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2. A pale yellow inorganic compound K is insoluble in hot and dil.  $HNO_3$  but dissolves in concentrated ammonia solution and compound L is formed, on treatment with dil.  $HNO_3$  compound L produces a metal cation which gives white precipitate M with hypo solution. when an aqueous solution of (M) is boiled, a black precipitate of (N) is formed which dissolves in hot dil.  $HNO_3$  and on adding HCl gives a white precipitate. when the compound (K) is heated with concentrated  $H_2SO_4$  and  $MnO_2$  brown fumes are observed.

Q. Compound (M) and black precipitate of (N) are respectively:

A.  $PbI_2, PbS$

B.  $PbS_2, PbS$

C.  $Ag_2S_2O_3, Ag_2S$

D.  $AgSO_3, Ag$

**Answer: C**



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3. A pale yellow inorganic compound K is insoluble in hot and dil.  $HNO_3$  but dissolves in concentrated ammonia solution and compound L is formed, on treatment with dil.  $HNO_3$  compound L produces a metal cation which gives white precipitate M with hypo solution. when an aqueous solution of (M) is boiled, a black precipitate of (N) is formed which dissolves in hot dil.  $HNO_3$  and on adding HCl gives a white precipitate. when the compound (K) is heated with concentrated  $H_2SO_4$  and  $MnO_2$  brown fumes are observed.

Q. Compound (K) on heating with conc.  $H_2SO_4$  and  $MnO_2$  gives:



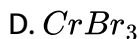
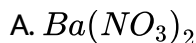
**Answer: B**



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4. A colourless inorganic compound (A) imparts a green colour to the flame. Its solution gives a white ppt. (B) with  $H_2SO_4$ . When heated with  $K_2Cr_2O_7$  and conc.  $H_2SO_4$ , a brown red vapour/gas (C) is formed. The gas/ vapour when passed through aqueous NaOH solution, it turns into a yellow solution (D) which forms yellow precipitate (E) with  $CH_3COOH$  and  $(CH_3COO)_2Pb$ . with reference to above information, answer the following questions.

Q. The colourless inorganic compound (A) is:



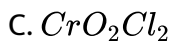
**Answer: B**



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5. A colourless inorganic compound (A) imparts a green colour to the flame. Its solution gives a white ppt. (B) with  $H_2SO_4$ . When heated with  $K_2Cr_2O_7$  and conc.  $H_2SO_4$ , a brown red vapour/gas (C) is formed. The gas/ vapour when passed through aqueous NaOH solution, it turns into a yellow solution (D) which forms yellow precipitate (E) with  $CH_3COOH$  and  $(CH_3COO)_2Pb$ . with reference to above information, answer the following questions.

Q. The liberated gas vapour (C) is:



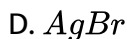
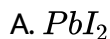
**Answer: C**



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6. A colourless inorganic compound (A) imparts a green colour to the flame. Its solution gives a white ppt. (B) with  $H_2SO_4$ . When heated with  $K_2Cr_2O_7$  and conc.  $H_2SO_4$ , a brown red vapour/gas (C) is formed. The gas/ vapour when passed through aqueous NaOH solution, it turns into a yellow solution (D) which forms yellow precipitate (E) with  $CH_3COOH$  and  $(CH_3COO)_2Pb$ . with reference to above information, answer the following questions.

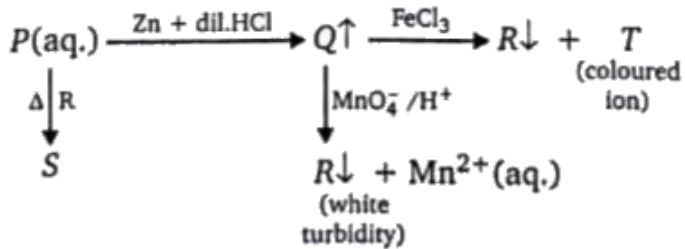
Q. The yellow ppt. formed when (D) reacts with  $CH_3COOH$  and  $(CH_3COO)_2Pb$  is:



**Answer: B**



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7.

Q. 'T' can not be identified by:

A.  $\text{NH}_3$  solution

B.  $\text{NH}_4\text{SCN}$

C.  $(\text{NH}_4)_2\text{S}$

D. excess KCN

**Answer: B**



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8.

Q. Species P and S are respectively:

- A.  $\text{SO}_3^- (\text{aq.})$ , S
- B.  $\text{SO}_3^{2-} (\text{aq.})$ ,  $\text{S}_2\text{O}_3^{2-} (\text{aq.})$
- C.  $\text{S}_2\text{O}_3^{2-} (\text{aq.})$ ,  $\text{SO}_3^{2-} (\text{aq.})$
- D. none of these

Answer: B

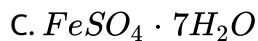
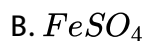
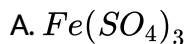
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9. A teacher gave a student two salts (A) and (B) and told him to identify these salts. The student heated salt (A) strongly and observed two oxides

to sulphur. He added NaOH solution to aqueous solution of (A) and observed a green precipitate, which turned brown on exposure to air.

When he took salt (B) to flame test, green colour was observed. On heating salt (B) with a solid compound (X) and concentrated sulphuric acid, orange red vapours are evolved. when this gas is passed through an aqueous solution of a base, the solution turns yellow.

Q. The salt (A) can be:



D. both (b) and (c)

**Answer: D**



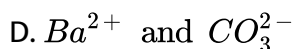
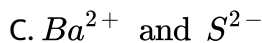
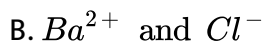
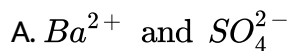
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10. A teacher gave a student two salts (A) and (B) and told him to identify these salts. The student heated salt (A) strongly and observed two oxides

to sulphur. He added NaOH solution to aqueous solution of (A) and observed a green precipitate, which turned brown on exposure to air.

When he took salt (B) to flame test, green colour was observed. On heating salt (B) with a solid compound (X) and concentrated sulphuric acid, orange red vapours are evolved. when this gas is passed through an aqueous solution of a base, the solution turns yellow.

Q. Salt (B) suggest that the cation and anion in it are respectively:



**Answer: B**



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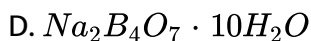
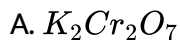
11. A teacher gave a student two salts (A) and (B) and told him to identify these salts. The student heated salt (A) strongly and observed two oxides



to sulphur. He added NaOH solution to aqueous solution of (A) and observed a green precipitate, which turned brown on exposure to air.

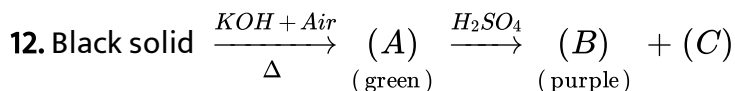
When he took salt (B) to flame test, green colour was observed. On heating salt (B) with a solid compound (X) and concentrated sulphuric acid, orange red vapours are evolved. when this gas is passed through an aqueous solution of a base, the solution turns yellow.

Q. Compound (X) is:



**Answer: A**

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(i) KI on reaction with alkali solution of (B) changes into a compound (D).

(ii) The colour of the compound (B) disappears on treatment with the acidic solution of  $FeSO_4$

(iii) With cold conc.  $H_2SO_4$  compound (B) gives (E), which being explosive decomposes to yield (F) and oxygen. It Brgt Q. Nature of compound (E) is:

A. Acidic oxide

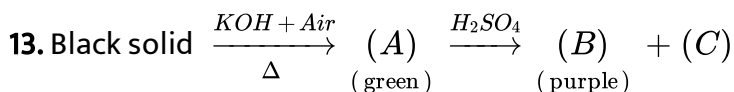
B. Basic oxide

C. Amphoteric oxide

D. Neutral oxide

**Answer: A**

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(i) KI on reaction with alkali solution of (B) changes into a compound (D).

(ii) The colour of the compound (B) disappears on treatment with the acidic solution of  $FeSO_4$

(iii) With cold conc.  $H_2SO_4$  compound (B) gives (E), which being explosive

decomposes to yield (F) and oxygen. ItBrgt Q. Colour of the solution obtained, when ferrous sulphate reacts with acidic solution of (B):

A. Colourless

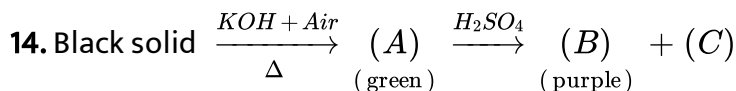
B. Pink

C. Green

D. Yellow

**Answer: D**

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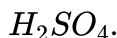


- (i) KI on reaction with alkali solution of (B) changes into a compound (D).
- (ii) The colour of the compound (B) disappears on treatment with the acidic solution of  $FeSO_4$
- (iii) With cold conc.  $H_2SO_4$  compound (B) gives (E), which being explosive decomposes to yield (F) and oxygen. ItBrgt Q. Which of the following options is correct?

A. (C) and (F) are same compounds having same colour.

B. (C) and (F) are different compounds having same colour.

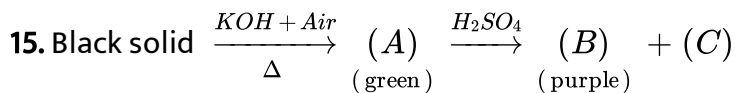
C. Compound (B) forms similar compound (E) with hot and conc.



D. Compound (A) does not give same type of reaction in acidic and neutral medium

**Answer: A**

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- (i) KI on reaction with alkali solution of (B) changes into a compound (D).
- (ii) The colour of the compound (B) disappears on treatment with the acidic solution of  $FeSO_4$
- (iii) With cold conc.  $H_2SO_4$  compound (B) gives (E), which being explosive decomposes to yield (F) and oxygen. It Brgt Q. Type of hybridization in compound (D) is:

A.  $sp^2$

B.  $sp^3$

C.  $sp^3d$

D. No hybridization

**Answer: B**



**Watch Video Solution**

16.  $(A) + NaCl \rightarrow (B)$  (white ppt.)

$(B) + KI \rightarrow (C)$  (green ppt).

$(C) + \underset{\text{(excess)}}{KI} \rightarrow (D) + (E)$  (colourless solution)

$(E) + NH_3 + KOH \rightarrow (F)$

Q. Compounds (A) and (B) are respectively:

A.  $AgNO_3$  and  $AgCl$

B.  $Pb(NO_3)_2$  and  $PbCl_2$

C.  $Hg_2(NO_3)_2$  and  $Hg_2Cl_2$

D.  $Cu_2(NO_3)_2$  and  $Cu_2Cl_2$

**Answer: C**



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17.  $(A) + NaCl \rightarrow (B)$  (white ppt.)

$(B) + Ki \rightarrow (C)$  (green ppt).

$(C) + \underset{\text{(excess)}}{KI} \rightarrow (D) + (E)$  (colourless solution)

$(E) + NH_3 + KOH \rightarrow (F)$

Q. When compound (A) reacts with  $Na_2CrO_4$  solution, the colour of the compound formed is

A. black

B. red

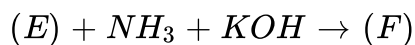
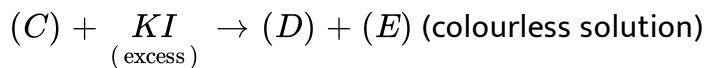
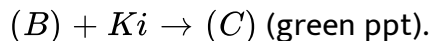
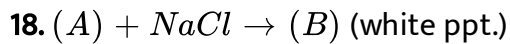
C. yellow

D. white

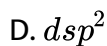
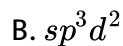
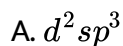
**Answer: B**



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Q. Type of hybridization in compound (E) is:



Answer: C



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19.  $(A) + NaCl \rightarrow (B)$  (white ppt.)

$(B) + KI \rightarrow (C)$  (green ppt).

$(C) + \underset{\text{(excess)}}{KI} \rightarrow (D) + (E)$  (colourless solution)

$(E) + NH_3 + KOH \rightarrow (F)$

Q. Colour of the compound (F) is:

A. Yellow

B. Blue

C. White

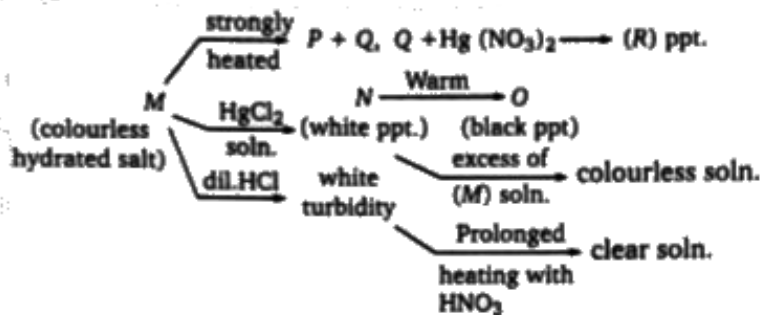
D. Brown

**Answer: D**



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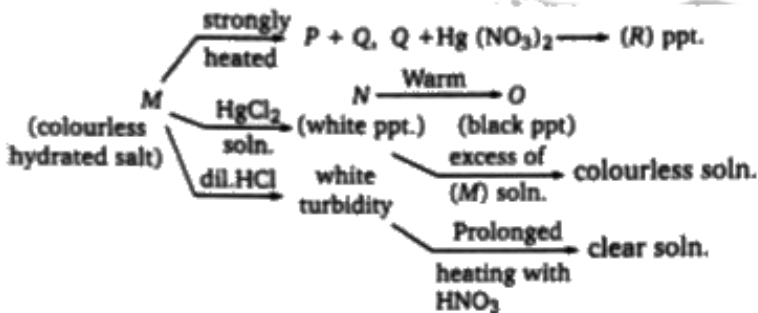
20.

Q. The structure of compound P is:

- A. Linear
- B. Crown shaped
- C. Square pyramidal
- D. Zig-zag chain

Answer: D

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21.

Q. Compound M is used

(I) In photography

(II) in analytical chemistry

(III) as a hydrating agent

(IV) as an oxidizing as well as reducing agent

Choose the correct code:

A. I,III

B. I,II and III

C. I,II

D. I,II,III and IV

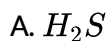
Answer: C



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22. A white crystalline solid 'A' on boiling with caustic soda solution gives a gas 'B', which on passing through an alkaline solution of potassium tetraiodomercurate (II) solution gives a brown ppt. the substance 'A' on heating evolves a neutral gas 'C', which is inert at room temperature and reactive a presence of catalyst and does not give brown fumes with nitric oxide.

Q. The gas 'B' is:



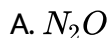
**Answer: B**



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23. A white crystalline solid 'A' on boiling with caustic soda solution gives a gas 'B', which on passing through an alkaline solution of potassium tetraiodomercurate (II) solution gives a brown ppt. the substance 'A' on heating evolves a neutral gas 'C', which is inert at room temperature and reactive a presence of catalyst and does not give brown fumes with nitric oxide.

Q. The gas 'C' is:



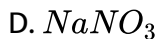
**Answer: D**



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24. A white crystalline solid 'A' on boiling with caustic soda solution gives a gas 'B', which on passing through an alkaline solution of potassium tetraiodomercurate (II) solution gives a brown ppt. the substance 'A' on heating evolves a neutral gas 'C', which is inert at room temperature and reactive a presence of catalyst and does not give brown fumes with nitric oxide.

Q. The substance 'A' is:



**Answer: C**



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25. A chemist opened a cupboard to find four bottles containing water solutions, each of which has lost its label. Bottles 1,2,3 contained colourless solutions, Whilst bottle 4 contained a blue solution. The labels from the bottles were lying scattered on the floor of the cupboard.

They were

copper (II) sulphate

sodium carbonate

lead nitrate

hydrochloric acid

By mixing samples of the contents of the bottles, in pairs, the chemist made the following observations:

(i) Bottle 1 + Bottle 2 white precipitate

(ii) Bottle 1 + bottle 3 white precipitate

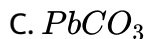
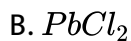
(iii) Bottle 1 + Bottle 4 white precipitate

(iv) Bottle 2 + Bottle 3 colourless gas evolved

(v) Bottle 2 + Bottle 4 no visible reaction

(vi) bottle 3 + bottle 4 blue precipitate

Q. Chemical formula of white precipitate in observation (i) is:



**Answer: B**



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**26.** A chemist opened a cupboard to find four bottles containing water solutions, each of which has lost its label. Bottles 1,2,3 contained colourless solutions, Whilst bottle 4 contained a blue solution. The labels from the bottles were lying scattered on the floor of the cupboard.

They were

copper (II) sulphate

sodium carbonate

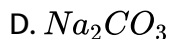
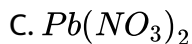
lead nitrate

hydrochloric acid

By mixing samples of the contents of the bottles, in pairs, the chemist made the following observations:

- (i) Bottle 1 + Bottle 2 white precipitate
- (ii) Bottle 1 + bottle 3 white precipitate
- (iii) Bottle 1 + Bottle 4 white precipitate
- (iv) Bottle 2 + Bottle 3 colourless gas evolved
- (v) Bottle 2 + Bottle 4 no visible reaction
- (vi) bottle 3 + bottle 4 blue precipitate

Q. Colourless solution present in bottle-1 is:



**Answer: C**



[View Text Solution](#)



27. A chemist opened a cupboard to find four bottles containing water solutions, each of which has lost its label. Bottles 1,2,3 contained colourless solutions, Whilst bottle 4 contained a blue solution. The labels from the bottles were lying scattered on the floor of the cupboard.

They were

copper (II) sulphate

sodium carbonate

lead nitrate

hydrochloric acid

By mixing samples of the contents of the bottles, in pairs, the chemist made the following observations:

(i) Bottle 1 + Bottle 2 white precipitate

(ii) Bottle 1 + bottle 3 white precipitate

(iii) Bottle 1 + Bottle 4 white precipitate

(iv) Bottle 2 + Bottle 3 colourless gas evolved

(v) Bottle 2 + Bottle 4 no visible reaction

(vi) bottle 3 + bottle 4 blue precipitate

Q. Nature of gas evolved in observation (iv) is:

A. Acidic

B. Neutral

C. Basic

D. Amphoteric

**Answer: A**



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**28.** A chemist opened a cupboard to find four bottles containing water solutions, each of which has lost its label. Bottles 1,2,3 contained colourless solutions, Whilst bottle 4 contained a blue solution. The labels from the bottles were lying scattered on the floor of the cupboard.

They were

copper (II) sulphate

sodium carbonate

lead nitrate

hydrochloric acid

By mixing samples of the contents of the bottles, in pairs, the chemist made the following observations:

- (i) Bottle 1 + Bottle 2 white precipitate
- (ii) Bottle 1 + bottle 3 white precipitate
- (iii) Bottle 1 + Bottle 4 white precipitate
- (iv) Bottle 2 + Bottle 3 colourless gas evolved
- (v) Bottle 2 + Bottle 4 no visible reaction
- (vi) bottle 3 + bottle 4 blue precipitate

Q. Chemical formula of white ppt. formed in observation (iii) is:

- A.  $PbCl_2$
- B.  $PbCO_3$
- C.  $CuCO_3$
- D.  $PbSO_4$

**Answer: D**



[View Text Solution](#)

29. A coloured compound (A) reacts with dilute  $H_2SO_4$  to produce a colourless gas (B) and colourless solution (C). The reaction between (B) and the acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly yellowish precipitate (D). the substance (D) burns in air to produce a gas (E) which also can change the colour of  $K_2Cr_2O_7$  solution.

Q. "A" probably, is:

A.  $ZnSO_3$

B.  $CoS$

C.  $MnS$

D.  $NiS$

**Answer: C**



[View Text Solution](#)

30. A coloured compound (A) reacts with dilute  $H_2SO_4$  to produce a colourless gas (B) and colourless solution (C). The reaction between (B) and the acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly yellowish precipitate (D). the substance (D) burns in air to produce a gas (E) which also can change the colour of  $K_2Cr_2O_7$  solution.

Q. When "B" reacts with "E":

- A. a new gas F will be produced
- B. It produced D and a colourless liquid
- C. there will be no reaction between them
- D. it yields B and an acidic oxide

**Answer: B**



[View Text Solution](#)

31. A coloured compound (A) reacts with dilute  $H_2SO_4$  to produce a colourless gas (B) and colourless solution (C). The reaction between (B) and the acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly yellowish precipitate (D). the substance (D) burns in air to produce a gas (E) which also can change the colour of  $K_2Cr_2O_7$  solution.

Q. Which is not correct about E ?

- A. It is colourless and highly water soluble
- B. The molecule is linear
- C. Its aqueous solution acidic
- D. it turns starch iodate paper blue

**Answer: B**



[View Text Solution](#)

32. A coloured compound (A) reacts with dilute  $H_2SO_4$  to produce a colourless gas (B) and colourless solution (C). The reaction between (B) and the acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly yellowish precipitate (D). the substance (D) burns in air to produce a gas (E) which also can change the colour of  $K_2Cr_2O_7$  solution.

Q. When D is boiled with alkaline sulphite solution a compound F is formed. F can be used in

- (I) Iodine titrations in volumetric analysis
- (II) Bleaching industry to destroy excess  $Cl_2$
- (III) Photography for 'fixing' films
- (IV) Iodometric titrations

Choose the correct codes:

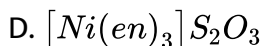
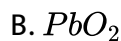
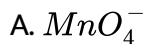
- A. I and IV
- B. I, III and IV
- C. II and III
- D. I, II, III and IV

Answer: D

 [View Text Solution](#)

33. A coloured compound (A) reacts with dilute  $H_2SO_4$  to produce a colourless gas (B) and colourless solution (C). The reaction between (B) and the acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly yellowish precipitate (D). the substance (D) burns in air to produce a gas (E) which also can change the colour of  $K_2Cr_2O_7$  solution.

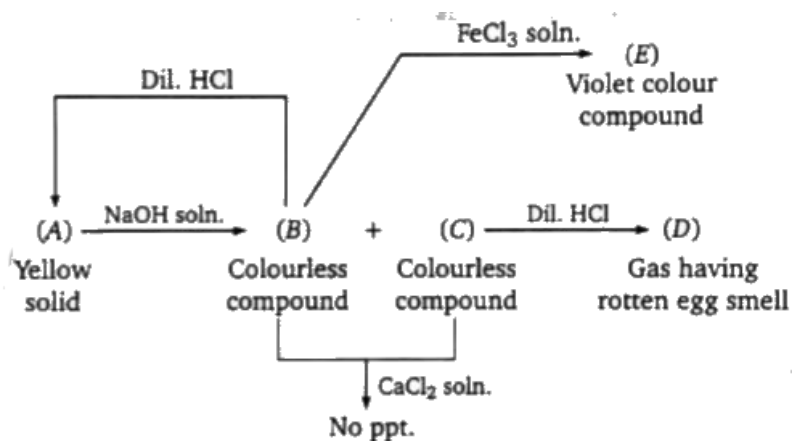
Q. When colourless solution (C) reacts with  $Pb_3O_4/H^+$ , it acquires a violet red colour due to formation of :





Answer: A

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34.

Q. The structure of compound (A) is:

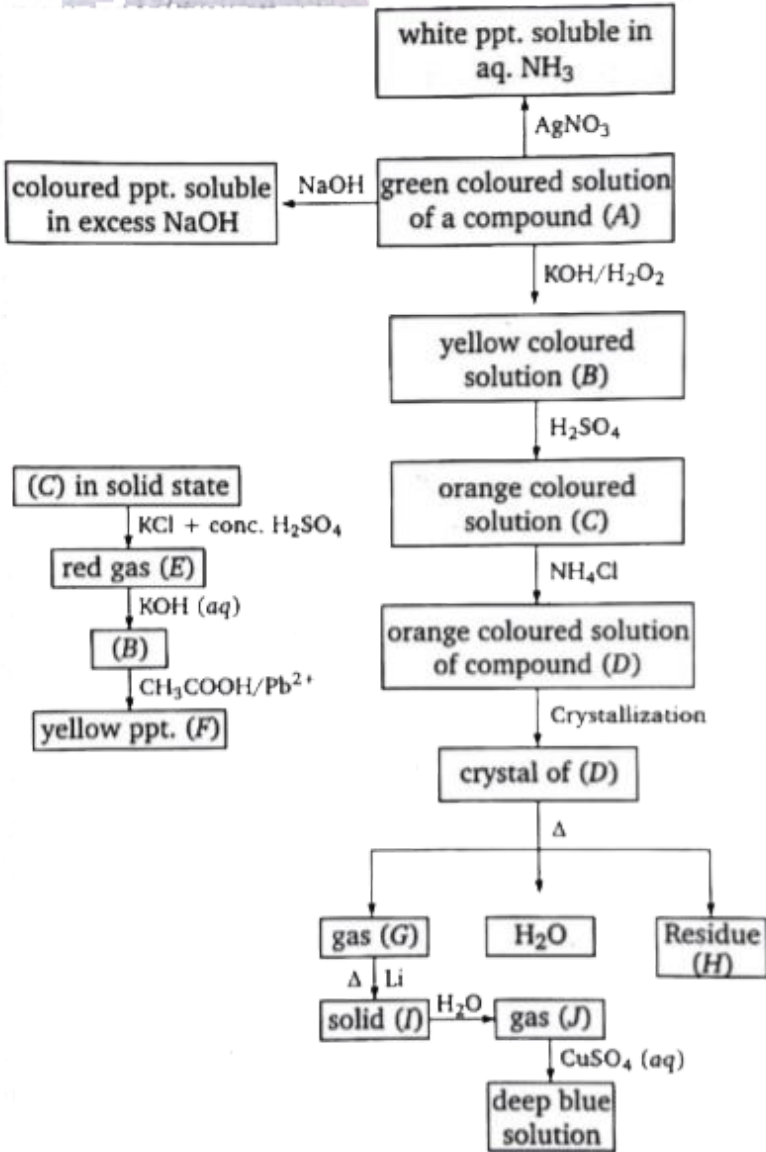
- A. Linear
- B. Crown shaped
- C. Square pyramidal
- D. Zig-zag chain

Answer: B

 View Text Solution



**35.** Read the following short write up and answer subsequent questions based on observations(A) to (J).



Q. Compound A and B are respectively:

A.  $FeCl_2, FeCl_3$

B.  $CuCl_2 \cdot 2H_2O, [CuCl_4]^{2-}$

C.  $CrCl_3$ ,  $K_2CrO_4$

D.  $NiCl_2$ ,  $NiCl_3$

**Answer: C**



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**36.** An unknown mixture contains one or two of the following:  $CaCO_3$ ,  $BaCl_2$ ,  $AgNO_3$ ,  $Na_2SO_4$ ,  $ZnSO_4$  and  $NaOH$ . The mixture is completely soluble in water and solution gives pink colour with phenolphthalein. When dilute hydrochloric acid is gradually added to the solution, a precipitate is formed which dissolved with further addition of the acid.

Q. Which of the following combination of compounds is soluble in water?

A.  $BaCl_2$  and  $AgNO_3$

B.  $AgNO_3$  and  $NaOH$

C.  $BaCl_2$  and  $Na_2SO_4$

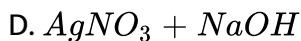
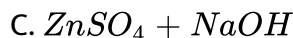
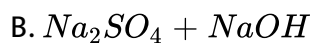
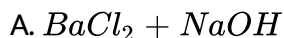
D.  $ZnSO_4$  and excess  $NaOH$

**Answer: D**

 [View Text Solution](#)

37. An unknown mixture contains one or two of the following:  $CaCO_3$ ,  $BaCl_2$ ,  $AgNO_3$ ,  $Na_2SO_4$ ,  $ZnSO_4$  and  $NaOH$ . The mixture is completely soluble in water and solution gives pink colour with phenolphthalein. When dilute hydrochloric acid is gradually added to the solution, a precipitate is formed which dissolved with further addition of the acid.

Q. The aqueous solution of mixture gives white precipitate with dil. HCl which dissolves in excess of dil HCl . it confirms.



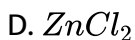
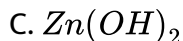
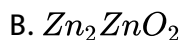
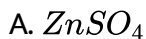
Answer: C



View Text Solution

38. An unknown mixture contains one or two of the following:  $CaCO_3$ ,  $BaCl_2$ ,  $AgNO_3$ ,  $Na_2SO_4$ ,  $ZnSO_4$  and  $NaOH$ . The mixture is completely soluble in water and solution gives pink colour with phenolphthalein. When dilute hydrochloric acid is gradually added to the solution, a precipitate is formed which dissolved with further addition of the acid.

Q. The white precipitate is



Answer: C





39. Aqueous solution of a salt 'A', when mixed with NaOH solution and warmed, a black precipitate is formed. Black ppt. is filtered and dissolved in dil.  $H_2SO_4$  solution. The resulting solution gives a chocolate coloured precipitate with potassium ferrocyanide solution. the filtrate obtained after filtering off the black precipitate, upon warming with Zn and NaOH evolves a pungent smelling gas. the resulting solution also responds to the ring test. the filtrate does not evolve any gas when it is boiled with urea in the presence of  $H_2SO_4$ .

Q. Salt 'A' consists of:

- A.  $Cu^{2+}$
- B.  $Hg^{2+}$  salt
- C.  $Cu^+$
- D.  $Pb^{2+}$

**Answer: A**



40. Aqueous solution of a salt 'A', when mixed with NaOH solution and warmed, a black precipitate is formed. Black ppt. is filtered and dissolved in dil.  $H_2SO_4$  solution. The resulting solution gives a chocolate coloured precipitate with potassium ferrocyanide solution. the filtrate obtained after filtering off the black precipitate, upon warming with Zn and NaOH evolves a pungent smelling gas. the resulting solution also responds to the ring test. the filtrate does not evolve any gas when it is boiled with urea in the presence of  $H_2SO_4$ .

Q. The filtrate obtained after filtering off the black precipitate consists of:



**Answer: B**

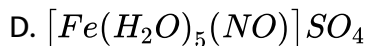
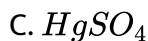
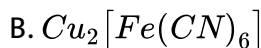
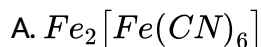


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41. Aqueous solution of a salt 'A', when mixed with NaOH solution and warmed, a black precipitate is formed. Black ppt. is filtered and dissolved in dil.  $H_2SO_4$  solution. The resulting solution gives a chocolate coloured precipitate with potassium ferrocyanide solution. the filtrate obtained after filtering off the black precipitate, upon warming with Zn and NaOH evolves a pungent smelling gas. the resulting solution also responds to the ring test. the filtrate does not evolve any gas when it is boiled with urea in the presence of  $H_2SO_4$ .

Q. The chocolate coloured precipitate is:



**Answer: B**

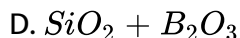
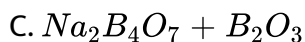
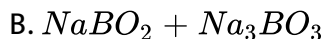
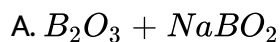


**View Text Solution**

**42.** Borax Bead Test is carried out when the original mixture is coloured. It is done with the help of a clean platinum wire on which a small loop is made at the end. When borax is heated on platinum wire loop transparent glass like bead is obtained. The hot bead is brought in contact with salt till it reacts with fused borax and colour is imparted to the bead. bead colour is noted.

Colour of the bead	Ion
1. Blue green	$Cu^{2+}$
2. Yellow	$Fe^{3+}$
3. Green	$Cr^{3+}$
4. Violet	$Mn^{2+}$
5. Dark blue	$Co^{2+}$
6. Brown	$Ni^{2+}$

Q. Glassy bead of :



Answer: A

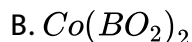
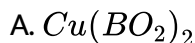


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Colour of the bead	Ion
1. Blue green	$Cu^{2+}$
2. Yellow	$Fe^{3+}$
3. Green	$Cr^{3+}$
4. Violet	$Mn^{2+}$
5. Dark blue	$Co^{2+}$
6. Brown	$Ni^{2+}$

Q. Blue bead can be of:



C. both (a) and (b)

D. None of these

**Answer: C**

 [Watch Video Solution](#)

**44.** Borax Bead Test is carried out when the original mixture is coloured. It is done with the help of a clean platinum wire on which a small loop is made at the end. When borax is heated on platinum wire loop transparent glass like bead is obtained. The hot bead is brought in contact with salt till it reacts with fused borax and colour is imparted to the bead. bead colour is noted.

Colour of the bead	Ion
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3. Green	$Cr^{3+}$
4. Violet	$Mn^{2+}$
5. Dark blue	$Co^{2+}$
6. Brown	$Ni^{2+}$

**Q.** The flame used in Borax Bead Test is:

- A. Reducing
- B. Oxidising
- C. Both (a) and (b)
- D. Neither (a) nor (b)

**Answer: C**

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45. When a crystalline compound X is heated with  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , a reddish brown gas A is evolved. On passing A into caustic soda, a yellow solution of B is formed. A yellow precipitate of C is obtained when a solution B is neutralised with acetic acid and then treated with a lead acetate solution. when X is heated with  $NaOH$ , a colourless gas is evolved which, when passed into a solution of  $K_2[HgI_4]$ , gives a reddish brown precipitate of D. It Brgt Q. Compound (X) is:

A.  $NH_4Br$



**Answer: B**

 [View Text Solution](#)

46. When a crystalline compound X is heated with  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , a reddish brown gas A is evolved. On passing A into caustic soda, a yellow solution of B is formed. A yellow precipitate of C is obtained when a solution B is neutralised with acetic acid and then treated with a lead acetate solution. when X is heated with  $NaOH$ , a colourless gas is evolved which, when passed into a solution of  $K_2[HgI_4]$ , gives a reddish brown precipitate of D. ItBrgt Q. If the solution B is colourless, which of the following ions would not be present in the solid X?

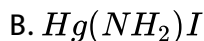


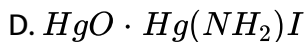
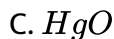


**Answer: A**

 [View Text Solution](#)

47. When a crystalline compound X is heated with  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , a reddish brown gas A is evolved. On passing A into caustic soda, a yellow solution of B is formed. A yellow precipitate of C is obtained when a solution B is neutralised with acetic acid and then treated with a lead acetate solution. when X is heated with  $NaOH$ , a colourless gas is evolved which, when passed into a solution of  $K_2[HgI_4]$ , gives a reddish brown precipitate of D. It Brgt Q. Which of the following is the composition of the brown precipitate (D) ?





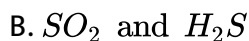
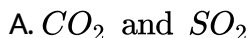
**Answer: D**



[View Text Solution](#)

**48.** A white solid A reacts with dilute  $H_2SO_4$  to produce a colourless gas B and a colourless solution C. the reaction between B and acidified dichromate yields a green solution and a slightly coloured precipitate D. the substance D, when burnt in air, gives a gas E which reacts with B to yield D and a colourless liquid. anhydrous copper sulphate turns blue with this colourless liquid. the addition of aqueous  $NH_3$  or  $NaOH$  to C produces a precipitate that dissolves in an excess of the reagent to form a clear solution.

Q. Which of the following gases are B and E respectively?





C.  $H_2S$  and  $SO_2$

D.  $CO_2$  and  $H_2S$

**Answer: C**



[View Text Solution](#)

**49.** A white solid A reacts with dilute  $H_2SO_4$  to produce a colourless gas B and a colourless solution C. The reaction between B and acidified dichromate yields a green solution and a slightly coloured precipitate D. The substance D, when burnt in air, gives a gas E which reacts with B to yield D and a colourless liquid. Anhydrous copper sulphate turns blue with this colourless liquid. The addition of aqueous  $NH_3$  or  $NaOH$  to C produces a precipitate that dissolves in an excess of the reagent to form a clear solution.

**Q.** What would happen if the gas E were passed through an acidified  $KMnO_4$  solution?

A. Bleaching of the permanganate solution without any precipitation

- B. Bleaching of the permanganate solution which would show a yellowish white turbidity
- C. Bleaching of the permanganate solution and the formation of a brown precipitate
- D. No action

**Answer: A**

 [View Text Solution](#)

50. A white solid A reacts with dilute  $H_2SO_4$  to produce a colourless gas B and a colourless solution C. the reaction between B and acidified dichromate yields a green solution and a slightly coloured precipitate D. the substance D, when burnt in air, gives a gas E which reacts with B to yield D and a colourless liquid. anhydrous copper sulphate turns blue with this colourless liquid. the addition of aqueous  $NH_3$  or  $NaOH$  to C produces a precipitate that dissolves in an excess of the reagent to form a clear solution.

Q. What would appear if the gas B were passed through an aqueous solution of  $Pb(NO_3)_2$  ?

- A. A white precipitate solution in hot dilute  $HNO_3$
- B. A black precipitate soluble in hot dilute  $HNO_3$
- C. A black precipitate insoluble in hot dilute  $HNO_3$
- D. A yellow precipitate insoluble in hot concentrated  $HNO_3$

**Answer: B**

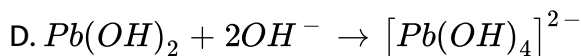
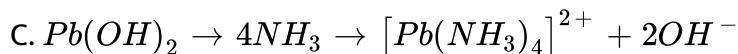
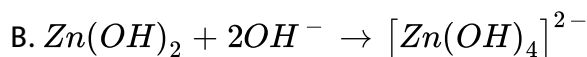
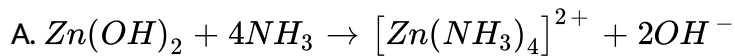


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51. A white solid A reacts with dilute  $H_2SO_4$  to produce a colourless gas B and a colourless solution C. the reaction between B and acidified dichromate yields a green solution and a slightly coloured precipitate D. the substance D, when burnt in air, gives a gas E which reacts with B to yield D and a colourless liquid. anhydrous copper sulphate turns blue with this colourless liquid. the addition of aqueous  $NH_3$  or  $NaOH$  to C produces a precipitate that dissolves in an excess of the reagent to form

a clear solution.

Q. Which of the following reactions are relevant to the action of  $NH_3$  or  $NaOH$  solution on C?



Answer: A::B



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52. A white solid A reacts with dilute  $H_2SO_4$  to produce a colourless gas B and a colourless solution C. the reaction between B and acidified dichromate yields a green solution and a slightly coloured precipitate D. the substance D, when burnt in air, gives a gas E which reacts with B to yield D and a colourless liquid. anhydrous copper sulphate turns blue with this colourless liquid. the addition of aqueous  $NH_3$  or  $NaOH$  to C

produces a precipitate that dissolves in an excess of the reagent to form a clear solution.

Q. Suppose the solution obtained by the treatment of the solution C with an excess of NaOH is acidified with acetic acid and the gas B is passed through it. Which of the following will be obtained?

A. A colourless solution

B. A yellow precipitate

C. A black precipitate

D. A white precipitate

**Answer: D**



[View Text Solution](#)

53. (i) An aqueous solution of a compound (A) is acidic towards litmus and (A) sublimes at about  $300^{\circ}C$ .

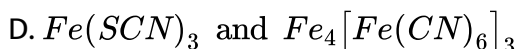
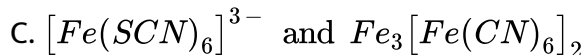
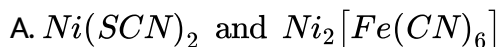
(ii) (A) on treatment with an excess of  $NH_4SCN$  gives a red coloured compound (B) and on treatment with a solution of  $K_4[Fe(CN)_6]$  gives a

blue coloured compound (C).

(iii) (A) on heating with excess of  $K_2Cr_2O_7$  in the presence of concentrated  $H_2SO_4$  evolves deep red vapours of (D).

(iv) On passing the vapour of (D) into a solution of NaOH and then adding the solution of acetic acid and lead acetate, a yellow precipitate of compound (E) is obtained.

Identify (A) to (E) and give chemical equations for the reactions.



**Answer: D**



**Watch Video Solution**

**54.** (i) An aqueous solution of a compound (A) is acidic towards litmus and (A) sublimes at about  $300^\circ C$ .

(ii) (A) on treatment with an excess of  $NH_4SCN$  gives a red coloured compound (B) and on treatment with a solution of  $K_4[Fe(CN)_6]$  gives a blue coloured compound (C).

(iii) (A) on heating with excess of  $K_2Cr_2O_7$  in the presence of concentrated  $H_2SO_4$  evolves deep red vapours of (D).

(iv) On passing the vapour of (D) into a solution of NaOH and then adding the solution of acetic acid and lead acetate, a yellow precipitate of compound (E) is obtained.

Identify (A) to (E) and give chemical equations for the reactions.

A. +VI

B. +V

C. +III

D. -II

**Answer: A**



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55. (i) An aqueous solution of a compound A is acidic towards litmus and A sublimes at about  $300^{\circ}C$
- (ii) A solution of A, on treatment with an excess of  $NH_4SCN$ , gives a red compound, and on treatment with a solution of  $K_4[Fe(CN)_6]$ , gives a blue compound.
- (iii) The solid A, on being heated with an excess of  $K_2Cr_2O_7$  in the presence of concentrated  $H_2SO_4$ , evolves deep red vapours of D.
- (iv) On passing the vapours of D into a solution of NaOH and then adding the solution of acetic acid and lead acetate, a yellow precipitate of a compound E is obtained.

Q. Can compound A be prepared in the anhydrous form by strongly heating its hydrated crystals?

A. No, because the water molecules are very strongly bound in the hydrated crystals

B. No, because the salt gets hydrolysed in the process

C. Yes, because the water molecules are loosely bound in the hydrated crystals



D. yes, because the salt sublimes at  $300^{\circ}C$

**Answer: B**



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56. (i) A yellow precipitate of the compound A is formed on passing  $H_2S$  through a neutral solution of the salt B.

(ii) The compound A is soluble in hot dilute  $HNO_3$  but insoluble in yellow ammonium sulphide.

(iii) The solution of B, on treatment with a small quantity of  $NH_3$ , gives a white precipitate soluble in an excess of the reagent, forming a compound C.

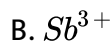
(iv). The solution of B gives a white precipitate with a small concentration of KCN. the precipitate is soluble in an excess of the reagent, forming a compound D.

(v) the solution of D, on treatment with  $H_2S$ , gives A.

(vi) The solution of B in dilute HCl, on treatment with a solution of  $BaCl_2$ , gives a white precipitate of the compound E, which is almost insoluble in

concentrated  $HNO_3$ .

Q. Which of the following is the cation present in B?



**Answer: D**



[View Text Solution](#)

57. (i) A yellow precipitate of the compound A is formed on passing  $H_2S$  through a neutral solution of the salt B.

(ii) The compound A is soluble in hot dilute  $HNO_3$  but insoluble in yellow ammonium sulphide.

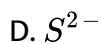
(iii) The solution of B, on treatment with a small quantity of  $NH_3$ , gives a white precipitate soluble in an excess of the reagent, forming a compound C.

(iv). The solution of B gives a white precipitate with a small concentration of KCN. the precipitate is soluble in an excess of the reagent, forming a compound D.

(v) the solution of D, on treatment with  $H_2S$ , gives A.

(vi) The solution of B in dilute HCl, on treatment with a solution of  $BaCl_2$ , gives a white precipitate of the compound E, which is almost insoluble in concentrated  $HNO_3$ .

Q. Which of the following anions is present in B?



**Answer: A**



[View Text Solution](#)

58. (i) A yellow precipitate of the compound A is formed on passing  $H_2S$  through a neutral solution of the salt B.

(ii) The compound A is soluble in hot dilute  $HNO_3$  but insoluble in yellow ammonium sulphide.

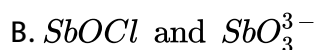
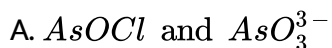
(iii) The solution of B, on treatment with a small quantity of  $NH_3$ , gives a white precipitate soluble in an excess of the reagent, forming a compound C.

(iv). The solution of B gives a white precipitate with a small concentration of KCN. the precipitate is soluble in an excess of the reagent, forming a compound D.

(v) the solution of D, on treatment with  $H_2S$ , gives A.

(vi) The solution of B in dilute HCl, on treatment with a solution of  $BaCl_2$ , gives a white precipitate of the compound E, which is almost insoluble in concentrated  $HNO_3$ .

Q. Which of the following are the white precipitate and the soluble substance formed by the excess of the NaOH reagent, respectively?





**Answer: D**



[View Text Solution](#)

59. (i) A yellow precipitate of the compound A is formed on passing  $H_2S$  through a neutral solution of the salt B.

(ii) The compound A is soluble in hot dilute  $HNO_3$  but insoluble in yellow ammonium sulphide.

(iii) The solution of B, on treatment with a small quantity of  $NH_3$ , gives a white precipitate soluble in an excess of the reagent, forming a compound C.

(iv). The solution of B gives a white precipitate with a small concentration of KCN. the precipitate is soluble in an excess of the reagent, forming a compound D.

(v) the solution of D, on treatment with  $H_2S$ , gives A.

(vi) The solution of B in dilute HCl, on treatment with a solution of  $BaCl_2$ ,

gives a white precipitate of the compound E, which is almost insoluble in concentrated  $HNO_3$ .

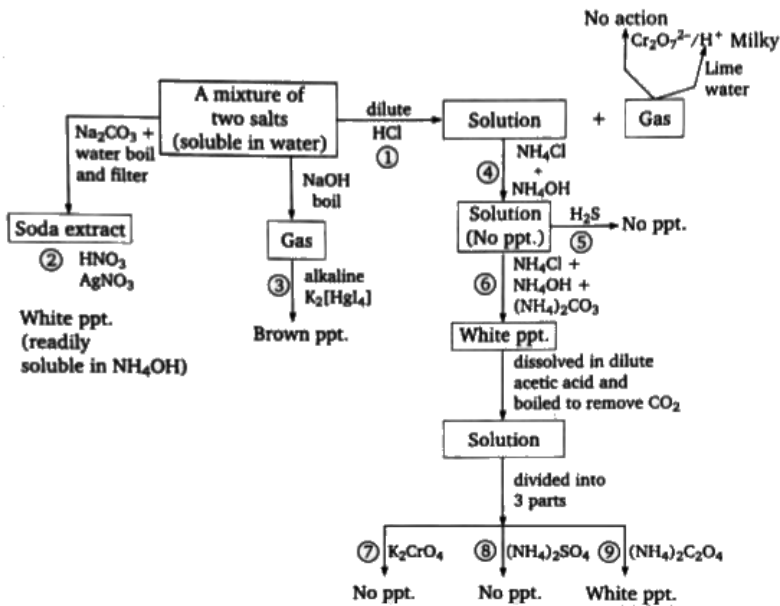
Q. Which of the following are the white precipitate and the soluble substance formed by the excess of the KCN reagent. respectively, in (iv) ?



**Answer: D**



**View Text Solution**



60.

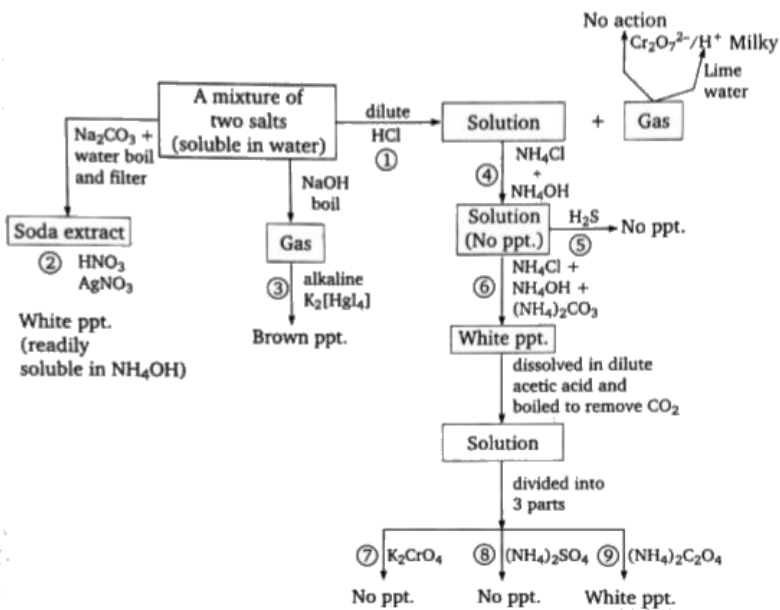
Q. The white precipitate obtained in step (2) when filtered, washed with water and dissolved in  $\text{NH}_4\text{OH}$ , furnishes the ions:

- A.  $\text{Ag}^+$ ,  $\text{NH}_4^+$  and  $\text{OH}^-$
- B.  $\text{Ag}^{2+} + \text{NH}_4^+ + \text{Cl}^-$
- C.  $[\text{Ag}(\text{NH}_3)_2]^+$ ,  $\text{Cl}^-$
- D.  $[\text{Ag}(\text{OH})_2]^-$ ,  $\text{NH}_4^+$ ,  $\text{Cl}^-$

Answer: C



View Text Solution



61.

Q. What will happen if the white precipitate obtained in step (9) is treated with a large volume of dilute  $\text{H}_2\text{SO}_4$  and then with a few drops of a  $\text{KMnO}_4$  solution?

- A. The precipitate will dissolve in dilute  $\text{H}_2\text{SO}_4$  and the solution will decolorise the permanganate solution
- B. The precipitate will dissolve in dilute  $\text{H}_2\text{SO}_4$  and the solution will give a brown precipitate with the  $\text{KMnO}_4$  solution



C. The precipitate will dissolve in dilute  $H_2SO_4$  and the solution will not react with  $KMnO_4$

D. The precipitate will not dissolve in dilute  $H_2SO_4$  and the mixture will not react with  $KMnO_4$

**Answer: A**

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**62.** An aqueous solution of a white salt A gives a white precipitate B on treatment with dilute HCl in cold condition. B is soluble in boiling water. An aqueous solution of A gives a yellow precipitate on treatment with a solution of  $K_2CrO_4$ . The soda extract of A is acidified with dilute  $H_2SO_4$ , boiled to remove  $CO_2$  and treated with a freshly prepared solution of  $FeSO_4$ . Concentrated  $H_2SO_4$  is added to the resulting solution. A brown ring is formed at the junction of the two layers.

**Q.** On treatment with a KI solution, an aqueous solution of A will give:

A. a yellow precipitate, soluble in boiling water

B. a yellow precipitate, insoluble in boiling water

C. a white precipitate, soluble, soluble in boiling water

D. a white precipitate, insoluble in boiling water

**Answer: A**



[View Text Solution](#)

**63.** An aqueous solution of a white salt A gives a white precipitate B on treatment with dilute HCl in cold condition. B is soluble in boiling water.

An aqueous solution of A gives a yellow precipitate on treatment with a solution of  $K_2CrO_4$ . The soda extract of A is acidified with dilute  $H_2SO_4$ , boiled to remove  $CO_2$  and treated with a freshly prepared solution of  $FeSO_4$ . Concentrated  $H_2SO_4$  is added to the resulting solution. A brown ring is formed at the junction of the two layers.

Q. A solution of A, when treated with  $NH_3$ , gives:

A. a white precipitate soluble in an excess of  $NH_3$

B. a white precipitate insoluble in an excess of  $NH_3$

C. a grey precipitate soluble in an excess of  $NH_3$

D. a grey precipitate insoluble in an excess of  $NH_3$

**Answer: B**

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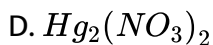
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Q. The salt A is:

A.  $PbBr_2$

B.  $Pb(NO_3)_2$

C.  $AgNO_3$



Answer: B

 [View Text Solution](#)

65. When an aqueous solution of a colourless mixture of two salts is treated with a drop of chlorine water, the solution becomes brown. Some chloroform is added to the brown solution and the resulting mixture is shaken well. The chloroform layer becomes violet.

(ii) When chlorine water is again added dropwise to the above mixture, the chloroform layer becomes colourless.

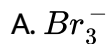
(iii) On being heated with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , the solid mixture gives vapours of a dark colour which form a yellow solution with aqueous NaOH. On acidification with acetic acid followed by treatment with lead acetate, the yellow solution gives a yellow precipitate.

(iv) When boiled with an NaOH solution, the mixture gives a gas that produces thick white fumes with HCl vapours and turns nessler's reagent

brown. the mixture does not respond to any other test for cations.

(v) The mixture, on being heated, gets completely sublimed.

Q. The brown solutin obtained in (i) is due to:



**Answer: B**



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**66.** When an aqueous solution of a colourless mixture of two salts is treated with a drop of chlorine water, the solution becomes brown. Some chloroform is added to the brown solution and the resulting mixture is shaken wel. The chloroform layer becomes violet.

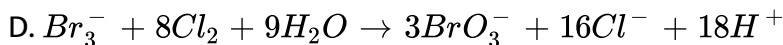
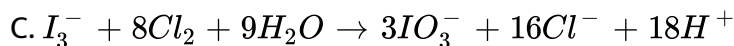
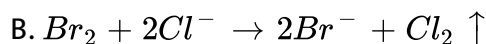
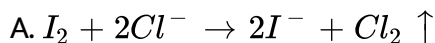
(ii) When chlorine water is again added dropwise to the above mixture, the chloroform layer becomes colourless.

(iii) On being heated with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , the solid mixture gives vapours of a dark colour which form a yellow solution with aqueous NaOH. On acidification with acetic acid followed by treatment with lead acetate, the yellow solution gives a yellow precipitate.

(iv) When boiled with an NaOH solution, the mixture gives a gas that produces thick white fumes with HCl vapours and turns nessler's reagent brown. the mixture does not respond to any other test for cations.

(v) The mixture, on being heated, gets completely sublimed.

Q. Which of the following reactions takes place in (ii) ?



**Answer: C**



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67. When an aqueous solution of a colourless mixture of two salts is treated with a drop of chlorine water, the solution becomes brown. Some chloroform is added to the brown solution and the resulting mixture is shaken well. The chloroform layer becomes violet.

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(v) The mixture, on being heated, gets completely sublimed.

Q. The vapours obtained in (iii) contain:

A.  $CrO_2Cl_2$  and  $I_2$

B.  $CrO_2Cl_2$  only

C.  $I_2$  only

D.  $CrO_2Br_2$

**Answer: A**



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68. When an aqueous solution of a colourless mixture of two salts is treated with a drop of chlorine water, the solution becomes brown. Some chloroform is added to the brown solution and the resulting mixture is shaken well. The chloroform layer becomes violet.

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produces thick white fumes with HCl vapours and turns nessler's reagent brown. the mixture does not respond to any other test for cations.

(v) The mixture, on being heated, gets completely sublimed.

Q. What is the oxidation state of the central atom in the anion constituting the yellow precipitate obtained in (iii)?

A. 0

B. +2

C. +4

D. +6

**Answer: D**



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69. When an aqueous solution of a colourless mixture of two salts is treated with a drop of chlorine water, the solution becomes brown. Some chloroform is added to the brown solution and the resulting mixture is shaken well. The chloroform layer becomes violet.

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(v) The mixture, on being heated, gets completely sublimed.

Q. The original mixture contains:

A.  $NH_4Cl$  and  $NH_4Br$

B.  $NH_4Br$  and  $NH_4I$

C.  $NH_4Cl$  and  $NH_4I$

D.  $NH_4Cl$  and  $NH_4NO_3$

**Answer: C**

70. (i) A white solid mixture of two salts containing a common cations in insoluble in water. It dissolves in dilute HCl producing some gases (with effervescence) that turn an acidified dichromate solution green. After the gases are passed through the acidified dichromate solution, the emerging gas turns baryta water milky.

(ii) On treatment with dilute  $HNO_3$ , the white solid gives a solution which does not directly give a precipitate with a  $BaCl_2$  solution but gives a white precipitate when warmed with  $H_2O_2$  and then treated with a  $BaCl_2$  solution.

(iii) The solution of the mixture in dilute HCl, when treated with  $NH_4Cl$ ,  $NH_4OH$  and an  $Na_2HPO_4$  solution, gives a white precipitate.

Q. The gases evolved in (i) are:

A.  $CO_2$  and  $HCl$

B.  $SO_2$  and  $CO_2$

C.  $SO_2$  and  $H_2S$

D.  $NH_3$  and  $CO_2$

**Answer: B**

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71. (i) A white solid mixture of two salts containing a common cations in insoluble in water. It dissolves in dilute HCl producing some gases (with effervescence) that turn an acidified dichromate solution green. After the gases are passed through the acidified dichromate solution, the emerging gas turns barium water milky.

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(iii) The solution of the mixture in dilute HCl, when treated with  $NH_4Cl$ ,  $NH_4OH$  and an  $Na_2HPO_4$  solution, gives a white precipitate.

Q. The white precipitate obtained in (ii) indicates the presence of a:

A. carbonate

B. sulphide

C. sulphite

D. chloride

**Answer: C**

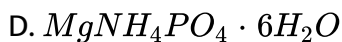
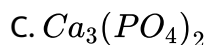
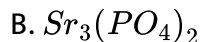
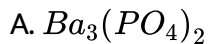
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72. (i) A white solid mixture of two salts containing a common cations in insoluble in water. It dissolves in dilute HCl producing some gases (with effervescence) that turn an acidified dichromate solution green. After the gases are passed through the acidified dichromate solution, the emerging gas turns baryta water milky.

(ii) On treatment with dilute  $HNO_3$ , the white solid gives a solution which does not directly give a precipitate with a  $BaCl_2$  solution but gives a white precipitate when warmed with  $H_2O_2$  and then treated with a  $BaCl_2$  solution.

(iii) The solution of the mixture in dilute HCl, when treated with  $NH_4Cl$ ,  $NH_4OH$  and an  $Na_2HPO_4$  solution, gives a white precipitate.

Q. The white precipitate obtained in (iii) consists of:



**Answer: D**

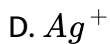
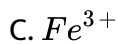


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**ONE OR MORE ANSWER IS/ARE CORRECT**

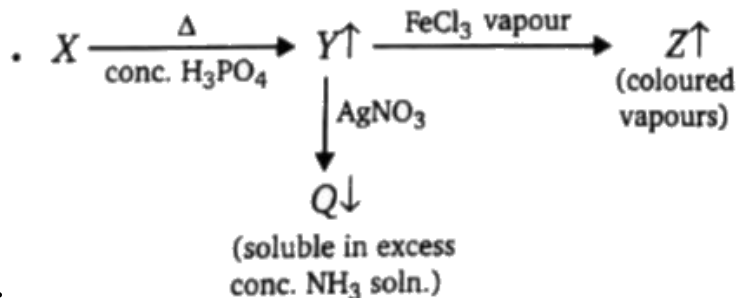
1. Basic radical(s) which can not be identified by borax bead test:





Answer: A::B::D

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2.

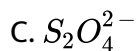
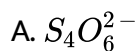
Which of the following anion cannot be in X?



**Answer: A::D**

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3. When ozone reacts with an excess of potassium iodide solution buffered with a borate buffer (pH 9.2) iodine is liberated which can be titrated against a standard solution of sodium thiosulphate, this is a quantitative method for estimating  $O_3$  gas. when liberated  $I_2$  and sodium thiosulphate will react, then product is/are:

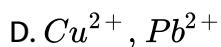
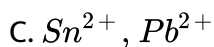
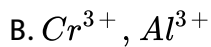
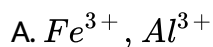


**Answer: A**

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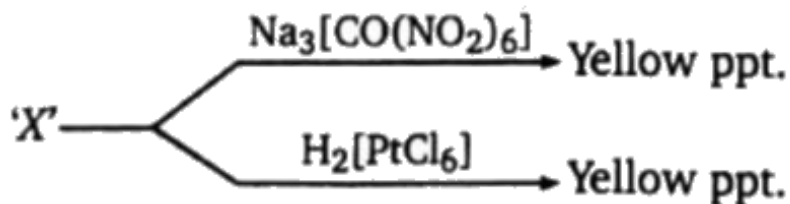
4. Which of the following pairs of cations cannot be separated by using an NaOH solution?



Answer: B::C

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5. \_\_\_\_\_ Aq. \_\_\_\_\_ Solution \_\_\_\_\_ of



the cation(s) present in 'X' is/are:



**Answer: A:D**

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6. Potassium chromate solution is added to an aqueous solution of a metal chloride. The precipitate thus obtained are insoluble in acetic acid.

These are subjected to flame test, the colour of the flame is

A. Lilac

B. Apple green

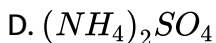
C. Crimson red

D. Blue

**Answer: B::D**

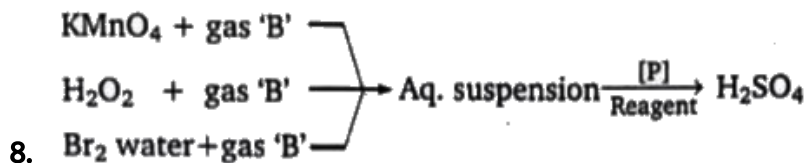
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7. A white sublimable solid, when boiled with an NaOH solution, gives a colourless gas that turns nessler's reagent brown. The solid on being heated with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$ , gives red brown vapours. The white solid can be:



**Answer: B::C**

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Which of the following option(s) is/are correct regarding 'P' among the following?

- A.  $\text{O}_3$
- B. Excess  $\text{Cl}_2$  water
- C. conc.  $\text{HNO}_3$
- D.  $\text{HCl}$

**Answer: A::C::D**

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9. In which of the following case a violet colouration be observed?

- A. An alkaline solution of sodium nitroprusside is treated with a solution of  $\text{Na}_2\text{S}$

B. A solution of sodium cobaltinitrite is treated with one of KCl

C. A solution of  $Mn(NO_3)_2$  is treated with sodium bismuthate or red lead in the presence of concentrated  $HNO_3$

D. A solution of sodium nitroprusside in aqueous NaOH is treated with  $Na_2SO_3$

**Answer: A:C**

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10. Saturated solution of  $SO_2$  is heated at  $150^\circ C$  in a closed container. The product obtained is treated with  $BaCl_2$  solution. What is/are the observation (s)?

A. No ppt.

B. White turbidity

C. Evolution of  $SO_2$

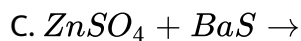
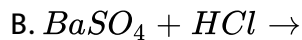
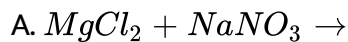
D. White ppt.

Answer: B::D



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11. Which reaction is/are possible?

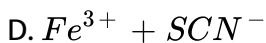
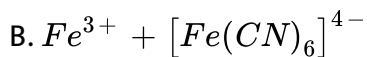
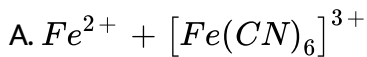


Answer: C::D



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12. Which of the following combinations in an aqueous medium will give a blue colour or precipitate ?



**Answer: A::B::C**

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**13.** Which of the following statements (s) is (are) correct with reference to the ferrous and ferric ions?

(a).  $Fe^{3+}$  gives brown colour with potassium ferricyanide.

(b).  $Fe^{2+}$  gives blue precipitate with potassium ferricyanide.

(c).  $Fe^{3+}$  gives red colour with potassium thiocyanate.

(d).  $Fe^{2+}$  gives brown colour with ammonium thiocyanate.

A.  $Fe^{2+}$  gives brown colour with potassium ferricyanide

B.  $Fe^{2+}$  gives blue colour with potassium ferricyanide

C.  $Fe^{3+}$  gives red colour with potassium thiocyanate

D.  $Fe^{2+}$  gives brown colour with potassium thiocyanate

**Answer: B::C**

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**14.** Which of the following combinations in an aqueous medium will give a red colour or precipitate ?

A.  $Fe^{3+} + SCN^{-}$

B.  $Fe^{2+} + [Fe(CN)_6]^{3-}$

C.  $Ni^{2+}$  + dimethyloxime +  $NH_3$  solution

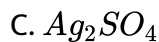
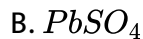
D.  $Co^{2+} + SCN^{-}$

**Answer: A::C**

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15. Which of the following sulphates are soluble in water?

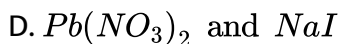
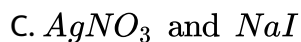
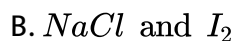


Answer: A::C



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16. Which of the following pair(s) contain species, which react with each other on mixing their aqueous solutions to give yellow precipitate?



Answer: C::D

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17. Which of the following sulphides dissolve in dilute HCl?

A.  $CoS$

B.  $NiS$

C.  $MnS$

D.  $ZnS$

Answer: C::D

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18. Acidic  $K_2Cr_2O_7$  reacts with  $H_2S$  to produce:

A.  $Cr^{6+}$  ions

B.  $Cr^{3+}$  ions

C.  $SO_2$

D. S

**Answer: B::D**

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19. Which of the following reagents can be used to distinguish between  $SO_2$  and  $CO_2$ ?

A. Lime water

B.  $BaCl_2$  solution

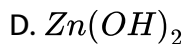
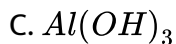
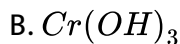
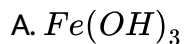
C.  $H_2O_2$  +  $BaCl_2$  solution+dil. HCl

D. Acidified dichromate paper

**Answer: C::D**

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20. Which of the following will dissolve in a mixture of NaOH and  $H_2O_2$ ?



Answer: B::C::D



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21. Which of the following reagents will not be useful in separating a mixture of  $Zn^{2+}$  and  $Cu^{2+}$ ?

A.  $H_2S$  in an acid medium

B.  $H_2S$  in an alkaline medium

C. Excess of NaOH solution

D.  $NH_3$  solution

Answer: B::D

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22. Which of the following mixtures cannot be separated by passing  $H_2S$  through their solutions containing dilute HCl ?

A.  $Cu^{2+}$  and  $Sb^{3+}$

B.  $Pb^{2+}$  and  $Cd^{2+}$

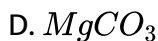
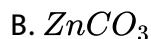
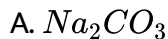
C.  $Pb^{2+}$  and  $Al^{3+}$

D.  $Zn^{2+}$  and  $Mn^{2+}$

Answer: A::B::D

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23. Which of the following substance on being heated with give a gas that turns limewater milky?

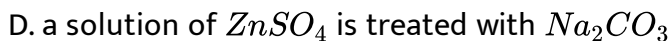
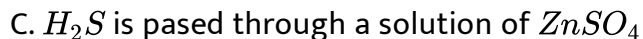
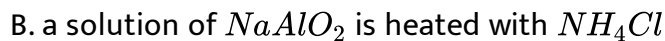
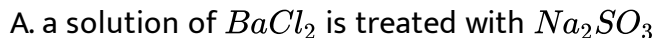


Answer: B::C::D



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24. A white precipitate is obtained when:



**Answer: A::B::D**

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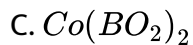
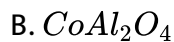
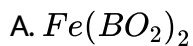
**25.** Which of the following cations will turns a borax bead green in an oxidising flame?



**Answer: C**

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**26.** Which of the following substance are blue?

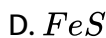
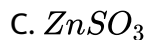
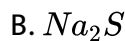
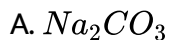


**Answer: B::C::D**



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27. On reaction with dilute  $H_2SO_4$ , which of the following salts will give out a gas that turns an acidified dichromate paper green?



**Answer: B::C::D**



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28. A yellow precipitate is obtained when:

A. lead acetate solution is treated with  $K_2CrO_4$

B.  $Pb(NO_3)_2$  solution is treated with  $K_2CrO_4$

C.  $AgNO_3$  solution treated with KI

D.  $H_2S$  is passed through a solution of  $CdSO_4$

Answer: A::B::C::D

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29. Which of the following ions can be separated by using  $NH_4Cl$  and  $NH_4OH$  ?

A.  $Fe^{3+}$  and  $Cr^{3+}$

B.  $Cr^{3+}$  and  $Co^{2+}$

C.  $Cr^{3+}$  and  $Al^{3+}$

D.  $Al^{3+}$  and  $Ba^{2+}$

**Answer: B::D**

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**30.** Which of the following pairs of cations cannot be separated by adding  $NH_4Cl$  and  $NH_4OH$  to the mixture and then passing  $H_2S$  through it?

A.  $Ca^{2+}$  and  $Ni^{2+}$

B.  $Mg^{2+}$  and  $Mn^{2+}$

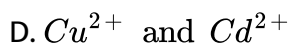
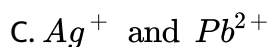
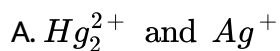
C.  $Ni^{2+}$  and  $Mn^{2+}$

D.  $Co^{2+}$  and  $Zn^{2+}$

**Answer: C::D**

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31. Which of the following mixtures of ions in solution can be separated by using  $NH_3$  solution?

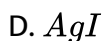
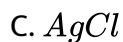
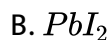


Answer: A::B::C



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32. Which of the following compound are coloured?



**Answer: B::D**

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**33.** Which of the following mixtures of ions in solution can be separated by using dilute  $H_2SO_4$ ?

A.  $Zn^{2+}$  and  $Pb^{2+}$

B.  $Ba^{2+}$  and  $Pb^{2+}$

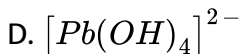
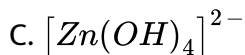
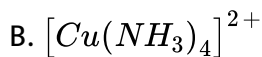
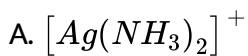
C.  $Mn^{2+}$  and  $Sr^{2+}$

D.  $Sr^{2+}$  and  $Ba^{2+}$

**Answer: A::C**

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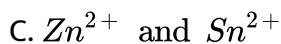
**34.** Which of the following species will be decomposed on acidification?



**Answer: A::B::C::D**

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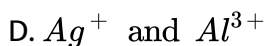
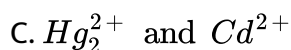
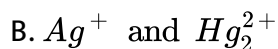
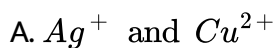
**35.** Which of the following mixtures of ions in solution can be separated by using NaOH solution?



**Answer: A::D**

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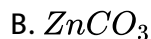
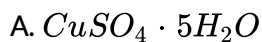
36. Which of the following ions can be separated by using dilute HCl?

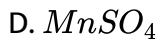


Answer: A::C::D

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37. Which of the following substance will leave a black residue on strong heating?

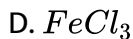
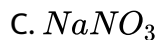
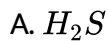




**Answer: A::D**

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38. By which of the following reagents can a sublimate of  $HgCl_2$  be distinguished from  $NH_4Cl$  ?



**Answer: A**

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39. An aqueous solution is prepared by dissolving a mixture containing  $ZnCl_2$ ,  $CdCl_2$  and  $CuCl_2$ . Now  $H_2S$  gas is passed through the aqueous solution of salt to form precipitate.

A.  $CdS$

B.  $CuS$

C.  $ZnS$

D. No ppt.

Answer: A::B



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40. An aqueous solution containing  $S^{2-}$  ions will not give:

A. Yellow precipitate with the suspension of  $CdCO_3$  in water

B. Black precipitate with lead acetate solution

C. White precipitate with  $BaCl_2$  solution



D. Purple colour with sodium thiosulphate solution

**Answer: C::D**

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41. Which of the following statement (s) is (are) correct when a mixture of NaCl and  $K_2Cr_2O_7$  is gently warmed with conc.  $H_2SO_4$  ?

A. A deep red vapour is evolved

B. The vapour when passed into NaOH solution gives a yellow solution of  $Na_2CrO_4$

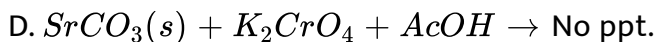
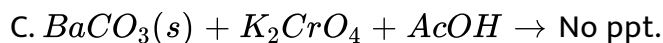
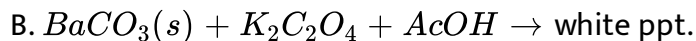
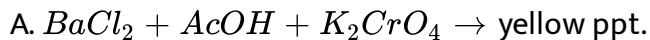
C. Chlorine gas is evolved

D. Chromyl chloride is formed

**Answer: A::B::D**

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42. Choose the correct reaction:



Answer: A::D



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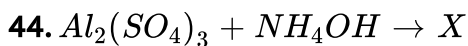
43. Which of the following aqueous solution of cation(s) give(s) white ppt. with NaOH and  $NH_4OH$  solution and formed ppt. is/are further completely dissolve in one of the excess reagent?



D.  $Bi^{3+}$

Answer: A::C

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Select the correct statement(s) about compound X:

- A. X is a white coloured compound
- B. X is insoluble in excess of  $NH_4OH$
- C. X is soluble in NaOH
- D. X can be used as an antacid

Answer: A::B::C::D

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45. The evolution of a red-brown gas on heating a salt with  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$  can arise from:

- A. chloride
- B. bromide
- C. nitrate
- D. nitrite

Answer: A::B::C::D



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## MATCH THE COLUMN

Column-I (Reaction with Salt/Radical)	Column-II (Salt/Radical)
(A) $Zn + \text{dil. } H_2SO_4$	(P) $Pb(NO_2)_2$
(B) $\text{dil. } HCl$	(Q) $(NH_4)_2S$
(C) $NaOH$ (excess)	(R) $MnO_4^-$ (aq.)
(D) $KI$	(S) $Hg_2^{2+}$ (aq.)
	(T) $Bi^{3+}$ (aq.)

1.

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Column-I	Column-II
(A) Colourless gas evolved on addition of dil. $H_2SO_4$	(P) $S_2O_3^{2-}$
(B) White ppt. on addition of $AgNO_3$	(Q) $S^{2-}$
(C) Black ppt. obtained when $HgCl_2$ is added in little amount	(R) $NO_2^-$
(D) The ppt. obtained on addition of $AgNO_3$ followed by $NH_3$ solution	(S) $CH_3CO_2^-$

2.

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## ASSERTION-REASON TYPE QUESTIONS

1. Assertion:  $AgNO_3$  reacts with KCN to form white ppt. of  $AgCN$ . This white ppt. disappears when excess KCN is added.

Reason:  $AgCN$  decomposes to form silver-carbide and evolve  $N_2$  gas.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: A**

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2. Assertion:  $HgCl_2$  does not respond chromyl chloride test.

Reason:  $HgCl_2$  being covalent compound ionises upto 2%.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**

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**3. Assertion:**  $Zn + HNO_3(\text{conc.}) \rightarrow Zn(NO_3)_2 + NO_2 + H_2O$

**Reason:** Nitric acid plays double role in action of Zn metal, it acts as an acid as well as an oxidising agent.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**



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4. Assertion: If yellow precipitate is obtained on adding ammonium molybdate solution on boiling then phosphate radical is identified.

Reason: Ammonium phosphomolybdate is a yellow compound.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: B**



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5. Assertion:  $HgCl_2$  and  $SnCl_2$  cannot exist together in an aqueous solution.

Reason:  $SnCl_2$  is a strong reducing agent because Sn shows inert pair effect.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: A**



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6. Assertion: Sometimes a white turbidity is obtained when a solution is prepared in water.

Reason:  $Pb^{2+}$  cations are precipitate as  $PbCl_2$  which is sparingly solution in water.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and reason is the correct explanation of assertion
- D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: D**



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7. Assertion:  $CdS$  and  $As_2S_3$  are yellow coloured compounds.

Reason:  $CdS$  and  $As_2S_3$  can be separated by ammonium sulphide.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: D**



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8. Assertion Green edge flame test tells presence of borate ion.

Reason: Green colour of the flame is due to burning of tri ethyl borate.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**

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9. Assertion: A solution of  $\text{AgCl}$  in  $\text{NH}_4\text{OH}$  gives a white precipitate when acidified with  $\text{HNO}_3$ .

Reason:  $[\text{Ag}(\text{NH}_3)_2]^+$  decomposes in the presence of  $\text{HNO}_3$ .

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**

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10. Assertion: When  $H_2S$  is passed through a solution of  $CuSO_4$ , no precipitate of  $CuS$  is obtained until the solution is acidified with  $HCl$ .

Reason: The solubility product constant of  $CuS$  is not so high as to require a high concentration of  $S^{2-}$  for the precipitate of  $CuS$ .

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: B**



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**11. Assertion:** When  $H_2S$  is passed through a solution containing  $[Cu(CN)_4]^{2-}$  and  $[Cd(CN)_4]^{2-}$  ions, only cadmium precipitates as  $CdS$ .

**Reason:** The oxidation state and co-ordination number of cadmium in  $[Cd(CN)_4]^{2-}$  are II and 4 respectively.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and reason is the correct explanation of assertion
- D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: D**



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12. Assertion: concentrated solution of  $BiCl_3$  can be hydrolysed with water.

Reason:  $BiCl_3$  does not change in composition with dilution.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and reason is the correct explanation of assertion
- D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: A**



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**13. Assertion:** The blue precipitate formed by the action of  $K_4[Fe(CN)_6]$  on  $Fe^{3+}$  and by that of  $K_3[Fe(CN)_6]$  on  $Fe^{2+}$  have the same composition.

**Reason:**  $[Fe(CN)_6]^{3-}$  oxidises  $Fe^{2+}$  to  $Fe^{3+}$  and itself gets reduced to  $[Fe(CN)_6]^{4-}$ .

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and reason is the correct explanation of assertion
- D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**

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14. Assertion:  $Zn(OH)_2$  dissolves in an excess of NaOH solution as well as  $NH_4OH$  solution.

Reason:  $Zn(OH)_2$  forms the soluble zincate salts with these alkalies.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: A**



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15. Assertion: When a solution of  $Na_2ZnO_2$  is acidified with dilute HCl and treated with  $H_2S$ , a precipitate of ZnS is formed.

Reason:  $Na_2ZnO_2$  is decomposed by HCl to give  $Zn^{2+}$  ions.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and reason is the correct explanation of assertion
- D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: B**

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**16.** Assertion:  $Br^-$  ions do not interfere in the chromyl chloride test for chlorides.

Reason: A bromide, on oxidation with  $K_2Cr_2O_7$  / concentrated  $H_2SO_4$ , liberates  $Br_2$ , which dissolves in NaOH to give a colourless solution.

- A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If both assertion and reason are true but reason is not the correct explanation of assertion

**Answer: C**

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**17.** Assertion: Basic radical of V group are precipitated as their carbonates in presence of  $NH_4Cl$ .

Reason:  $NO_4OH$  maintains the pH of the solution basic.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

D. If oth assertion and reason are true but reason is not the correct explanation of assertion

**Answer: D**



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**18.** Assertion:  $NO_3^-$  ion can not be detected by brown ring test in presence of  $NO_2^-$  ion.

Reason: Both  $NO_2^-$  and  $NO_3^-$  ions evolve brown  $NO_2$  gas with conc.  $H_2SO_4$  acid.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and reason is the correct explanation of assertion

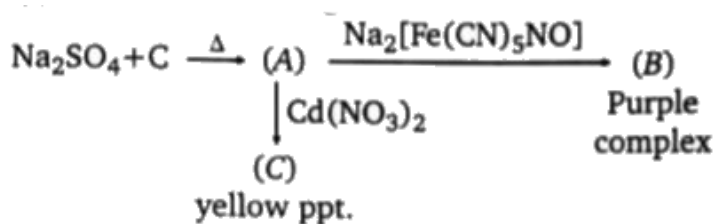
D. If oth assertion and reason are true but reason is not the correct explanation of assertion

Answer: C

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## SUBJECTIVE PROBLEMS

1. Consider the following reaction



Then calculate value of  $|X^2 - Y^2|$  (where X and Y are total number of electrons present  $t_{-}(2g)$  and  $e_{-}(g)$  orbitals respectively in d-block metal ion of compound B).

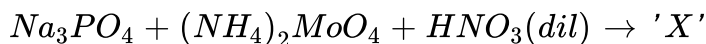
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2. Find number of basic radicals among the following cations, which can form soluble complex on adding excess of  $\text{NH}_4$  solution.

$Cd^{2+}(aq.)$ ,  $Pb^{2+}(aq.)$ ,  $Ni^{2+}(aq.)$ ,  $Mn^{2+}(aq.)$ ,  $Zn^{2+}(aq.)$ ,  $Ag^+(aq.)$ ,

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3. Consider the following reaction



Then calculate total number of atoms of 15th group element which are  $sp^3$  hybridized in compound 'X'.

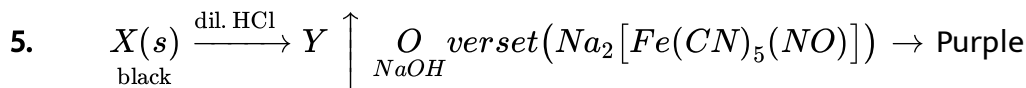
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4. How many anions will give colourless acid vapour/ gas with conc.

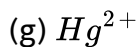
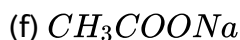
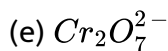
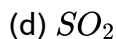
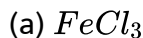
$H_2SO_4$  on reaction with following gives anions?



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solution gas Y has been allowed to react with following species in neutral/acidic medium:



Then calculate value of (P+Q-R)

P: Number of species which undergoes redox reaction with gas Y.

Q: Number of species with which gas Y undergoes precipitation.

R: Number of species with which gas Y produce no observable change.



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