



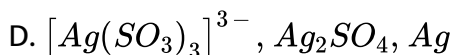
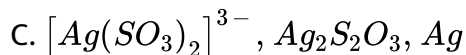
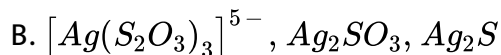
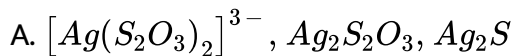
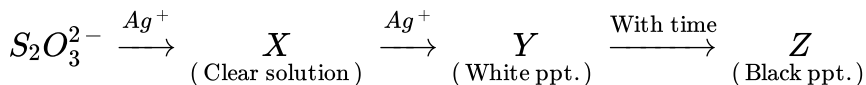
CHEMISTRY

BOOKS - IIT-JEE PREVIOUS YEAR (CHEMISTRY)

QUALITATIVE ANALYSIS

Jee Main And Advanced

1. In the following sequence in aqueous solution, the species X, Y and Z, respectively, are



Answer: A

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2. In Carius method of estimation of halogens 250mg of an organic compound gave 141mg of AgBr . The percentage of bromine in the compound is (atomic mass $\text{Ag} = 108$, $\text{Br} = 80$)

A. 24

B. 36

C. 48

D. 60

Answer: A

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3. Passing H_2S gas into a mixture of Mn^{2+} , Ni^{2+} , Cu^{2+} and Hg^{2+} ions in an acidified aqueous solution precipitates

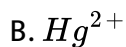
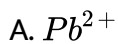
- A. CuS and HgS
- B. MnS and CuS
- C. MnS and NiS
- D. NiS and HgS

Answer: A



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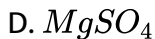
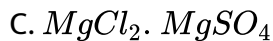
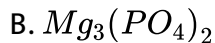
4. A solution of a metal ion when treated with KI gives a red precipitate which dissolves in excess KI to give a colourless solution. Moreover, the solution of metal ion on treatment with a solution of cobalt (II) thiocyanate gives rise to a deep blue crystalline precipitate. The metal ion is



Answer: B

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5. $MgSO_4$ on reaction with Na_4OH and Na_2HPO_4 forms a white crystalline precipitate. What is its formula?

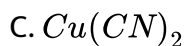
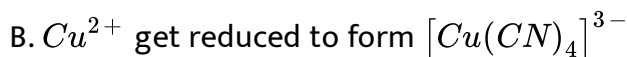
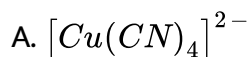


Answer: A



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6. $CuSO_4$ decolourises on addition of KCN , the product is

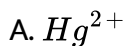


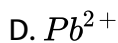
Answer: B



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7. A metal nitrate reacts with KI to give a black precipitate which on addition of excess of KI convert into orange colour solution. The cation of metal nitrate is





Answer: B



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8. A sodium salt of an unknown anion when treated with $MgCl_2$ gives white precipitate only on boiling. The anion is



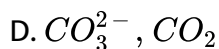
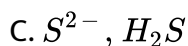
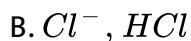
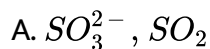
Answer: B



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9. $[X] + H_2SO_4 \rightarrow [Y]$ a colourless gas with irritating smell

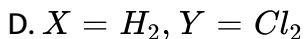
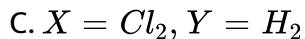
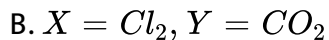
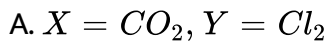
$[Y] + K_2Cr_2O_7 + H_2SO_4 \rightarrow$ green solution $[X]$ and $[Y]$ are



Answer: A

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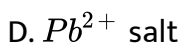
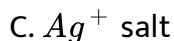
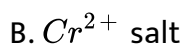
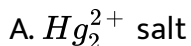
10. A gas X is passed through water to form a saturated solution. The aqueous solution on treatment with silver nitrate gives a white precipitate. The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colourless gas Y. Identify X and Y.



Answer: C

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11. An aqueous solution of a substance gives a white precipitate on treatment with dilute hydrochloric acid, which dissolves on heating. When hydrogen sulphide is passed through the hot acidic solution, a black precipitate is obtained. The substance is a



Answer: D

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12. In nitroprusside ion the iron and NO exist as Fe (II) and NO^+ rather than the Fe(III) and NO. these forms can be differentiated by

- A. estimating the concentration of iron
- B. measuring the concentration of CN
- C. measuring the solid state magnetic moment
- D. thermally decomposing the compound

Answer: C

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13. An aqueous solution $FeSO_4$, $Al_2(SO_4)_3$ and chrome alum is heated with excess of Na_2O_2 and filtered. The materials obtained are

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

Answer: C

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14. The brown ring complex compound is formulated as

$[Fe(H_2O)_5NO]SO_4$. The oxidation state of Fe is

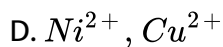
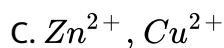
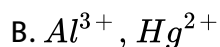
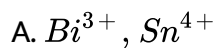
- A. 1
- B. 2
- C. 3
- D. 0

Answer: A



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15. Which are amongst the following pairs of ions cannot be separated by H_2S is dilute HCl ?



Answer: A



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16. Which of the following is insoluble in acetic acid?

A. calcium acid

B. calcium carbonate

C. calcium oxalate

D. calcium hydroxide

Answer: C

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17. The ion that cannot be precipitated by both HCl and H_2S is

A. Pb^{2+}

B. Cu^{+}

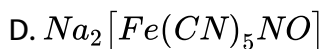
C. Ag^{+}

D. Sn^{2+}

Answer: C

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18. The reagent (s) that can selectively precipitate S^{2-} from a mixture of S^{2-} and SO_4^{2-} in aqueous solution is (are)

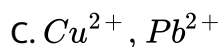
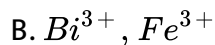
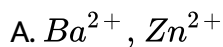


Answer: A



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19. The pair (s) of ions where both the ions are precipitate upon passing H_2S gas in presence of dilute HCl , is (are)



D. Hg^{2+} , Bi^{3+}

Answer: C::D

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20. For the given aqueous reaction which of the statement (s) is (are) true ? Excess $KI + K_3[Fe(CN)_6] \xrightarrow{\text{Dilute } H_2SO_4}$

Brownish-yellow solution
 $\downarrow ZnSO_4$

(White precipitate + Brownish-yellow filtrate)

$\downarrow Na_2S_2O_3$
Colourless solution

- A. The first reaction is a redox reaction
- B. White precipitate is $Zn_3[Fe(CN)_6]_2$
- C. Addition of filtrate to starch solution gives blue colour
- D. White precipitate is soluble in $NaOH$ solution

Answer: A::C::D

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21. A solution of colourless salt H on boiling with excess $NaOH$ produces a non-flammable gas. The gas evolution ceases after sometime. Upon addition of Zn dust to the same solution, the gas evolution restarts. The colourless salt(s) H is (are)



Answer: A::B



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22. 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. Chromly chloride is formed

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

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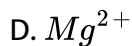
23. Which of the following statement(s) is (are) correct with reference to the ferrous and ferric ions ?

- 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 colour with ammonium thiocyanate

Answer: B::C

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24. The reagents, NH_4Cl and aqueous NH_3 will precipitate



Answer: B::C

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25. Statement I Sulphate is estimated as $BaSO_4$, not as $MgSO_4$.

Statement II Ionic radius of Mg^{2+} is smaller than that of Ba^{2+} .

- A. Statement I is correct, Statement II is correct Statement II is a correct, explanation of Statement I
- B. Statement I is correct, Statement II is correct Statement II is not correct, explanation of Statement I.
- C. Statement I is correct, Statement II is incorrect.
- D. Statement I is incorrect, Statement II is correct.

Answer: B

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26. Statement I A very dilute acidic solution of Cd^{2+} and Ni^{2+} gives yellow precipitate of CdS on passing H_2S .

Statement II Solubility product of CdS is more than that of NiS .

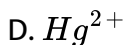
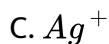
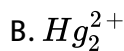
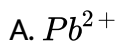
- A. Statement I is correct, Statement II is correct Statement II is a correct, explanation of Statement I

- B. Statement I is correct, Statement II is correct Statement II is not correct, explanation of Statement I.
- C. Statement I is correct, Statement II is incorrect.
- D. Statement I is incorrect, Statement II is correct.

Answer: C

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27. An aqueous solution of a mixture of two inorganic salts, when treated with dilute HCl, gave a precipitate (P) and a filtrate (Q). The precipitate (P) was found to dissolved in hot water. The filtrate (Q) remained unchanged, when treated with H_2S in a dilute mineral acid medium. However, it gave a precipitate (R) with H_2S in an ammoniacal medium. The precipitate (R) gave a coloured solution (S), when treated with H_2O_2 in an aqueous NaOH medium. The precipitate (P) contains ---- while the colored solution (S) contains

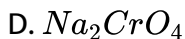
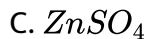
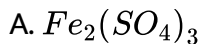


Answer: A

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28. An aqueous solution of a mixture of two inorganic salts, when treated with dilute HCl , gave a precipitate (P) and filtrate (Q). The precipitate (P) was found to dissolve in hot water. The filtrate (Q) remained unchanged, when treated with H_2S in a dilute mineral acid medium. However, it gave a precipitate (R) With H_2S in an ammoniacal medium. The precipitate R gave a coloured solution (S), when treated with H_2O_2 in an aqueous $NaOH$ medium.

The coloured solution S contains



Answer: D

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29. When a metal rod M is dipped into an aqueous colourless concentrated solution of compound N, the solution turns light blue. Addition of aqueous $NaCl$ to the blue solution gives a white precipitate O. Addition of aqueous NH_3 dissolves O and gives an intense blue solution.

The metal rod M is



C. Ni

D. Co

Answer: B



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30. When a metal rod M is dipped into an aqueous colourless concentrated solution of compound N, the solution turns light blue.

Addition of aqueous $NaCl$ to the blue solution gives a white precipitate

O. Addition of aqueous NH_3 dissolves O and gives an intense blue solution.

The compound N is

A. $AgNO_3$

B. $Zn(NO_3)_2$

C. $Al(NO_3)_3$

D. $Pb(NO_3)_2$

Answer: A

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31. The formula of the deep red liquid formed on warming dichromate with KCl in concentrated sulphuric acid is....

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32. From the solution containing copper (+ 2) and zinc (+ 2) ions, copper can be selectively precipitated using sodium sulphide.

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33. Among PbS , CuS , MnS , Ag_2S , NiS , CoS , Bi_2S_3 and SnS_2 the total number of black coloured sulphides is

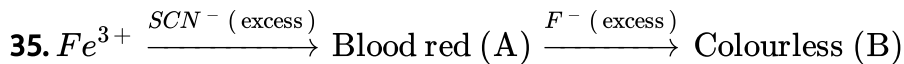
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34.



Identify the metal M and hence MCl_4 . Explain the difference in colours of MCl_4 and A.

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Identify A and B.

(i) Write IUPAC name of A and B.

(ii) Find out spin only magnetic moment of B.

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36. Write the chemical reactions associated with the 'brown ring test'.

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37. An aqueous solution containing one mole of HgI_2 and two moles of NaI is orange in colour. On addition of excess NaI the solution becomes colourless. The orange colour reappears on subsequent addition of $NaOCl$. Explain with equations.

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38. During the qualitative analysis of a mixture containing Cu^{2+} and Zn^{2+} ions, H_2S gas is passed through and acidified solution containing these ions in order to test Cu^{2+} alone. Explain briefly.

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39. Aluminium sulphide gives a foul odour when it becomes damp. Write a balanced chemical equation for the reaction.

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40. Gradual addition of KI solution of $Bi(NO_3)_3$ solution initially produces a dark brown precipitate which dissolves in excess of KI to give a clear yellow solution. Write chemical equations for the above reactions.

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Objective Question I

1. Upon treatment with ammoniacal H_2S , the metal ion that precipitates as a sulphide is

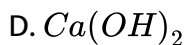
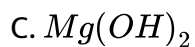
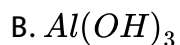
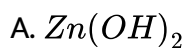
- A. $Fe(III)$
- B. $Al(III)$
- C. $Mg(II)$
- D. $Zn(II)$

Answer: D

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2. A solution when diluted with H_2O and boiled, it gives a white precipitate. On addition of excess NH_4Cl/NH_4OH , the volume of precipitate decreases leaving behind a white gelatinous precipitate.

Identify the precipitate which dissolves in NH_4OH / NH_4Cl .



Answer: A

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3. $(NH_4)_2Cr_2O_7$ on heating gives a gas which is also given by

A. Heating NH_4NO_2

B. Heating NH_4NO_3

C. $Mg_3N_2 + H_2O$

D. $Na(\text{comp.}) + H_2O$

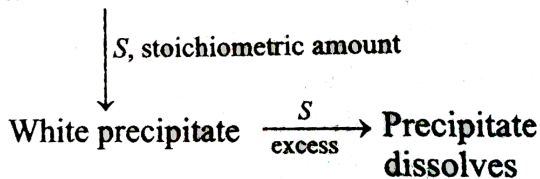
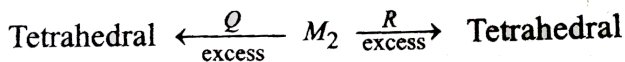
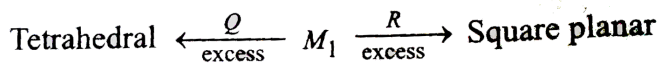
Answer: A

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Passage Based Questions

1. An aqueous solution of metal ion M_1 reacts separately with reagents Q and R in excess to give tetrahedral and square planar complexes, respectively. An aqueous solution of another metal ion M_2 always forms tetrahedral complexes with these reagents. Aqueous solution of M_2 on reaction with reagent S gives white precipitate which dissolves in excess of S. The reaction are summarised in the scheme given below

Scheme



M_1 , Q and R , respectively are



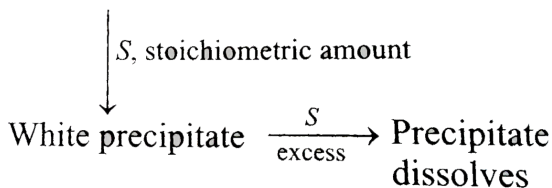
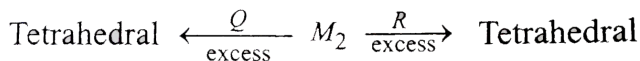
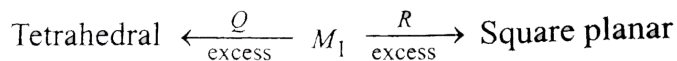
Answer: B

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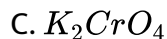
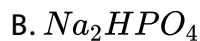
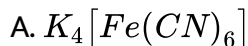
2. An aqueous solution of metal ion M_1 reacts separately with reagents Q and R in excess to give tetrahedral and square planar complexes, respectively. An aqueous solution of another metal ion M_2 always forms

tetrahedral complexes with these reagents. Aqueous solution of M_2 on reaction with reagent S gives white precipitate which dissolves in excess of S. The reaction are summarised in the scheme given below

Scheme



Reagent S is



Answer: D

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3. When a metal rod M is dipped into an aqueous colourless concentrated solution of compound N, the solution turns light blue. Addition of aqueous $NaCl$ to the blue solution gives a white precipitate O. Addition of aqueous NH_3 dissolves O and gives an intense blue solution.

The final solution contains

- A. $[Pb(NH_3)_4]^{2+}$ and $[CoCl_4]^{2-}$
- B. $[Al(NH_3)_4]^{3+}$ and $[Cu(NH_3)_4]^{2+}$
- C. $[Ag(NH_3)_2]^+$ and $[Cu(NH_3)_4]^{2+}$
- D. $[Ag(NH_3)_2]^+$ and $[Ni(NH_3)_6]^{2+}$

Answer: C

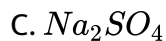
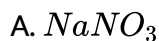


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4. p-amino-N, N-dimethyl aniline is added to a strongly acidic solution of x. The resulting solution is treated with a few drops of aqueous solution

of Y to yield blue colouration due to the formation of methylene, blue. Treatment of the aqueous solution of Y with the reagent potassium hexaxyanoferrate (II) leads to the formation of an intense blue precipitate. The precipitate of the solution of Y with the solution of potassium hexacyanoferrate (III) leads to a brown colouration due to the formation of Z.

The compound X, is



Answer: D

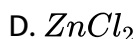
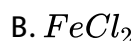
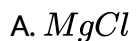


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5. p-amino-N, N-dimethyl laniline is added to a strongly acidci solution of x. The resulting solution is treated with a few drops of aqueous solution

of Y to yield blue colouration due to the formation of methylene, blue. Treatment of the aqueous solution of Y with the reagent potassium hexaxyanoferrate (II) leads to the formation of an intense blue precipitate. The precipitate of the solution of Y with the solution of potassium hexacyanoferrate (III) leads to a brown colouration due to the formation of Z.

The compound Y, is



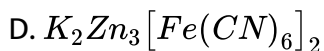
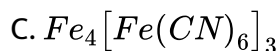
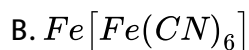
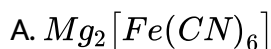
Answer: C



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6. p-amino-N, N-dimethyl laniline is added to a strongly acidci solution of x. The resulting solution is treated with a few drops of aqueous solution

of Y to yield blue colouration due to the formation of methylene, blue. Treatment of the aqueous solution of Y with the reagent potassium hexacyanoferrate (II) leads to the formation of an intense blue precipitate. The precipitate of the solution of Y with the solution of potassium hexacyanoferrate (III) leads to a brown colouration due to the formation of Z.



Answer: B



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Fill In The Blanks

1. If metal ions of groups III are precipitated by NH_4Cl and NH_4OH without prior oxidation by conc. HNO_3 is not completely precipitated.

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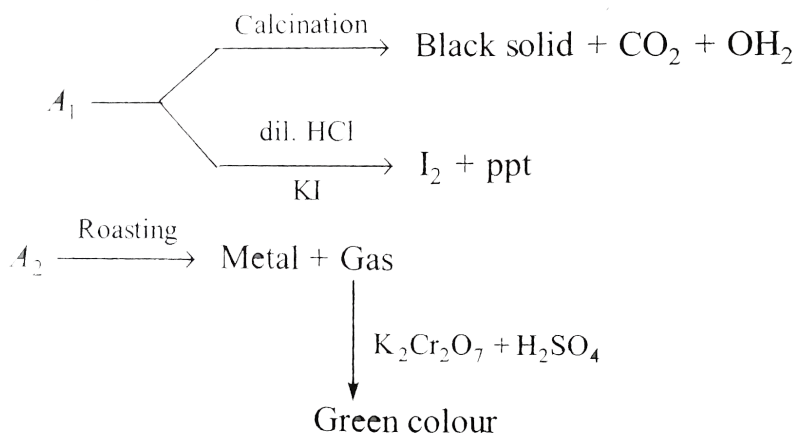
True False

1. Addition of ammonium chloride to a solution containing ferric and magnesium ions is essential for selective precipitation of ferric hydroxide by aqueous ammonia.

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Subjective Questions

1. A_1 and A_2 are two ores of metal M. A_1 on calcination gives black precipitate, CO_2 and water.



Identify A_1 and A_2 .

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2. A salt mixture consists of yellow solid (A) and a colourless solid (B). The aqueous solution of the mixture

(i) On passing H_2S , we get a black precipitate of (C), which dissolves only in aqua-regia. On extraction and reaction with $SnCl_2$ a greyish white precipitate is obtained.

(ii) On treatment with ammonium hydroxide a reddish brown precipitate

(D) is obtained.

The sodium extract of the solution gives the following tests:

(i) On reaction with $AgNO_3$ it gives a yellow precipitate which is insoluble in NH_3 .

(ii) On shaking with $FeCl_3$ and CCl_4 a violet colouration in CCl_4 layer is obtained.

Mixture of performing flame test gives lilac colour. Identify the compounds (A), (B), (C) and (D).

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3. When a white 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. Neutralising the solution of B with acetic acid and on subsequent addition of lead acetate a yellow precipitate C is obtained.

When X is heated with $NaOH$ solution, colourless gas is evolved and on passing this gas into K_2HgI_4 solution, a reddish brown precipitate D is formed. Identify a, B, C, D and X. Write the equation of reaction involved.

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4. A white substance A reacts with dilute H_2SO_4 to produce a colourless gas B and a colourless solution C. The reaction between B and acidified $K_2Cr_2O_7$ solution produces a green solution and a slightly coloured precipitate D. The substance D burns in air to produce a gas E which reacts with B to yield D and a colourless liquid. Anhydrous copper sulphate is turned blue on addition of this colourless liquid. Addition of aqueous NH_3 or $NaOH$ to C produces first a precipitate, produce a clear solution in each case. Identify A, B, C, D and E. Write the equations of the reactions involved.



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5. Write the chemical reactions associated with the 'borax bead test' of cobalt (II) oxide.



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6. An aqueous blue coloured solution of a transition of metal sulphate reacts with H_2S in acidic medium to give a black precipitate A, which is insoluble in warm aqueous solution of KOH . The blue solution on treatment with KI in weakly acidic medium, turns yellow and produces a white precipitate B. Identify the transition metal ion. Write the chemical reaction involved in the formation of A and B.

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7. A soluble compound of a poisonous element M, when heated with Zn/H_2SO_4 gives a colourless and extremely poisonous gaseous compound N, which on passing through a heated blue gives a silvery mirror of element M. Identify M and N.

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8. A colourless inorganic salt (A) decomposes completely at about $250^\circ C$ to give only two products (B) and (C), leaving no residue. The oxide (C) is a

liquid paper, while the gas (B) is a neutral oxide.

White phosphorus burns in excess of (B) to produce a strong white dehydrating agent. Write balanced equations for the reactions involved in the above process.

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9. A scarlet compound A is treated with conc. HNO_3 to give a chocolate brown precipitate B. The precipitate is filtered and the filtrate is neutralised with $NaOH$. Addition of KI to the resulting solution gives a yellow ppt C. The brown ppt B on warming with conc. HNO_3 in the presence of $Mn(NO_3)_2$ produces a pink coloured solution due to the formation of D. Identify A, B, C and D. Write the reaction sequence.

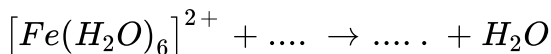
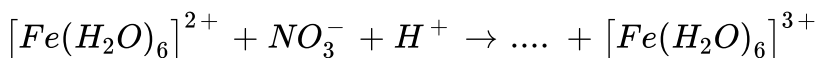
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10. An orange solid a on heating gave a green residue B, a colourless gas c and water vapour. The dry gas c on passing over heated Mg gave a

white solid D. D on reaction with water gave a gas E which formed dense white fumes with HCl . Identify A to E and give the reaction involved.

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11. The acidic aqueous solution of ferrous ion forms a brown complex in the presence of NO_3^- , by the following two steps :

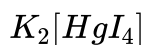


Complete and balance the equation.

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12. A light bluish green crystalline compound responds to the following tests

(i) Its aqueous solution gives a brown precipitate or colouration with



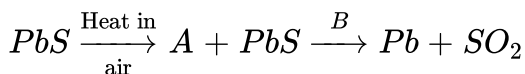
(ii) Its aqueous solution gives a blue colour with $K_3[Fe(CN)_6]$.

(iii) Its solution in hydrochloric acid gives white precipitate with $BaCl_2$.

Identify the ions present and suggest the formula of the compound.

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13. In the following reactions, identify the compounds/reaction conditions represented by the alphabets A and B.



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14. Give reason in one or two sentence for the following "The hydroxides of aluminium and iron are insoluble in water. However, $NaOH$ is used to separate one from other.

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15. The gas liberated, on heating a mixture of two salts with $NaOH$, gives a reddish brown precipitate with an alkaline solution of K_2HgI_4 .

The aqueous solution of the mixture on treatment with $BaCl_2$ gives a white precipitate which is sparingly soluble in conc. HCl .

On heating the mixture with $K_2Cr_2O_7$ and conc. H_2SO_4 , red vapours A are produced. The aqueous solution of the mixture gives a deep blue colouration B with potassium ferricyanide solution. Identify the radicals in the given mixture and write the balanced equations for the formation of A and B.



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16. Write the balanced chemical equations for the following

(i) Silver chloride is treated with aqueous sodium cyanide and the product thus formed is allowed to react with zinc in alkaline medium.

(ii) Cobalt (II) solution reacts with KNO_3 in acetic acid medium.



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17. Give reason for, "The colour of mercurous chloride, Hg_2Cl_2 , changes from white to black when treated with ammonia."

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18. A mixture of two salts was treated as follows :

(i) The mixture was heated with manganese dioxide and concentrated sulphuric acid, when yellowish green gas was liberated.

(ii) The mixture on heating with sodium hydroxide solution gave a gas which turned red litmus blue.

(iii) Its solution in water gave blue precipitate with potassium ferricyanide and red colouration with ammonium thiocyanate.

(iv) The mixture was boiled with potassium hydroxide and the liberated gas was bubbled through an alkaline solution of K_2HgI_4 to give brown precipitate.

Identify the two salts, Give ionic equations for reactions involved in the tests (i), (ii) and (iii).

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19. Write balanced the two equations for the following "potassium permanganate is reacted with warm solution of oxalic acid in the presence of sulphuric acid".

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20. Mention the products formed in the following :

(i) Zinc oxide is treated with excess of sodium hydroxide solution.

(ii) Iodine is added to a solution of stannous chloride.

(iii) Sulphur dioxide gas , water vapour and air are passed over heated sodium chloride.

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21. What happen when

(i) hydrogen sulphide is bubbled through an aqueous solutions of

sulphur dioxide.

(ii) aqueous ammonia is added dropwise to a solution of copper sulphate till it is in excess.

(iii) tin is treated with concentrated nitric acid.

(iv) $CrCl_3$ solutions is treated with sodium hydroxide and then with hydrogen peroxide.

(v) Pb_3O_4 is treated with nitric acid.

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22. Write down the balanced equations for the reactions, when 'a mixture of potassium chlorate, oxalic acid and sulphuric acid is heated.

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23. When 16.8g of white solid, X were heated, 4.4g of acid gas A, that turned lime water milky was driven off together with 1.8g of a gas B which condensed to a colourless liquid.

The solid that remained, Y, dissolved in water to give an alkaline solution, which excess barium chloride solution gave a white precipitate Z. The precipitate effervesces with acid giving off carbon dioxide. Identify a, B and Y and write down the equation for the thermal decomposition of X.

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24. compound a is a light green crystalline solid. It gives the following tests

- (i) It dissolves in dilute sulphuric acid. No gas is produced.
- (ii) A drop of $KMnO_4$ is added to the above solution. The pink colour disappears.
- (iii) Compound A is heated strongly. Gases B and C, with pungent smell, come out. A brown residue D is left behind.
- (iv) The gas mixture (B and C) is passed into a dichromate solution. The solution turns green.
- (v) The green solution from step (iv) gives a white precipitate E with a solution of barium nitrate.
- (vi) Residue D from step (iii) is heated on charcoal in a reducing flame. It

gives a magnetic substance.

Name the compound A, B, C, D and E.

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25. Explain the following in not more than two sentences.

A solution of $FeCl_3$ in water gives a brown precipitate on standing.

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26. The precipitate of second group sulphide in qualitative analysis is carried out with hydrogen sulphide in the presence of hydrochloric acid but not in nitric acid. Explain.

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27. A white amorphous powder A on heating yields a colourless, non-combustible gas B a solid C. The later compound assumes a yellow colour

on heating and changes to white on cooling. C dissolves in dilute hydrochloric acid and the resulting solution gives a white precipitate with $K_4Fe(CN)_6$ solution. A dissolves in dil. HCl with the evolution of gas, which is identical in all respect with B.

The gas B turns lime water milky, but the milkiness disappears with the continuous passage of gas. The solution of A as obtained above, gives a white ppt E on addition of $NaOH$ solution, which dissolves on further addition of base. Identify the compound A, B, C, D and E.



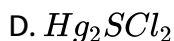
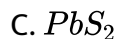
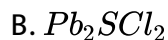
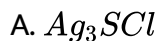
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Test

1. To a nitrate salt solution of a metal, addition of dilute solution of HCl in cold condition results in formation of white coloured precipitate and no visible change is observed above formed precipitate.

On the other hand. The above formed white precipitate dissolves in a saturated solution of KCl , giving a clear solution, formed above, initially a red precipitate (X) is formed, which finally turned into black precipitate

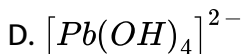
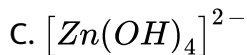
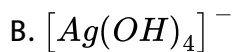
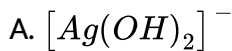
on passing $H_2S(g)$ for long time. This black precipitate on treatment with boiling, concentrated X is most likely to be



Answer: B

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2. An aqueous solution of a metal nitrate yields a white precipitate on treatment with aqueous Na_2SO_3 solution. Precipitate dissolves in $NaOH(aq)$ solution forming a complex anion X. Also, the original sample of solution yields a white precipitate on treatment with dilute HCl solution, which dissolves in boiling water. The most likely formula of the complex anion (X) is



Answer: D

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3. Passing H_2S gas in slightly acidic solution of a metal nitrate results in formation of a black coloured precipitate (X). The precipitate is insoluble in cold-dilute acid solution as well as in ammonium sulphide solution. Boiling, concentrated HCl dissolves X, evolving a pungent smelling gas. Hot, dilute HNO_3 dissolves the precipitate, leaving behind a white precipitate (Y). Boiling the solution for a longer time dissolves Y too. The most likely identity of X and Y are

A. CuS and S

B. Bi_2S_3 and S

C. PbS and S

D. Ag_2S and S

Answer: B



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4. An aqueous solution of a metal sulphide is blue colored and on treatment with aqueous $NaOH$ solution forms a blue precipitate (X). The precipitate 'X' is insoluble in excess of $NaOH$ and on heating it converts into a black solid (Y). The X and Y respectively are most likely to be

A. $CuSO_4$ and Cu_2O

B. CO and Cu_2O

C. $Cu(OH)_2$ and CuO

D. $CuOH$ and CuO

Answer: C



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5. Which one of the following doesn't produce metallic sulphide with H_2S ?

A. $ZnCl_2$

B. $CdCl_2$

C. $CoCl_2$

D. $CuCl_2$

Answer: A:C



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6. Which of the following statement is correct?

- A. Fe^{2+} gives brown colour with ammonium thiocyanate
- B. Fe^{2+} gives blue precipitate with potassium ferricyanide
- C. Fe^{3+} gives brown colour with potassium ferricyanide
- D. Fe^{3+} gives red colour with potassium ferrocyanide

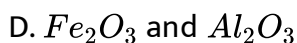
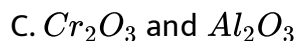
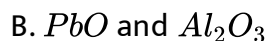
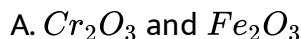
Answer: B::C

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7. A mixture consists of two metal oxides A (green) and B (white). Mixture was dissolved in $20\text{ mL } 2\text{ M NaOH}$ solution containing some H_2O_2 to give a clear yellow solution leaving no residue. The above solution was separated into two parts. One part was acidified with acetic acid and then treated with $(CH_3COO)_2Pb$ solution to give a yellow precipitate (C). C dissolves in dilute nitric acid forming a clear orange solution. Other part of solution was acidified with 2.0 M HCl and the 2 M NH_3 was added till the solution became alkaline and finally boiled. A white gelatinous precipitate (D) was obtained. D was then dissolved in dilute

HCl and $6.0M$ ammonium acetate was added. The solutions was finally treated with a few drops of alumium reagent and made basic by adding ammonium carbonate. A red precipitate was obtained. Answer the following three questions based on the above information.

Compounds A and B are respectively



Answer: C



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8. A mixture consists of two metal oxides A (green) and B (white). Mixture was dissolved in $20mL 2M NaOH$ solution containing some H_2O_2 to give a clear yellow solution leaving no residue. The above solution was separated into two parts. One part was acidified with acetic acid and

then treated with $(CH_3COO)_2Pb$ solution to give an yellow precipitate (C). C dissolves in dilute nitric acid forming a clear orange solution. Other part of solution was acidified with $2.0M HCl$ and the $2M NH_3$ was added till the solution became alkaline and finally boiled. A white gelatinous precipitate (D) was obtained. D was then dissolved in dilute HCl and $6.0M$ ammonium acetate was added. The solutions was finally treated with a few drops of alumium reagent and made basic by adding ammonium carbonate. A red precipitate was obtained. Answer the following three questions based on the above information.

Compound C is most likely

- A. $PbCr_2O_7$
- B. $PbCrO_4$
- C. $Pb(AlO_2)_2$
- D. $Pb(FeO_2)_2$

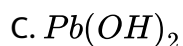
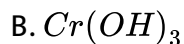
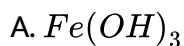
Answer: B



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9. A mixture consists of two metal oxides A (green) and B (white). Mixture was dissolved in $20\text{ mL } 2\text{ M NaOH}$ solution containing some H_2O_2 to give a clear yellow solution leaving no residue. The above solution was separated into two parts. One part was acidified with acetic acid and then treated with $(\text{CH}_3\text{COO})_2\text{Pb}$ solution to give a yellow precipitate (C). C dissolves in dilute nitric acid forming a clear orange solution. Other part of solution was acidified with 2.0 M HCl and the 2 M NH_3 was added till the solution became alkaline and finally boiled. A white gelatinous precipitate (D) was obtained. D was then dissolved in dilute HCl and 6.0 M ammonium acetate was added. The solution was finally treated with a few drops of aluminum reagent and made basic by adding ammonium carbonate. A red precipitate was obtained. Answer the following three questions based on the above information.

Compound D is most likely



D. $Al(OH)_3$

Answer: D

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Assertion And Reason

1. Assertion Cations of both $Cu(II)$ group and $Fe(III)$ group are precipitated by passing H_2S gas but former in dilute acidic medium while later in dilute alkaline medium.

Reason Sulphides of $Cu(II)$ group cations have lower solubility than that of $Fe(III)$ group cations.

A. Both assertion and reason are correct and reason is the correct explanation of the assertion

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. Assertion is correct but reason is incorrect

D. Assertion is incorrect but reason is correct

Answer: A

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2. Assertion Ca^{2+} and Ba^{2+} can be distinguished by treatment with $Na_2C_2O_4$ solution.

Reason CaC_2O_4 is soluble in dilute acetic acid while BaC_2O_4 is insoluble in dilute acetic acid solution.

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