CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

HALOGEN COMPOUNDS

Single Answer Questions

1. The stable oxidation states of Mn are

A. "+2,+3"

B. "+2,+7"

C. "+3,+7"

D. "+3,+5"

Answer: B

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2. $FeSO_4$ solution gives brown colour ring in testing nitrates or nitrites. This is due to formation of

A. `[Fe(H_(2)O)_(5)NO]^(2+)

B. `[Fe(H_(2)O)_(5)NO_(2)]^(2+)

C. `[Fe(H_(2)O)_(4)NO_(2)]^(2+)

D. `[Fe(H_(2)O)_(4)NO]^(2+)

Answer: A

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3. Pb and Sn are extracted from their chief ore by :

A. Carbon reduction and self reduction

B. Self reduction and carbon reduction

C. Electrolysis and self reduction

D. Self reduction and electrolysis

Answer: B

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4. On heating $ZnCl_2.2H_2O$, the compounds obtained is

A. $ZnCl_2$

B. $Zn(OH)Cl$

C. $Zn(OH)_2$

D. ZnO

Answer: B

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5. Zn reacts with cold and very dil HNO_3 to give

A. NH_4NO_3

B. N_2O

C. NO

D. NO_2

Answer: A

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6. $K_2Cr_2O_7$, on heating gives

A. Cr_2O_3

B. K_2CrO_4

C. O_2

D. All of these

Answer: D

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7. Which one of the following is used in eye lotions?

A. $AgNO_3$

B. $CuSO_4$

C. $ZnSO_4$

D. $FeSO_4$

Answer: C

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8. Which one of the following is used in skin ointments ?

A. ZnO

B. CuO

C. FeO

D. Fe_2O_3

Answer: A

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9. The waste solution from Kipps apparatus when evaporated and crystallized gives

A. $ZnSO_4$

B. $FeSO_4$

C. Al_(2)(SO_(4))_(3)`

D. Na_2SO_4

Answer: B

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10. Litharge is

A. PbO

B. PbO_2

C. Pb_2O_3

D. Pb_3O_4

Answer: A

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11. Which one of the following compounds is not stable ?

A. $PbCl_2$

B. PbI_4

C. $SnCl_2$

D. $SnCl_4$

Answer: B

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12. Which of the following can act as a good mordant ?

A. $SnCl_4$

B. $SnCl_2$

C. $PbCl_2$

D. PbI_4

Answer: A

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13. Solution of MnO_4^- is purple $-$ coloured due to

A. $d-d-$ transition

B. charge transfer from O to Mn

C. due to both $d - d -$ transition and charge transfer

D. none of these

Answer: B

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14. During estimation of oxalic acid Vs $KMnO_4$, self indicator is

A. $KMnO_4$

B. oxalic acid

C. K_2SO_4

D. $MnSO_4$

Answer: A

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15. Bayer's reagent used to detect olifinic double bond is

A. acidified $KMnO_4$

B. aqueous $KMnO_4$

C. 1% alkaline $KMnO_4$ solution

D. $KMnO_4$ in benzene

Answer: C

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16. When $KMnO_4$ solution is added to hot oxalic acid solution, the decolourisation is slow in the beginning but becomes instantaneous after some time. This is because.

A. Mn^{2+} acts as auto catalyst

B. CO_2 is formed

C. Reaction is exothermic

D. MnO_4^- catalyses the reaction

Answer: A

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17. 1 mole of Fe^{2+} ions are oxidised to Fe^{3+} ions with the help of (in acidic medium)

A. $1/5$ moles of $KMnO_4$

B. $5/3$ moles of $KMnO_4$

C. $2/5$ moles of $KMnO_4$

D. $5/2$ moles of $KMnO_4$

Answer: A

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18. The rusting of iron is formulated as $Fe_2O_3 \cdot xH_2O$ which involves the formation of:

A. Fe_2O_3

B. $Fe(Oh)_3$

C. $Fe(OH)_2$

D. $Fe_2O_3 + Fe(OH)_3$

Answer: D

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19. Amongst CuF_2, $CuCl_2$ and $CuBr_2$

A. only CuF_2 is ionic

B. both $CuCl_2$ and $CuBr_2$ are covalent

C. CuF_2 and $CuCl_2$ are ionic but $CuBr_2$ is covalent

D. CuF_2, $CuCl_2$ as well as $CuBr_2$ are ionic

Answer: A

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20. Solid $CuSO_4.5H_2O$ having covaent, ionic as well as co- ordinate bonds. Copper atom / ion forms ..... co- ordinate bonds with water

A. 1

B. 2

C. 3

D. 4

Answer: D

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21. $KMnO_4 + HC < oH_2O + X(g)$, X is a:
(Acidified)

A. red liquid

B. violet gas

C. greenish yellow gas

D. yellow-brown gas

Answer: C

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22. $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 + 4H_2O + X$ (Chromium compound), oxidation state of chromium that changes from $(NH_4)_2Cr_2O_7$ to X is

A. 3

B. 4

C. 5

D. -3

Answer: D

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23. Which of the following hydrated salt on heating undergo hydrolysis and doesn't give anhydrated salt.

A. $SnCl_2.2H_2O$

B. $Na_2SO_4.10H_2O$

C. $Na_2CO_3.10H_2O$

D. $Na_2SO_4.8H_2O$

Answer: A

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24. Which of the following respong to Butter of tin(or) Oxymuriate of tin

A. $SnCl_2.2H_2O$

B. $SnCL_2.5H_2O$

C. $SnCl_4.3H_2O$

D. $SnCl_4.8H_2O$

Answer: B

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25. Which of the following respond to chromyl chloride test

A. $SnCl_2$

B. $NaCl$

C. $PbCl_2$

D. $AgCl$

Answer: B

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26. Metastannic Acid on heating gives

A. SnO

B. $Sn(OH)Cl$

C. SnO_2

D. $SnCl_2$

Answer: C

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27. Massicot is

A. a yellow powder form of PbO

B. a buff coloured crystalline form of PbO

C. a yellow crystalline form of PbO_2

D. a buff coloured powder of PbO_2

Answer: A

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28. $PbO + O_2 \xrightarrow[(470^\circ C)]{} X$, Where 'X' is

A. litharge

B. massicot

C. Red lead (or) Sindur

D. $Pb(OH)_2$

Answer: C

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29. Strongest oxidising agent is

A. PbO_2

B. PbO

C. Pb_3O_4

D. White lead

Answer: A

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30. The products formed when red lead is heated with carbon

A. $PbCO_3, CO$

B. $PbCO_3, Pb(OH)_2$

C. Pb, CO

D. $PbCO_3, CO_2$

Answer: C

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31. $SnCl_4 + C_2H_5Cl + Na\overset{\Delta}{X}$, 'X' is

A. $(C_2H_5)_4Sn$

B. $SnCl_2$

C. $C_2H\_(5) - O - C_2H_5$

D. SnO_2

Answer: A

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32. Incorrect Statement

A. $SnCl_2$ reduces Nitrobenzene to aniline

B. $SnCl_2$ reduces gold chloride $(AuCl_3)$ to metallic gold sol (purple of cassius)

C. When $SnCl_2$ is treated with excess of $NaOH$ an insoluble $Sn(OH)_2$ which precipitate is formed.

D. When $SnCl_2$ reacts with conc. HCL, chlorostannic acid H_2SnCl_6 is formed.

Answer: C

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33. $\underset{(\text{Chromite})}{FeO.Cr_2O_3} + Na_2CO_3 + O_2 \xrightarrow{\Delta}$

$X + Fe_2O_3 + CO_2 \uparrow$

$Na_2CrO_4 + H_2SO_4 \rightarrow Y + Na_2SO_4 + H_2O$

The oxidation states of $'Cr'$ in X,Y respectively.

A. $+3, +6$

B. $+4, +6$

C. $+6, +4$

D. $+6, +6$

Answer: D

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34. $Cr_4^{2-} \Leftrightarrow Cr_2O_7^{2-}$ equilibrium is estabilished in a solution whose $p^H = 4$. Correct statement is

A. CrO_4^{2-} predominate $\left(p^H > 4\right)$

B. CrO_7^{2-} predominate $\left(p^H > \right)$

C. Both form exists $50\,\%$ at $p^H = 10$

D. equilirium doesn't shifts as p^H changes

Answer: A

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35. $K_2Cr_2O_7 + H_2SO_4 + 4H_2O_2 \xrightarrow{\text{ether}} K_2SO_4 + X + H_2O$

The no. of oxygen atoms involved in peroxy bonds in $'X'$ are

A. 1

B. 2

C. 3

D. 4

Answer: D

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36. $K_2Cr_2O_7$ is preferred oxidizing agent than $Na_2Cr_2O_7$ because

A. $Na_2Cr_2O_7$ is hygroscopic

B. $K_2Cr_2O_7$ is hygroscopic

C. $Na_2Cr_2O_7$ is not an oxidizing agent

D. $K_2Cr_2O_7$ is oxidizing and hygroscopic

Answer: A

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37. On heating crystals of red coloured ammonium dichromate a violent action accompanied by flashes of light is observed.

$(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 + X + 4H_2O$,'X' is

A. dichromate

B. chromate

C. chromium sesqui oxide

D. CrO_5

Answer: C

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Single Answer Questions Level Ii

1. MnO_4^- is of intense pink colour, though Mn is in$(+7)$ oxidation state.It is due to:

A. oxygen gives colour to it

B. charge transfer when Mn gives its electron to oxygen

C. charge transfer when oxygen gives its electron to Mn making it $Mn(+VI)$ hence coloured

D. None is correct.

Answer: C

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2. When $SnCl_2$ reacts with $HgCl_2$, the product formed are :

A. $Sn + HgCl_4$

B. $Sn + Cl_2 + HgCl$

C. $SnCl_4$ and Hg

D. None of these

Answer: C

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3. When MnO_2 is fused with KOH, a coloured compound is formed, the product and its colour is:

A. K_2MnO_4, green

B. Mn_2O_3, brown

C. Mn_2O_4, black

D. $KMnO_4$,Purple

Answer: A

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4. Which one of the following does not give a precipitate with an excess of aqueous $NaOH$ solution ?

A. $ZnSO_4$

B. $CuSO_4$

C. $FeSO_4$

D. $MnSO_4$

Answer: A

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5. When $CuSO_4$ is treated with excess of aq. KCN solution, the species formed is

A. $\left[Cu(CN)_4\right]^{2-}$

B. $\left[Cu(CN)_4\right]^{3-}$

C. $Cu(CN)_2$

D. $Cu_2(CN)_2$

Answer: B

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6. The compound used in the quanlitative and quantitative analysis of carbon and hydrogen in the organic compound is

A. ZnO

B. FeO

C. Fe_2O_3

D. CuO

Answer: D

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7. K_2CrO_4 is converted to $K_2Cr_2O_7$ by

A. conc. H_2SO_4

B. KOH

C. K_2CO_3

D. KNO_3

Answer: A

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8. The compound formed during goldent yellow spangle test is

A. $PbCl_2$

B. $PbCrO_4$

C. PbS

D. PbI_2

Answer: D

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9. When ferrous oxalate is heated in the absence of air, the compound obtained is

A. Fe

B. FeO

C. Fe_2O_3

D. Fe_3O_4

Answer: B

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10. The pure zince carbonate is prepared by addition of the following reagent to a zinc sulphate solution

A. Sodium carbonate

B. Calcium carbonate

C. Sodium bicarbonate

D. Sodium hydroxide + Sodium carbonate

Answer: C

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11. Which one of the following does not give a precipitate with $AgNO_3$ solution ?

A. CrO_4^{2-}

B. Cl^-

C. SCN^-

D. ClO_4^-

Answer: D

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12. To the $CuSO_4$ solution, $NaHSO_3$ and HCl were added followed by ammonium thiocanate solution. The compound formed is

A. $Cu(SCN)_2$

B. $CuSCN$

C. $Cu(SO_3)_2$

D. $CuSO_4$

Answer: B

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13. When Pb_3O_4 is treated with conc. HNO_3, the insoluble product obtained is

A. PbO

B. PbO_2

C. Pb

D. Pb_2O_3

Answer: B

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14. The correct order of stability is

A. $Pb^{4+} > Sn^{4+}$

B. $Pb^{4+} > Pb^{2+}$

C. $Sn^{2+} > Sn^{4+}$

D. $Pb^{2+} > Sn^{2+}$

Answer: D

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15. The precipitate obtained by adding lead nitrate solution to a sodium carbonate solution is

A. $Pb(OH)_2$

B. $PbCO_3$

C. $PbCO_3.\ Pb(OH)_2$

D. PbO_2

Answer: C

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16. Which one of the following anions will give a white precipitate with $Pb(NO_3)_2$ solution ?

A. S^{2-}

B. Cl^-

C. CrO_4^{2-}

D. I^-

Answer:

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17. Purple of Cassius is obtained by the addition of $SnCl_2$ solution to a solution of

A. $CuCl_2$

B. $HgCl_2$

C. Hg_2Cl_2

D. $AuCl_3$

Answer: D

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18. $Cr_2O_7^{2-} \underset{Y}{\overset{X}{\rightleftharpoons}} 2CrO_4^{2-}$, X and Y are respectively.

A. $X = OH^-, Y = H^+$

B. $X = H^+, Y = OH^-$

C. $X = OH^-, Y = H_2O_2$

D. $X = H_2O_2, Y = OH^-$

Answer: A

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19. Acidified chromic acid $+ H_2O_2 \rightarrow \underset{(\text{blue colour})}{X + Y}$, X and Y are

A. CrO_5 and H_2O

B. Cr_2O_3 and H_2O

C. CrO_2 and H_2O

D. CrO and H_2O

Answer: A

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20. $(NH_4)_2Cr_2O_7$(Ammonium dichromate) is used in fire works. The green coloured powder blown in air is

A. Cr_2O_3

B. CrO_2

C. Cr_2O_4

D. CrO_3

Answer: A

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21. When $KMnO_4$ solution is added to hot oxalic acid solution the decoloursitation is slow in the beginning but becomes instantaneous

after some time. This is because

A. Mn^{2+} acts as auto catalyst

B. CO_2 is formed

C. reaction is exothermic

D. MnO_4^- catalyses the reaction

Answer: A

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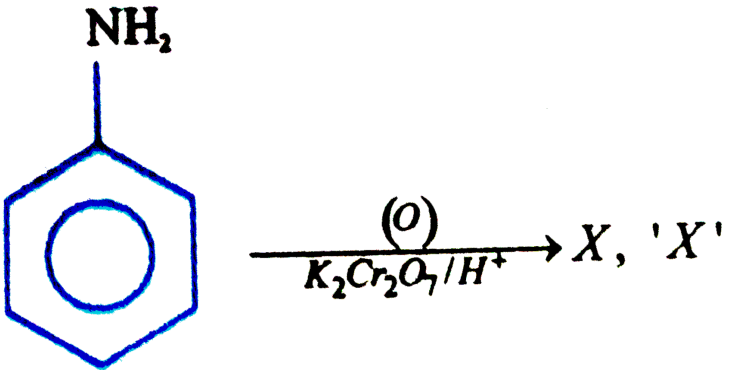
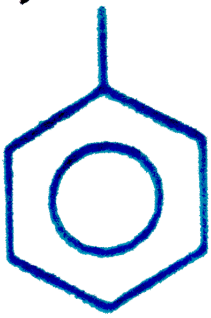
22. Complete the following reaction



A) NO_2

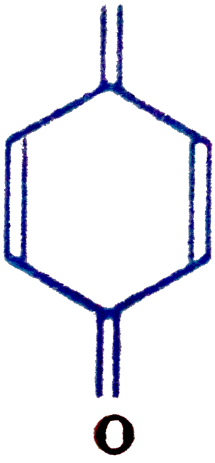


A.

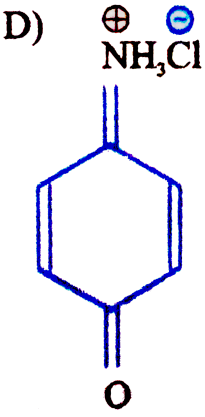
B) CN

B.

C) O



C.

D) 

D.

Answer: C

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23. Which of the following metal liberates H_2 from dil. HNO_3

A. Mn

B. FeO

C. Cr

D. Al

Answer: A

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24. $K_2MnO_4 + Cl_2 \rightarrow X + KCl$

$X \xrightarrow{200^\circ C} A + B + O_2 \uparrow$ where 'B' is

A. $KMnO_4$

B. MnO_2

C. $HMnO_4$

D. H_2MnO_4

Answer: B

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25. Statement 1: Lithophone is preferred over white lead as white pigment.

Statement 2: In the presence of H_2S present in air, white lead turns black.

A. Statement 1 is True, Statement 2 is True, Statement 2 is a correct explanation for Statement 1

B. Statement 1 is True, Statement 2 is True, Statement 2 is not a correct explanation for Statement 1

C. Statement -1 is True, Statement -2 is False

D. Statement -1 is False, statement -2 is True.

Answer: A

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26. $KMnO_4$ is not used as primary standard because

A. It is easily obtained in pure state free from MnO_2

B. It is very difficulty to obtain in pure state as it is not free from MnO_2.

C. It is very difficulty in pure state free from MnO_2

D. It is easily obtained in pure state but not free from SO_2.

Answer: B

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27. Which of the following statement is wrong regarding copper sulphate.

A. It reacts with KI to give I_2.

B. It reacts with KCI to give Cl_2.

C. Its tartarate complex reacts with NaOH and glucose followed by heating to give Cu_2O.

D. It gives CuO on strong heating in air.

Answer: B

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28. ZnO shows yellow colour on heating due to

A. d-d transition

B. charge transfer spectra

C. higher polarization caused by ion

D. presence of F- center.

Answer: D

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29. When excess of $SnCl_2$ is added to a solution of $HgCl_2$, a white precipitate turning to gray is obtained. The grey colour is due to

A. Hg_{20Cl_2}

B. $SnCl_4$

C. Sn

D. Hg

Answer: D

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30. Which of the following is not formed when FeC_2O_4 heated in the absence of air

A. FeO

B. O_2

C. CO

D. CO_2

Answer: B

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31. When Cu^{2+} solution reacts with excess KI. Which of the following statements is correct ?

A. Which ppt. of Cu_2I_2 is obtained.

B. A clear brown solution is obtained

C. A dark brown solution is obtained in which pppt. Of Cu_2I_2 is invisible.

D. A blue solution is obtained.

Answer: C

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32. Statement 1: Concentrated solution of $CuCl_2$ in water is yellow in colour.

Statement 2: The concentrated solution contains $[CuCl_4]^{2-}$ ion and $\left[Cu(H_2O_4\right]^{2+}$ ion.

A. Statement 1 is True, Statement2 is True. Statement2 is a correct explanation for Statement 1

B. Statement 1 is True, Statement 2 is True, Statement 2 is not a correct explanation for Statement 1

C. Statement -1 is True, Statement -2 is False

D. Statement -1 is False, statement -2 is True.

Answer: D

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33. Statement 1: $FeCl_2$ is a primary standard substance.

Statement 2: The weight of $FeCl_2$ does not change with time by any means.

A. Statement1 is True, Statement 2 is True, Statement2 is correct explanation for Statement 1

B. Statement 1 is True, Statement 2 is True, Statement 2 is not a correct explanation for Statement 1

C. Statement -1 is True, Statement -2 is False

D. Statement -1 is False, statement -2 is True.

Answer: A

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34. In the oxidation reactions of $KMnO_4$, in acidic medium, only H_2SO_4 is used to product acidic medium but not HCl(or) HNO_3 because

A. HCl reacts with $KMnO_4$ and produces Cl_2, HNO_3 itself is oxidizing agent.

B. HNO_3 reacts with $KMnO_4$ and produces Cl_2, HCl itself acts as oxidizing agent.

C. Both HNO_3 and HCl liberates Cl_2 from $KMnO_4$

D. Both HNO_3 and HCl liberates O_2 from $KMnO_4$

Answer: A

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35. Choose the correct options (true or false) for the following statements.

$i)$ FeO is stable enough at room temperature.

$ii) FeCl_2$ on heating in air and in steam produces the same iron oxide.

$iii)$ The colour of $FeCl_2$ depends upon the number of water of crystallization.

A. T T F

B. F T F

C. F F T

D. T F T

Answer: C

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36. AgO actually exists as $Ag[AgO_2]$, which is diamagnetic in nature. Then which of the following statements is true regarding AgO?

A. The arrangement of O^{2-} ions around Ag^+ ion is square planar

B. The arrangement of O^{2-} ions around Ag^+ ion is tetrahedral

C. The arrangement of O^{2-} ions around Ag^+ ion is square planar.

D. Both (B) and (C) are correct.

Answer: C

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Level Iii Single Answer Questions

1. Which of the following statement(s) is correct ?

A. $AgNO_3$ Produces a black Stain on Skin due to its reduction into matallic Silver.

B. NH_4Cl is a strong electrolyte, which decreases the ionization of NH_4OH by common ion effect so as to precipitate less soluble hydroxides of AL^{3+}, Cr^{3+}, Fe^{3+}

C. $Fe(OH)_3$ and $AL(OH)_3$ can not be separated by adding NaOH

D. A yellow precipitate is obtained on adding KI in aqueous solutions of Pb^{2+}, Ag^{+}

Answer: C

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2. Copper sulphate is prepared by blowing a current of air through copper scrap and dilute H_2SO_4. Dilute HNO_3 is also added:

A. to oxidise copper to Cu^{2+} which then form $CuSO_4$ with dilute H_2SO_4

B. to oxidise Fe^{2+} to iron (III) sulphate, which remains in solution after crystallisation of $CuSO_4$

C. to speed up the ionisation of H_2SO_4 to give SO_4^{2-} ions

D. which combines with H_2SO_4 to give a very strong oxidising mixture and oxidise Cu to Cu^{2+}

Answer: A

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3. Identify the wrong statement regarding copper sulphate :

A. It reacts with KI to give I_2.

B. It reacts with KCI to give Cl_2.

C. It's tartarate complex reacts with NaOH and glucose to give Cu_2O

D. It gives CuO on strong heating in air

Answer: B

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4. A white percipitate of AgCl dissolves in excess of

$I) NH_3(aq) \quad II) Na_2S_2O_3 \quad III) NaCn$

A. III only

B. I,II,III

C. I,II

D. I only

Answer: B

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5. The oxoanion which contains all equivalent M-O bond is

$I) CrO_4^{2-} \quad II) MnO_4^- \quad III) Cr_2O_7^{2-}$

A. III only

B. I,II,III

C. I,II

D. I only

Answer: C

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6. Among the following which is most stable ?

$(1)\underset{(X)}{\left[Fe(CN)_6\right]^{3-}}$ and $\underset{(Y)}{\left[FeF_6\right]^{3-}}$

$(2)\underset{(S)}{\left[Fe(CN)_6\right]^{3-}}$ and $\underset{(T)}{\left[Fe(CN)_6\right]^{4-}}$

$(3)\underset{(P)}{\left[Cr(CN)_6\right]^{N-6}}$ and $\underset{(Q)}{\left[Cr(CN)_6\right]^{n-4}}$ Choose the correct code

A. $1-X, 2-T, 3-Q$

B. $1-X, 2-S, 3-Q$

C. $1-X, 2-S, 3-P$

D. $1-Y, 2-T, 3-Q$

Answer: C

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7. IdentifyC in the following sequence

$$FeCO_3 \xrightarrow[\text{in air}]{\text{heated}} A \xrightarrow[\text{HCl}]{\text{boil with}} B \xrightarrow{K_4\left[Fe(CN)_6\right]} C$$

A. $K_3\left[Fe(CN)_6\right]$

B. $Fe(CNS)_3$

C. $Fe_4\left[Fe(CN)_6\right]_3$

D. Both B & C

Answer: C

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8. A metal M and its compound can give the following observable changes in a consequence of reactions

$M \xrightarrow[HNO_3]{\text{dilute}} [\text{Colourless Solutions}] \xrightarrow[NaOH]{\text{aqueous}} [\text{White Precipitate}] \xrightarrow[\text{NaOH(aq)}]{\text{excess}}$ [

A. Mg

B. Pb

C. Zn

D. Sn

Answer: C

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9. When Cu powder is heated with $CuCl_2$ solution, the compound obtained is

A. $Cu[CuCl_4]$

B. $Cu_2[CuCl_4]$

C. Cu_2O

D. Cu_2Cl_2

Answer: D

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10. Copper (II) is estimated by the addition of the following reagent

A. excess KCN solution

B. excess KI solution

C. excess $Na_2S_2O_3$

D. excess aq. NH_3

Answer: B

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11. Mohrs salt is used as a Primary standard in the permanganometric titrations because

A. Mohrs salt has higher molecular weight than $FeSO_4$ solution

B. $FeSO_4$ is oxidised by air, where as Mohrs salt is stable

C. In Mohrs salt, the sulphate is also oxidized by $KMnO_4$

D. Mohrs salt is more soluble in water than $FeSO_4$

Answer: B

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12.

$$\underset{\text{imparts violet colour to flame}}{(T)} \xrightarrow{\text{Compound (U)+conc. } H_2SO_4} \underset{\text{Red gas}}{(V)} \xrightarrow{NaOH+AgNO_3} \underset{\text{Red ppt.}}{(W)} \xrightarrow{NH}$$

$(W) \xrightarrow{\text{dil. KCl}} (Y)$ white ppt

$(U) \xrightarrow[\Delta]{NaoH} (Z)$ gas (gives white fumes with HCl)

Identify (T) to (Z).

A.

$$T = KMnO_4, U = HCl, V = Cl_2, W = HgI_{92}), X = Hg(NH_2)NO$$

B.

$$T = K_2Cr_2O_7, U = NH_4Cl, V = CrO_2Cl_2, W = Ag_2CrO_4, X = [$$

C.

$$T = K_2CrO_4, U = KCl, V = CrO_2Cl_2, W = HgI_2, X = Na_2CrO_4$$

D.

$$T = K_2MnO_4, U = NaCl, V = CrO_3, W = AgNO_2, X = (NH_4)_2C$$

Answer: B

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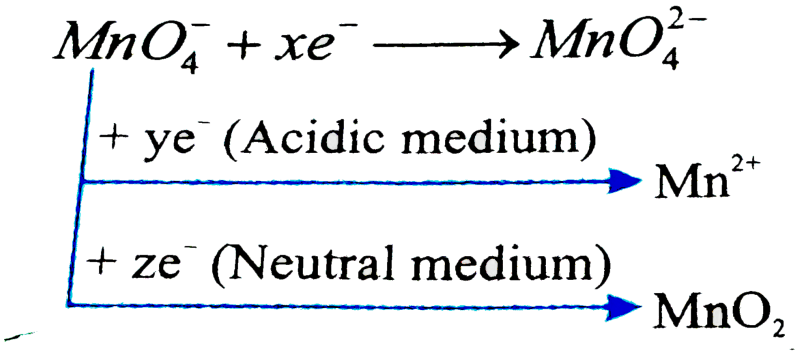
13. $MnO_4^- + xe^- \rightarrow MnO_4^{2-}$



x,y and z are respectively

A. 1,2,3

B. 1,5,3

C. 1,3,5

D. 5,3,1

Answer: B

Watch Video Solution

Level Iv Ncert Based Questions

1. The electronic configurationo of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following is correct ?

A. Cu(I) is more stable

B. Cu(II) is less stable

C. Cu(I) and Cu(II) are equally stable

D. Stability of Cu(I) and Cu(II) depends on nature of copper salts

Answer: A

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2. Generally transition elements from coloured salts due to the presence of unpaired electrons. Which of the following compounds will be coloured in solid state?

A. Ag_2SO_4

B. CuF_2

C. ZnF_2

D. Cu_2Cl_2

Answer: B

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3. On addition of small amoung of $KMnO_4$ to concentrated H_2SO_4, a green oily compound is obtained which is highly explosive in nature. Identify the compound from the following.

A. Mn_2O_7

B. MnO_2

C. $MnSO_4$

D. Mn_2O_3

Answer: A

Watch Video Solution

4. Which of the following reactions are disproportionation reactions?

(A) $Cu^+ \rightarrow Cu^{2+} + Cu$

(B) $3MnO_4 + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$

(C) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

(D) $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$

A. a,b

B. a,b,c

C. b,c,d

D. a,d

Answer: A

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5. When $KMnO_4$ solution is added to oxalic acid solution , the decolourisation is slow in the beginning but becomes instantaneous after some time because

A. CO_2 is formed as the product

B. Reaction is exothermic

C. MnO_4^- catalyses the reaction

D. Mn^{2+} acts as autocatalyst

Answer: D

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6. $KMnO_4$ acts as an oxidising agent in acidic medium. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphide ions in acidic solution is

A. $\frac{2}{5}$

B. $\frac{3}{5}$

C. $\frac{4}{5}$

D. $\frac{1}{5}$

Answer: A

Watch Video Solution

7. $KMnO_4$ acts as on oxidising agent in alkaline medium. When alkaline $KMnO_4$ is treated with KI, iodide ion is oxidised to .....

A. I_2

B. IO^-

C. IO_3^-

D. IO_4^-

Answer: C

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8. Which of the following statements is not correct ?

A. Copper liberated hydrogen from acids

B. In its higher oxidation states, manganese forms stable compounds with oxygen and fluorine

C. Mn^{3+} and CO^{3+} are oxidising agents in aqueous solution.

D. Ti^{2+} and Cr^{2+} are reducing agents in aqueous solution

Answer: A

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9. When acidified $K_2Cr_2O_7$ solution is added to Sn^{2+} salts then Sn^{2+} changes to

A. Sn

B. Sn^{3+}

C. Sn^{4+}

D. Sn^{+}

Answer: C

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10. Higher oxidation state of manganese in fluoride is $+4(MnF_4)$ but highest oxidation state in oxides is $+7(Mn_2O_7)$ because

A. fluorine is more electronegative than oxygen

B. fluorine does not posses d- orbitals.

C. fluorine stabilises lower oxidation state.

D. In covalent compounds fluorine can form single bond only while oxygen forms double bond.

Answer: D

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11. Why HCl not used to make the mdeium acidic in oxidation reactions of $KMnO_4$ in acidic medium ?

A. Both HCl and $KMnO_4$ acts as oxidising agents

B. $KMnO_4$ oxidise HCl into Cl_2 which is also an oxidising agent.

C. $KMnO_4$ is a weaker oxidising agent thatn HCl

D. $KMnO_4$ acts as a reducing agent in the presence of HCl.

Answer: B

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12. $CuFeS_2 + O_2(\text{excess}) \xrightarrow{\Delta} X$(hydrated salt is blue)+Y(s)(Unbalanced Equation):

Which is correct choice for (X) and (Y) ?

A. (Y) on heating liberates SO_3 only

B. (X) forms bluish white ppt. with sodium hydroxide which redissolves in excess of sodium hydroxide.

C. (Y) on reaction with potassium ferricyanide gives brown ppt.

D.

Answer: A

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13. Anhydrous ferric chloride is prepared by

A. heating hydrated ferric chloride at a high temperature in a stream of air

B. heating metallic iron in a stream of dry chlorine gas

C. reaction of ferric oxide with HCl(aq)

D. reaction of metallic iron with HCl(aq)

Answer: B

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14. Exess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the following statement is incorrect for this reaction ?

A. Evolved I_2 is reduced

B. CuI_2 is formed

C. $Na_2S_2O_3$ is oxidised

D. Cu_2I_2 is formed

Answer: B

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15. Copper becomes green when exposed to moist air for longer period because of the formation of a layer of

A. cupric oxide on the surface of copper

B. basic carbonate of copper on the surface of copper

C. cupric hydroxide on the surface of copper

D. cupric acetate on the surface of copper

Answer: B

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16. The yellow colour solution of Na_2CrO_4 changes to orange red on passing CO_2 gas due to the formation of :

A. CrO_5 and H_2O

B. CrO_3

C. $Na_2Cr_2O_7$ is not an oxidizing agent

D. Cr_2O_{30}

Answer: C

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17. $KMnO_4$ on treatment with conc. H_2SO_4 forms a compound (X) which decomposes explosively on heating forming (Y). The (X) and (Y) are respectively :

A. Mn_2O_7, MnO_2

B. Mn_2O_7, Mn_2O_3

C. $MnSO_4, Mn_2O_3$

D. Mn_2O_3, MnO_2

Answer: A

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18. An inorganic sulphate on reaction with very dilute NaOH gave a precipitate which dissolved in excess of NaOH. The resultant dissolved in excess of NaOH. The resultant solution gave the sulphide of the metal when hydrogen sulphide gas was passed through it. The inorganic sulphate is

A. $MnSO_4$

B. $FeSO_4$

C. $NiSO_4$

D. $ZnSO_4$

Answer: D

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19. An aqueous solution of an anhydrous white solid A on addition of KCN solution gives a white precipitate B. Addition of excess of KCN to the precipitate dissolves if forming C.

A. $K_2\left[Cr(CN)_4\right.$

B. $K_3\left[Cu(CN)_4\right]$

C. $CuCN$

D. $Cu(CN)_2$

Answer: B

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20. Which two sets of reactants best represent the amphoteric character of $Zn(OH)_2$?

Set 1: $Zn(OH)_2 \& OH^-(aq)$

Set 2: $Zn(OH)_2(s) \& H_2O(l)$

Set 3: $Zn(OH)_2(s) \& H^+(aq)$

Set 4: $Zn(OH)_2(s) \& NH_3(aq)$

A. 1 and 2

B. 1 and 3

C. 2 and 4

D. 3 and 4

Answer: B

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21. $AgNO_3 \xrightarrow{\Delta} (W) + (X) + O_2$

$(X) + H_2O \rightarrow HNO_2 + HNO_3$

$(W) + HNO_3 \rightarrow Y + NO + H_2O$

$(Y) + Na_2S_2O_3(\text{excess}) \rightarrow (Z) + NaNO_3$

A. $W = Ag \quad X = N_2O \quad Y = AgNO_3$

$Z = Na_2\left[Ag(S_2O_3)_2\right]$

B. $W = Ag_2O \quad X = NOY = AgNO_3$

$Z = Na_3\left[Ag(S_2O_3)_2\right]$

C. $W = AgX = NO_2Y = AgNO_3$

$Z = Na_3\left[Ag(S_2O_3)_2\right]$

D. $W = Ag_2OX = N_2Y = AgNO_3$

$Z = Na\left[Ag(S_2O_3)_2\right]$

Answer: C

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22. Give the correct order of initials T of F for following statements. Use T if statements is true and F if it is false.

$I)$ Sulphide reacts with $Na_2\left[Fe(CN)_5(NO)\right]$ to form a purple coloured compound $Na_4\left[Fe(CN)_5(NOS)\right]$. In the reaction, the oxidation state of iron changes.

$II)Pt(IV)$ compounds are relatively more stable than $Ni(IV)$ compounds

$III)$ The welding of magnesium can be done in the atmosphere of Helium.

$IV)LiAlH_2$ on hydrolysis will give H_2

A. F F T T

B. F T T T

C. T F T F

D. T F T T

Answer: B

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Level V Multiple Answer Questions

1. In which reaction (s) blood red coloration is observed in product?

A. $FeSO_4 \xrightarrow{H_2O_2} \ldots\ldots \xrightarrow{\text{KSCN}} \text{product}$

B. $Na_2S_2O_3 \xrightarrow{\text{KSCN}} \ldots\ldots\ldots \xrightarrow{Fe^{3+}} \text{product}$

C. $NH_4SCN \xrightarrow{\text{Ferric alum}} \text{product}$

D. $NO_2^- \xrightarrow{\text{Thiourea}} \ldots\ldots \xrightarrow{Fe^{3+}} \text{product}$

Answer: A,B,C,D

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2. $K_4\left[Fe(CN)_6\right]$ is used to detect

A. Cu^{2+}

B. As^{3+}

C. Zn^{2+}

D. Fe^{3+}

Answer: A,C,D

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3. $CuSO_4$ reacts with KCN to form

A. $Cu(CN)_2$

B. $CuCN$

C. $K_2\left[Cu(CN)_4\right]$

D. $K_3\left[Cu(CN)_4\right]$

Answer: B,D

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4. Among the following the colour less compound (s) is / are

A. CuCl

B. $K_3\left[Cu(CN)_4\right]$

C. CuF_2

D. $\left[Cu(CH_3CN)_4\right]BF_3$

Answer: A,B,D

Watch Video Solution

5. Potassium manganate (K_2MnO_4) is formed when

A. chlorine is passed into aqueous $KMnO_4$ solution

B. manganese dioxide is fused with potassium hydroxide in air

C. formaldehyde reacts with potassium permanganate in presence of a strong alkali

D. potassium permanganate reacts with conc. Sulphuric acid

Answer: B,C

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6. The equilibrium $2cU^{1} \Leftrightarrow Cu^{0} + Cu^{II}$ in aqueous medium at $25^{\circ}C$ shifts towards the left in the presence of

A. NO_3^-

B. Cl^-

C. SCN^-

D. CN^-

Answer: B,C,D

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7. For the given aqueous reactions, which of the statements(s) is (are) true ? Excess

$KI + K_3\left[Fe(CN)_6\right] \xrightarrow{\text{dilute}H_3SO_4}$ brownish yellow solution $\xrightarrow{ZnSO_4} whiteppt + brownishyellowfi < rate$overset(Na_(2)S_(2)O_(3))(rarr)` colourless solution

A. The first reaction is a redox reaction

B. White precipitate is $Zn_3\left[Fe(CN)_6\right]_2$

C. Addition of filtration to starch solution gives blue colour

D. White precipitate is soluble in NaOH solution

Answer: A,C,D

Watch Video Solution

8. $CuSO_4.5H_2O \xrightarrow{1000^\circ C} \underset{(\text{solide})}{A} + \underset{(\text{gas})}{B} + O_2$

$\underset{\text{bluish white}}{CuSO_4.H_2O} \overset{x}{\Longleftrightarrow} \underset{\text{white}}{CuOS_4}$ here

A. $A = CuSO_4$

B. $A = CuO$

C. $B = SO_2$

D. $X = 230^\circ C$

Answer: B,C,D

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9. Which of the following coinage metal is / are dissolved in conc. HNO_3 ?

A. Copper (Cu)

B. Silver (Ag)

C. Gold (Au)

D. Zinc (Zn)

Answer: A,B,C

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10. When ferrous sulphate is added to mercuric chloride then

A. $HgCl_2$ is oxidised to $HgCl_4$

B. $HgCl_2$ is reduced to Hg_2Cl_2

C. $FeSO_4$ is oxidised to $Fe_2(SO_4)_3$

D. $FeSO_4$ is oxidised to $FeCl_3$

Answer: B,C,D

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11. Which statements are correct regarding copper sulphate ?

A. It reacts with NaOH and Glucose to give Cu_2O

B. It reacts with KCl to give Cu_2O

C. It gives CuO on strong heating in air

D. It reacts with KI to give brown colouration

Answer: A,C,D

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12. Copper ion forms blue coloured complex with ligand NH_3 and a colourless complex with ligand. 'B' which has low dissociation constant than Cu^{2+} with NH_3 . Conc. Of Cu^{2+} can be estimated by titration using NH_3 and B is

A. NH_3 as a titrant and B as indicator

B. The end point with appearance of blue colour

C. Using 'B' as titrant and NH_3 as indicator

D. The end point will correspond to first disappearance of colour

Answer: C,D

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13. Which of the following is / are correct about Wilkinson's catalyst?

A. It is used as homogeneous catalyst for selective hydrogenation of organic molecule at room temperature and pressure

B. Square planner complex

C. It does not have unpaired electrons

D. Its formula is $[RHCl(PPh_3)]$

Answer: A,B,C

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14. Which of the following give O_2 on strong heating ?

A. $KMnO_4$

B. $K_2Cr_2O_7$

C. $AgNO_3$

D. ZnO

Answer: A,B,C,D

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15. K_2MnO_4 can be converted to $KMnO_4$ by

A. Cl_2

B. O_3

C. CO_2

D. Anodic oxidation

Answer: A,B,C,D

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16. The diamagnetic compounds is / are

A. $HgCl_2$ is oxidised to $HgCl_4$

B. Hg_2Cl_2

C. Cu_2Cl_2

D. $K_2Cr_2O_7$ is oxidizing and hygroscopic

Answer: A,B,C,D

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17. The compounds that liberate Cl_2 on heating with conc. HCl is / are

A. PbO_2

B. Pb_3O_4

C. PbO

D. SnO_2

Answer: A,B

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18. Which of the following ions will give a coloured precipitate with lead nitrate solution

A. S^{2-}

B. CrO_4^{2-}

C. I^-

D. SO_4^{2-}

Answer: A,B,C

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19. The metal oxide which decomposes on heating is / are :

A. ZnO

B. Al_2O_3

C. Ag_2O

D. AgO

Answer: C,D

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20. The species that undergoes disproportionational is an alkaline medium are

A. Cl_2

B. MnO_4^{2-}

C. NO_2

D. ClO_4^-

Answer: A,B,C

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21. Choose correct statements (s) regarding the following reactions.

$$Cr_2O_7^{2-}(aq) + 3SO_3^{2-}(aq) + 8H^+ \rightarrow 2Cr^{3+}(aq) + 3SO_4^{2-}(aq) + 4H_2O$$

A. $Cr_2O_7^{3+}$ is oxidisin agent

B. SO_3^{2-} is oxidising agent

C. The oxidation number of per 'S' atom in $3SO_3^{2-}$ is increase by two

D. The oxidation number of per 'Cr' atom in $Cr_2O_7^{2-}$ is decreased by three

Answer: A,B,C,D

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22. Which of the following produce Cr_2O_3 along with O_2 ?

A. Heating $(NH_4)_2Cr_2O_7$

B. Heating CrO_3

C. Heating $K_2Cr_2O_7$

D. Reaction of Al_2O_3 with Cr

Answer: B,C

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23. $FeCr_2O_4 + Na_2CO_3 + O_2 \xrightarrow{\text{Fusion}} [X] \xrightarrow[H_2O]{H^+} [Y] \xrightarrow[H_2O_2]{H^+} [Z]$

Which of the following statement is true for the compounds [X],[Y] and [Z] ?

A. In all three compounds , the chromium is in $+6$ oxidation state.

B. $[Z]$ is a deep blue - violet coloured compound which decomposes rapidly in aqueous solution into Cr^{3+} and dioxygen

C. Saturated solution of [Y] gives bright organge compound, chromic anhydride, with concentrated H_{20SO_4}.

D. $[X]$ is an oxidizing agent under acidic conditions.

Answer: A,B,C,D

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24. Pyrolusite is MnO_2 used to prepare $KMnO_4$. Steps are, $MnO_2 \xrightarrow{I} MnO_4^{2-} \xrightarrow{II} MnO_4^-$ Steps I and II are respectively:

A. fuse with KOH / air and electrolytic oxidation

B. fuse with KOH / KNO_3 and electrolytic oxidation

C. fuse with conc. HNO_3 / air and electrolytic reduction

D. dissolve in H_2O and oxidation.

Answer: A,B

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25. Which of the following chemical reactions (s) is (are) involved in the developing of photographic plate ?

A. $C_6H_4(OH)_2 + 2AgBr \rightarrow 2Ag + C_6H_4O_2 + 2HBr$

B. $AgBr + 2Na_2S_2O_3 \rightarrow Na_3\left[Ag(S_2O_3)_2\right] + NaBr$

C. $AgBr + 2NH_3(aq) \rightarrow \left[Ag(NH_3)_2\right]Br$

D. $2AgBr + Na_2S_2O_3 \rightarrow Ag_2S_2O_3 + 2NaBr$

Answer: A,B,

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26. Which of the following statements (s) is (are) not correct with reference to ferrous and ferric ions

A. Fe^{3+} gives brown colour solution with potassium ferricyanide

B. Fe^{2+} gives red colour precipitate with potassium ferricyanide

C. Fe^{3+} gives red colour solution with potassium sulphocyanide.

D. Fe^{2+} gives brown colour solution with potassium sulphocyanide.

Answer: D

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27. Correct statements(s) is / are

A. an acidified solution of $K_2Cr_{20O_7}$ liberates iodine from KI

B. $K_2Cr_2O_7$ is used as a standard solution for estimation of Fe^{2+} ions

C. in acidic medium , $M = N/6$ for $K_2Cr_2O_7$

D. $(NH_4)_2Cr_2O_7$ on heating decomposes to yield Cr_2O_3 through an endothermic reaction

Answer: A,B,C

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Comprehension Type Questions Passage

1. Light green (Compound 'A') $\xrightarrow{\Delta} White Residue' (B)'$ underset("Temp")overset("High")(rarr)C+D+Ei)

$'D'$ and $'E' are two acidic gases. ii) 'D' is passed through$ HgCl_(2) $solution \rightarrow give yellow pt.$ iii)

$'E' is passed through water first$ and $then$ H_(2)S $is passed, white turbidity is obta \in ed.$ iv)

$Aiswaterso$ lub $\leq$ and $additionof$HgCl_(2)` in it, white ppt is obtained but white ppt does not turn into grey on addition of excess solution of 'A'.

'D' and 'E' are respectively

A. SO_2 and SO_3

B. SO_3 and SO_2

C. SO_2 and CO_2 and conc. CH_3COOH

D. CO_2 and CO Boiled conc. HCl

Answer: B

Watch Video Solution

2. Light green (Compound 'A') $\xrightarrow{\Delta} WhiteResidue'(B)'$ underset("Temp")overset("High")(rarr)C+D+Ei)

$'D'$ and $'E'aretwoacidicgases.ii)'D'ispassedthrough$HgCl_(2) $solution \rightarrow giveyellowpt.$ iii)

$'E'ispassedthroughwaterfirst$ and $then$H_(2)S

$ispassed, whiteturbidityisobta \in ed.$ iv)

$Aiswaterso$ lub $\leq$ and $additionof$HgCl_(2)` in it, white ppt is obtained but white ppt does not turn into grey on addition of excess solution of 'A'.

Yellow ppt in the above observation is

A. Mercuric (II) sulphite

B. Basic mercury(II) sulphite

C. Basic mercury (II) sulphate

D. Mercuric iodide

Answer: C

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3. Light green (Compound 'A') $\xrightarrow{\Delta} White Residue'(B)'$ underset("Temp")overset("High")(rarr)C+D+Ei)

$'D'$ and $'E'aretwoacidicgases. ii)'D'ispassedthrough$HgCl_(2) $solution \rightarrow giveyellowpt.$ iii)

$'E'ispassedthroughwaterfirst$ and $then$H_(2)S

$ispassed, whiteturbidityisobta \in ed.$ iv)

$Aiswaterso$ lub $\leq$ and $additionof$HgCl_(2)` in it, white ppt is obtained but white ppt does not turn into grey on addition of excess solution of 'A'.

'C' is soluble in

A. dil. HCl(B)

B. dil. H_2SO_4

C. conc. CH_3COOH

D. Boiled conc. HCl

Answer: D

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4. Light green (Compound 'A') $\xrightarrow{\Delta} WhiteResidue'(B)'$ underset("Temp")overset("High")(rarr)C+D+Ei)

$'D'$ and $'E'aretwoacidicgases. ii)'D'ispassedthrough$HgCl_(2)

$solution \rightarrow giveyellowpt.$ iii)

$'E'ispassedthroughwaterfirst$ and $then$H_(2)S

$ispassed, whiteturbidityisobta \in ed.$ iv)

$Aiswaterso$ lub $\leq$ and $additionof$HgCl_(2)` in it, white ppt is obtained but white ppt does not turn into grey on addition of excess solution of 'A'.

The no. of water of crystallisation in 'A' is

A. 0

B. 2

C. 7

D. 5

Answer: C

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5. A compound (A) is greenish crystalline salt which gave the following results :

$i)$ Addition of $BaCl_2$ solution to solution of (A) results in the formation of a white ppt. (B), which is insoluble in dil. HCl.

$ii)$ On heating (A), water vapours and two oxides of sulphur, (C) and (D) are liberated leaving a red brown residue (E).

$iii)$ (E) dissolves in warm conc. HCl to give a yellow solution (F).

$iv)$ With H_2S, the solution (F) yields a pale yellow ppt. (G), which when filtered, leaves a greenish filtrate (H).

$v)$ Solution (F) on treatment with thiocyanate ions gives blood red coloured compound (I).

Identify the substances from (A) to (I).

Yellow ppt (G) is a :

A. metal sulphate

B. metal sulphide

C. metallic precipitate

D. sulphur

Answer: D

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6. A compound (A) is greenish crystalline salt which gave the following results :

$i)$ Addition of $BaCl_2$ solution to solution of (A) results in the formation of a white ppt. (B), which is insoluble in dil. HCl.

$ii)$ On heating (A), water vapours and two oxides of sulphur, (C) and (D) are liberated leaving a red brown residue (E).

$iii)$ (E) dissolves in warm conc. HCl to give a yellow solution (F).

$iv)$ With H_2S, the solution (F) yields a pale yellow ppt. (G), which when filtered, leaves a greenish filtrate (H).

$v)$ Solution (F) on treatment with thiocyanate ions gives blood red coloured compound (I).

Identify the substances from (A) to (I).

Red brown residue (E) produces metal when it is heated with

I) coke II)Al_2O_3

$III)$ metal sulphide of same metal

$IV)$ Al metal

A. I,II

B. I,III

C. I,III,IV

D. I,IV

Answer: D

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7. A compound (A) is used in paints instead of salts of lead. . Compound(A) is obtained when a white compound (B) is strongly heated . Compound (B) is insoluble in water but dissolves in sodium hydroxide forming a solution of compound (C) the compounds (A) on heating with coke gives a metal (D) and a gas (E) which burns with blue flame . (B) also dissolves in ammonium sulphate solution mixed with ammonium hydroxide. solution of compound (A) in dilute HCl gives a bluish white//white precipitate (F) with excess of (F) with excees of $K_4\left[Fe(CN)_6\right]$ identify (A) to (F) and explain the reactions.

A. $+3,\ +2,\ +2$

B. $+3, +3, +2$

C. $+2, +3, +2$

D. $+2, +2, +3$

Answer: C

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8. A compound (A) is used in paints instead of salts of lead. . Compound(A) is obtained when a white compound (B) is strongly heated . Compound (B) is insoluble in water but dissolves in sodium hydroxide forming a solution of compound (C) the compounds (A) on heating with coke gives a metal (D) and a gas (E) which burns with blue flame . (B) also dissolves in ammonium sulphate solution mixed with ammonium hydroxide. solution of compound (A) in dilute HCl gives a bluish white//white precipitate (F) with excess of (F) with excees of $K_4[Fe(CN)_6]$ identify (A) to (F) and explain the reactions.

A. Solution (F)

B. Solution (H)

C. A and B both

D. None of these

Answer: A

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Passage Ii

1. Iron $(+II)$ is one of the most important oxidation states, and salts are called ferrous salts. Most of $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_6\right]^{2+}$ ion. $Fe(+II)$ compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4\left[Fe(CN)_6\right]$

Anhydrous $FeCl_2$ is made by

A. heating Fe with dilute HCl

B. heating Fe with gaseous HCl

C. reacting Fe with conc. HCl

D. heating Fe with Cl_2 gas

Answer: B

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2. Iron $(+II)$ is one of the most important oxidation states, and salts are called ferrous salts. Most of $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_6\right]^{2+}$ ion. $Fe(+II)$ compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4\left[Fe(CN)_6\right]$

$K_3\left[Fe(CN)_6\right]$ is used in the detection of Fe^{2+} ion with which it gives a deep blue colour. This colour is due to the formation of

A. $K_2Fe\left[Fe(CN)_6\right]$

B. $Fe_4\left[Fe(Cn)_6\right]_3$

C. $Fe\left[Fe(CN)_6\right]$

D. $Fe_3\left[Fe(CN)_6\right]_2$

Answer: D

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3. Iron $(+II)$ is one of the most important oxidation states, and salts are called ferrous salts. Most of $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_6\right]^{2+}$ ion. $Fe(+II)$ compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4\left[Fe(CN)_6\right]$

$FeSO_4$ is used in brown ring test for nitrates and nitrites. In this test , a freshly prepared $FeSO_4$ solution is mixed with solution containing NO_2^- or NO_2^- and the conc. H_2SO_4 is run down the side of the test tube. If the mixture gets hot or is shaken.

$I)$ the brown colour disappear

$II)$ No is evolved

$III)$ a yellow solution of $Fe_2(SO_4)_3$ is formed

A. I,II,III correct

B. I,II correct

C. II,III correct

D. only I correct

Answer: A

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Passage Iii

1. $\underset{(\text{Purple})}{A} \rightarrow \underset{(\text{Green})}{B} + \underset{(\text{Black})}{C} + \underset{(\text{Gas})}{D}$

Wrong statement is

A. Black compound 'C' is MnO_2

B. D is Cl_2

C. The oxidation state of the d- block metal in A is $+7$

D. The oxidation state of the d- block metal in B is $+6$

Answer: B

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2. $\underset{(\text{Purple})}{A} \rightarrow \underset{(\text{Green})}{B} + \underset{(\text{Black})}{C} + \underset{(\text{Gas})}{D}$

B cannot be converted to A by

A. KOH

B. CO_2 is formed

C. Cl_2

D. O_2

Answer: A

View Text Solution

Passage Iv

1. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B).

(ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 − water gives a compound (D).

(iv) A solution of (D) in conc. HNO_3 on treatment with lead peroxide at boiling temperature produced a compound (E) which was of the same colour at that of (C).

(v) A solutionof (A) on treatment with a solution of barium chloride gas a white precipitate of compound (F) which was insoluble in conc. HNO_3 and conc. HCl.

Which of the following is true for compound (C).

A. It oxidises ammonia to nitrogen dioxide in neutral medium.

B. It's pink colour is due to d-d transition

C. It can be oxidised by ozone.

D. It is obtained by alkaline fusion of pyrolusite in presence of air followed by electrolytic oxidation

Answer: D

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2. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B).

(ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 – water gives a compound (D).

(iv) A solution of (D) in conc. HNO_3 on treatment with lead peroxide at boiling temperature produced a compound (E) which was of the same colour at that of (C).

(v) A solutionof (A) on treatment with a solution of barium chloride gas a white precipitate of compound (F) which was insoluble in conc. HNO_3 and conc. HCl.

The oxidation state of central metal ions of (A) , (B) and (C) compounds are respectively.

A. $+II,\ +VI$ and $+VII$

B. $+II,\ +VI$ and $+VI$

C. $+II,\ +VII$ and $+VII$

D. $+VI,\ +VII$ and $+VII$

Answer: A

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3. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B).

(ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 – water gives a compound (D).

(iv) A solution of (D) in conc. HNO_3 on treatment with lead peroxide at

boiling temperature produced a compound (E) which was of the same colour at that of (C).

(v) A solutionof (A) on treatment with a solution of barium chloride gas a white precipitate of compound (F) which was insoluble in conc. HNO_3 and conc. HCl.

Consider the following statements :

(I) An ions of both (B) and (C) are diamagnetic and have tetradhedral geometry.

(II) Anions of both (B) and (C) are paramagnetic and have tetrahedral geometry.

(C) is diamagnetic but both have same tetrahedral geometry.

(IV) Green coloured compound (B) in a neutral or acidic medium disproportionates to give (C) and (D).

Of these select the correct one from the codes given :

A. I and III only

B. II and III only

C. II and IV only

D. III and IV only

Answer: D

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Passage V

1. Transition metals usually from coloured complexes and d-d transitions $\left(t_{2g} \Leftrightarrow e_g\right)$ are responsible for colour as the energy difference between t_{2g} and e_g lies in visible region. But all the coloured ions are not dut to d-d transition but charge transfer bands also play important roles. Charge transfer bands may be of two types.

(i) ligand to metal (CTLM) (ii) metal to ligand (CTML).

Charge transfer transition always produces intense colour as compared to d-d transition.

Select the incorrect statement :

A. d- block metal ions are usually coloured

B. Colour of d- block metal ions is generally due to d-d transition

C. All the complexes of Cu^(+) $arecolour \leq ssonaountofdiamag \neq ticnature$(d^(10)` configuration).

D. CrO_3 is bright orange due to CTLM.

Answer: C

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2. Transition metals usually from coloured complexes and d-d transitions $\left(t_{2g} \Leftrightarrow e_g\right)$ are responsible for colour as the energy difference between t_{2g} and e_g lies in visible region. But all the coloured ions are not dut to d-d transition but charge transfer bands also play important roles. Charge transfer bands may be of two types.

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Charge transfer transition always produces intense colour as compared to d-d transition.

MnO_4^- is dark purple coloured though Mn is in $(+VII)$ oxidation state with $3d^\circ$ configuration

A. due to d-d transition

B. due to CTML spectra

C. due to CTLM spectra

D. None of these

Answer: C

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3. Transition metals usually from coloured complexes and d-d transitions $(t_{2g} \Leftrightarrow e_g)$ are responsible for colour as the energy difference between t_{2g} and e_g lies in visible region. But all the coloured ions are not dut to d-d transition but charge transfer bands also play important roles. Charge transfer bands may be of two types.

(i) ligand to metal (CTLM) (ii) metal to ligand (CTML).

Charge transfer transition always produces intense colour as compared

to d-d transition.

Select the correct statement

A. In CTML, no net reduction - oxidation takes place because of the short life time of excited state.

B. Cu_2O is a red coloured salt.

C. Vermilon (HgS) is a red coloured compound.

D. All of these

Answer: D

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Passage Vi

1. Photography is based on the nature of silver halides. Except AgF, the silver halides are photosensitive. These undergo decomposition in light and turn black due to formation of free silver.

$2AgBr \xrightarrow{light} 2Ag + Br_2$

The photography films are prepared by adding 20% aqueous solution of $AgNO_3$ to NH_4Br solution containing gelatin. When such a film is exposed, emulsion gets affected and a latent image is formed on the film. When this exposed film or plate is dipped in a developer which contains a reducing agent, the part affected most during exposure are reduced to the maximum. The image becomes visible. It is called a negative. The remaining sensitive emulsion on the negative is removed by dissolving it in hypo solution (fixer). Finally, a positive of the negative already prepared is made on silver bromide paper.

Q. The compound formed on the unexposed photographic film or plate is

A. silver nitrate

B. ammonium bromide

C. diamminesilver bromide

D. silver bromide

Answer: D

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Q. The exposed part of the film or plate after developing contains

A. silver metal

B. silver oxide

C. silver bromide

D. silver nitrate

Answer: A

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3. Photography is based on the nature of silver halides. Except AgF, the silver halides are photosensitive. These undergo decomposition in light and turn black due to formation of free silver.

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prepared is made on silver bromide paper.

Q. Silver bromide dissolves in hypo solution forming:

A. alkaline solution of pyrogallol

B. alkaline solution of quinol

C. either (A) or (B)

D. neither (A) nor (B)

Answer: C

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4. Photography is based on the nature of silver halides. Except AgF, the silver halides are photosensitive. These undergo decomposition in light and turn black due to formation of free silver.

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Q. Silver halides are used in photographgy because these compounds

A. are insoluble in water

B. are affected by light

C. are soluble in ammonia solution

D. easily stick on the surface of photographic plate or film

Answer: B

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5. Photography is based on the nature of silver halides. Except AgF, the silver halides are photosensitive. These undergo decomposition in light

and turn black due to formation of free silver.

$2AgBr \xrightarrow{light} 2Ag + Br_2$

The photography films are prepared by adding $20\,\%$ aqueous solution of $AgNO_3$ to NH_4Br solution containing gelatic. When such a film is exposed, emulsion gets affected and a latent image is formed on the film. When this exposed film or plate is dipped ina developer which contains a reducing agent, the part affected most during exposure are reduced to the maximum. The image becomes visible. It is called a negative. The remaining sensitive emulsion on the negative is removed by dissolving it in hypo solution (fixer). Fihnally, a positive of the nagative already prepared is made on silver bromide paper.

Q. Silver bromide dissolves in hypo solution forming:

A. $Ag_2S_2O_3$

B. Ag_{20S}

C. $Na_3\left[Ag(S_2O_3)_2\right]$

D. $NaAgS_2O_3$

Answer: C

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Passage Vii

1. Pyrolusite ore on oxidation with $KCIO_3 / KNO_3$ in basic medium produces dark green coloured compound (A), which on electrolysis produces a purple coloured compound (B). The purple coloured rhombic prisms. It shows different reactions in different mediums.

Excess of compounds (B) on heating with conc. H_2SO_4 gives an explosive oil (C), which on heating decomposes to gives another compound (D) along with oxygen.

The nature of compound (C) is :

A. basic

B. acidic

C. neutral

D. amphoteric

Answer: B

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2. Pyrolusite ore on oxidation with $KClO_3 / KNO_3$ in basic medium produces dark green coloured compound (A), which on electrolysis produces a purple coloured compound (B). The purple coloured rhombic prisms. It shows different reactions in different mediums.

Excess of compounds (B) on heating with conc. H_2SO_4 gives an explosive oil (C), which on heating decomposes to gives another compound (D) along with oxygen.

On passing CO_2 in the solution of (A), a purple coloured solution along with brown ppt is observed.

A. disproportion reaction where oxidation no. changes from $+6$ to $+7, \ +4.$

B. comproportionation reaction in where oxidation no. changes from $+3$ to $+2.$

C. both (i) and (ii)

D. none

Answer: A

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3. Pyrolusite ore on oxidation with $KCIO_3 / KNO_3$ in basic medium produces dark green coloured compound (A), which on electrolysis produces a purple coloured compound (B). The purple coloured rhombic prisms. It shows different reactions in different mediums.

Excess of compounds (B) on heating with conc. H_2SO_4 gives an explosive oil (C), which on heating decomposes to gives another compound (D) along with oxygen.

Identify (D).

A. Mn_2O_7

B. MnO_2

C. $MnSO_4$

D. Mn_2O_3

Answer: B

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4. Pyrolusite ore on oxidation with $KClO_3 / KNO_3$ in basic medium produces dark green coloured compound (A), which on electrolysis produces a purple coloured compound (B). The purple coloured rhombic prisms. It shows different reactions in different mediums.

Excess of compounds (B) on heating with conc. H_2SO_4 gives an explosive oil (C), which on heating decomposes to gives another compound (D) along with oxygen.

When (D) reacts with PbO_2 / HNO_3 it produces a purple / pink coloured compound (E). Identify (E)

A. $NaMnO_4$

B. $Mn(OH)_2$

C. $HMnO_4$

D. Na_2MnO_4

Answer: C

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5. Pyrolusite ore on oxidation with $KClO_3 / KNO_3$ in basic medium produces dark green coloured compound (A), which on electrolysis produces a purple coloured compound (B). The purple coloured rhombic prisms. It shows different reactions in different mediums.

Excess of compounds (B) on heating with conc. H_2SO_4 gives an explosive oil (C), which on heating decomposes to gives another compound (D) along with oxygen.

Red coloured oxide (M) whose cation has pseudo inert electronic configuration reacts with compound (B) in acidic medium gives another oxide (N) which is black in colour. When sulphate of its metal is reacted with $K_4\left[Fe(CN)_6\right.$ it produces chocolate brown ppt. Select the correct statement.

A. The chocolate brown ppt formed is $Cu_2\left[Fe(CN)_6\right]$

B. the red coloured oxide is Cu_2O

C. the black coloured oxide is CuO

D. All of these

Answer: D

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Passage Viii

1. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B). (ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 – water gives a compound (D).

(iv) A solution of (D) in conc. HNO_3 on treatment with lead peroxide at boiling temperature produced a compound (E) which was of the same

coloure at that of (C).

(v) A solution of (A) on treatment with a solution of barium chloride gave a white precipitate of compound (F) Which was insoluble in conc. HNO_3 and conc. HCl.

Which of the following is true for compound (C).

A. It oxidises ammonia to nitrogen dioxide in neutral medium.

B. It's pink colour is due to d-d transition

C. It can be oxidised by ozone.

D. It is obtained by alkaline fusion of pyrolusite in presence of air followed by electrolytic oxidation

Answer: D

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2. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B). (ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 – water gives a compound (D).

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The oxidation state of central metal ions of (A), (B) and (C) compounds are respectively :

A. $+II,\ +VI$ and $+VII$

B. $+II,\ +VI$ and $+VI$

C. $+II,\ +VII$ and $+VII$

D. $+VI,\ +VII$ and $+VII$

Answer: A

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3. (i) A powdered substance (A) on treatment with fusion mixture gives a green coloured compound (B). (ii) The solution of (B) in boiling water on acidification with dilute H_2SO_4 gives a pink coloured compound (C).

(iii) The aqueous solution of (A) on treatment with NaOH and Br_2 – water gives a compound (D).

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(v) A solution of (A) on treatment with a solution of barium chloride gave a white precipitate of compound (F) Which was insoluble in conc. HNO_3 and conc. HCl.

Consider the following statement :

(I) Anions of both (B) and (C) are diamagnetic and have tetradhedral geometray.

(II) Anions of both (B) and (C) are paramagnetic and have tetrahedral geometry.

(III) Anions of (B) is paramagnetic and that of (C) is diamagnetic but both have same tetrahedral geometry.

(IV) Green coloured compound (B) in a neutral of acidic medium

disproportionates to give (C) and (D).

Of these select the correct one from the code given :

A. I and III only

B. II and III only

C. II and IV only

D. III and IV only

Answer: D

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Matric Matching Questions

1. Match the following :

(A) $AgNO_3$	(p) Tyres and Paint Manufacturing
(B) Hg_2Cl_2	(q) Calomel
(C) ZnO	(r) Corrosive sublimate
(D) $HgCl_2$	(s) Photography
	(t) Marking Inks

Compound

Related to

A. $AgNO_3$ (p) Tyres and Paint Manufacturring

B. Hg_2Cl_2 (q) Calomel

C. ZnO (r) Corrosive sublimate

D. $HgCl_2$ (s) Photography
(t) Marking Inks

Answer: $A \to s, t:, B, B \to q: C \to p: D \to r$

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2. Match the following :

Compound	Characteristics
(A) Litharge	(p) PbO
(B) Red lead	(q) PbO_2
(C) Purple of Cassius	(r) $(NH_4)_2[SnCl_6]$
(D) Butter of tin	(s) Au adsorbed over $Sn(OH)_4$
	(t) Anode plate in lead accumulator

Compound

Characteristics

A. Litharge $(p)PbO$

B. Red lead $(q)PbO_2$

C. Purple of Cassius $(r(NH_4)_2[SnCl_6]$

D. Butter of tin (s)Au adsorbed over $Sn(OH)_4$
(t)Anode plate in lead accumulator

Answer: $A \to p, t:, B \to q: C \to s: D \to r$

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3. Match the following :

Compound Reagent

(A) $CuSO_4$ (p) Fentons reagent

(B) $Anhyd.ZnCl_2$ (q) Benedict solution

(C) $Na_2\left[Fe(CN)_5(NO)\right]$ (r) Lucas reagent

(D) $FeSO_4$ (s) Legal's test

(t) Fehlings solution

Compound Reagent

A. $CuSO_4$ (p) Fentons reagent

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C. $Na_2\left[Fe(CN)_5(NO)\right]$ (r) Lucas reagent

D. $FeSO_4$ (s)Legal's test
(t)Fehlings solution

Answer: $A \to q, t:, B \to r: C \to s: D \to p$

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4. Match the compounds in column I with the products obtained on heating them in column II :

Column I	Column II
(A) $FeSO_4$	(P) SO_2
(B) $CuSO_4$	(Q) SO_3
(C) $AgNO_3$	(R) O_2
(D) $Zn(NO_3)_2$	(S) NO
	(T) NO_2

A. $FeSO_4$ $(PSO_2$

B. $CuSO_4$ $(Q)SO_3$

C. $AgNO_3$ $(R)O_2$

D. $Zn(SO_3)_2$ $(S)NO$ $(T)NO_2$

Answer: $A-P,Q;B-Q;C-R,T;D-R,T$

Watch Video Solution

5. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $AgNO_3(aq) + I_2$ (excess) $+ H_2O \longrightarrow$

(B) $K_2MnO_4(aq) + CO_2(g) \longrightarrow$

(C) $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$

D) $CuCl_2(aq) + Cu(s) \longrightarrow$

Column II

(p) Disproportionation

(q) Comproportionation

(r) Redox reaction

(s) One of the products is insoluble in water

A. $AgNO_3(aq) + I_2(\text{excess}) + H_2O \rightarrow$ (p)Disproportionation

B. $K_2MnO_4(aq) + CO_2(g) \rightarrow$ (p)Comproportionation

C. $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$ (r)Redox reaction

D.

$CuCl_2(aq) + Cu(s) \rightarrow$ (s)One of the products is insoluble in wa

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

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6. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $FeSO_4 \xrightarrow{\Delta}$

(B) $Mn^{2+} + S_2O_8^{2-} + H_2O \longrightarrow$ in+ VI oxidat ion state

(C) $Na_2Cr_2O_7$ (saturated salt) + H_2SO_4 (conc.) $\longrightarrow$

(D) $N_2H_4 + CuSO_4 \longrightarrow$

Column II

(p) One of the products is coloured due to charge transfer

(q) One of the products is

(r) Redox reaction

(s) One of the products is acidic oxide

A. $FeSO_4 \xrightarrow{\Delta}$ (p) One of the products is coloured due to charge transfer

B. $Mn^{2+} + S_2O_8^{2-} + H_2O \rightarrow$ in $+ VI$ oxidation state (q)One of the products is

C. $Na_2Cr_2O(\text{saturated salt}) + H_2SO_4(\text{conc.}) \rightarrow$ (r) Redox reaction

D. $N_2H_4 + CuSO_4 \rightarrow$ (s) One of the products is acidic oxide

Answer: $(A - q, r, s); (B - p, q, r); (C - p, q, s); (D - q, r)$

Watch Video Solution

7. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $AgNO_3(aq) + I_2(\text{excess}) + H_2O \longrightarrow$

(B) $K_2MnO_4(aq) + CO_2(g) \longrightarrow$

(C) $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$

(D) $CuCl_2(aq) + Cu(s) \longrightarrow$

Column II

(p) Disproportionation

(q) Comproportionation

(r) Redox

(s) One of the products is insoluble in water

A. $AgNO_3(aq) + I_2(\text{excess}) + H_2O \rightarrow$ (p)Disproportionation

B. $K_2MnO_4(aq) + CO_2(g) \rightarrow$ (p)Comproportionation

C. $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$ (r)Redox reaction

D.

$CuCl_2(aq) + Cu(s) \rightarrow$ (s)One of the products is insoluble in wat

Answer: $(A-p, r, s); (B-p, r, s); (C-r, s) : (D-q, r, s)$

Watch Video Solution

8. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $O_2^- \rightarrow O_2 + O_2^{2-}$

(B) $CrO_4^{2-} + H^+ \rightarrow$

(C) $MnO_4^- + NO_2^- + H^+ \rightarrow$

(D) $NO_3^- + H_2SO_4 + Fe^{2+} \rightarrow$

Column II

p) redox reaction

q) one of the products has trigonal planar structure

r) dimeric bridged tetrahdedral metal ion

(s) disproportionation

A. $O_2^- \rightarrow O_2 + O_2^2$ (p) redox reaction

B. $CrO_4^{2-} + H^+ \rightarrow$ (q) One of the products has trigonal planar structure

C. $MnO_4^- + NO_2^- + H^+ \rightarrow$ (r) dimeric bridged tetrahdedral metal ion

D. $NO_3^- + H_2SO_4 + Fe^{2+} \rightarrow$ (s) disproportionation

Answer: $(A-p, p, s); (B-r); (C-p, q); (D-p)$

Watch Video Solution

9. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column - I

(A) $MnO_4^{2-} + H^+ \rightarrow$

(B) $Cu^+(aq) \rightarrow$

(C) $Cr_2O_7^{2-}(s) + H^+(conc.) + Cl^-(s) \rightarrow$

(D) $Fe_2(SO_4)_3 + I^- \rightarrow$

Column - II

(p) One of the products of transition element is paramagnetic.

(q) Disproportation reaction.

(r) One of the products is liberated as coloured vapours.

(s) In one of the products central atom exhibits its highest oxidation stat

A. $MnO_4^{2-} + H^+ \rightarrow$ (p) One of the products of transition element is paramagnetic.

B. $Cu^+(aq) \rightarrow$ (q) Disproportation reaction.

C. $Cr_2O_7^{2-}(s) + H^+(\text{conc.}) + Cl^-(s) \rightarrow$ (r) One of the products central atom exhibits its highest oxidation state

D. $Fe_2(SO_4)_3 + I^- \rightarrow$ (s) In one of the products central atom exhibits its highest oxidation stat

Answer: $(A-p, q, s); (B-p, q); (C-r, s); (D-p, r, s)$

Watch Video Solution

10. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $FeSO_4 \xrightarrow{\Delta}$

(B) $Mn^{2+} + S_2O_8^{2-} + H_2O \longrightarrow$

(C) $Na_2Cr_2O_7$ (saturated salt) + H_2SO_4(conc.) $\longrightarrow$

(D) $N_2H_4 + CuSO_4 \longrightarrow$

Column II

(p) One of the products is coloured due to charge transfer

(q) One of the products is in + VI oxidation state

(r) Redox reaction

(s) One of the products is acidic oxide

A. $FeSO_4 \xrightarrow{\Delta}$ (p) One of the products is coloured due to charge transfer

B. $Mn^{2+} + S_2O_8^{2-} + H_2O \rightarrow$ (q) One of the products is in $+$ VI oxidation state

C. $Na_2Cr_2O_7(\text{saturated salt}) + H_2SO_4(\text{conc.}) \rightarrow$ (r) Redox reaction

D. $N_2H_4 + CuSO_4 \rightarrow$ (s) One of the products is acidic oxide

Answer: $(A - q, r, s); (B - p, q, r); (C - p, q, s); (D - q, r)$

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11. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $AgNO_3(aq) + I_2$ (excess) $+ H_2O \longrightarrow$

(B) $K_2MnO_4(aq) + CO_2(g) \longrightarrow$

(C) $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$

D) $CuCl_2(aq) + Cu(s) \longrightarrow$

Column II

(p) Disproportionation

(q) Comproportionation

(r) Redox reaction

(s) One of the products is insoluble in water

A. $AgNO_3(aq) + I_2(\text{excess}) + H_2O \rightarrow$ (p) Disproportionation

B. $K_2MnO_4(aq) + CO_2(g) \rightarrow$ (q) Comproportionation

C. $Na_2Cr_2O_7 + C \xrightarrow{\Delta}$ (r) Redox

D.

$CuCl_2(aq) + Cu(s) \rightarrow$ (s)One of the products is insoluble in wa

Answer: $(A-p, r, s); (B-p, r, s); (C-r, s) : (D-q, r, s)$

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12. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column I

(A) $O_2^- \rightarrow O_2 + O_2^{2-}$ (B) $CrO_4^{2-} + H^+ \rightarrow$

(C) $MnO_4^- + NO_2^- + H^+ \rightarrow$ (D) $NO_3^- + H_2SO_4 + Fe^{2+} \rightarrow$

Column II

(p) redox reaction

(q) one of the products has trigonal planar structure

(r) dimeric bridged tetrahdedral metal ion

(s) disproportionation

A. $O_2^- \rightarrow O_2 + O_2^{2-}$ (p) redox reaction

B. $CrO_4^{2-} + H^+ \rightarrow$ (q) one of the products has trigonal planar structure

C. $MnO_4^- + NO_2^- + H^+ \rightarrow$ (r) dimerica bridge tetrahdedral metal ion

D. $NO_3^- + H_2SO_4 + Fe^{2+} \rightarrow$ (s) disproportionation

Answer: $(A - p, s); (B - r); (C - p, q); (D - p)$

Watch Video Solution

13. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column - I

(A) $MnO_4^{2-} + H^+ \rightarrow$ (B) $Cu^+(aq) \rightarrow$

(C) $Cr_2O_7^{2-}(s) + H^+(conc.) + Cl^-(s) \rightarrow$

(D) $Fe_2(SO_4)_3 + I^- \rightarrow$

Column - II

(p) One of the products of transition element is paramagnetic.

(q) Disproportation reaction.

(r) One of the products is liberated as coloured vapours.

(s) In one of the products central atom exhibits its highest oxidation state.

A. $MnO_4^{2-} + H^+ \rightarrow$ (p) One of the products of transition element is paramagnetic

B. $Cu^{+}(aq) \rightarrow$ (q) Disproportionation reaction.

C. $Cr_2O_7^{2-}(s) + H^{+}(\text{conc.}) + Cl^{-}(s)$ (r) One of the products is liberated as coloured vapours.

D. $Fe_2(SO_4)_3 + I^{-} \rightarrow$ (s) In one of the products central atom exhibits its highest oxidation state.

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

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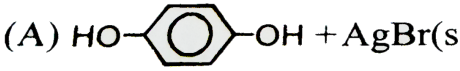
14. Match the reactions in Column I with nature of the reactions / type of the products in Column II.

Column - I

(A)  + AgBr(s) →

(B) $BaCl_2 + K_2Cr_2O_7 + H_2SO_4 \rightarrow$

(C) $FeSO_4 + K_3[Fe(CN)_6] \rightarrow$

(D) $Cu(OH)_2 + NH_4OH + (NH_4)_2SO_4 \rightarrow$

(E) $ZnO + Co(NO_3)_2 \xrightarrow{\Delta}$

Column - II

(p) Turnbull's blue pigment

(q) Schwitzer's reagent

(r) Rinmann's green pigment

(s) Chromyl chloride test (t) Photography

A. (p) Tumbull's blue pigment

B. $BaCl_2 + K_2Cr_2O_7 + H_2SO_4 \rightarrow$ (q) Schwitzer's reagent

C. $FeSO_4 + K_3\left[Fe(CN)_6\right] \rightarrow$ Ⓡ Chromyl chloride test

D. $Cu(OH)_2 + NH_4OH + (NH_4)_2SO_4 \rightarrow$ (s)Photography

Answer: (A-s),(B-r),(C-p),(D-q)

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15. Match the following :

A. Compound $(A) PbO_2$ Characteristics (p) Red pigment

B. Compound $(B) Pb_3O_4$ Characteristics (q) Reducing agent

C. Compound $(C) SnCl_2$ Characteristics (r) Oxidizing agent

D. Compound $(D) SnCl_4$ Characteristics (s) Soluble in benzene (t) Mordant

Answer: $A \to r;$, $B \to p, r : C \to q : D \to s, t$

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16. Match the following :

A. Compound $(A) PbCl_2$ Characteristics (p) White

B. Compound $(B) PbI_2$ Characteristics (q) Insoluble in cold water, soluble in hot water

C. Compound $(C) PbO$ Characteristics (r) Colored compound

D. Compound $(D) Pb_3O_4$ Characteristics (s) Oxidizing agent (t) Color due to charge transfer transition

Answer: $A \to p, q; B \to q, r, t; C \to r, t; D \to r, s$

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17. Match the following :

A.

Compound	Characteristics
$(A) TiCl_4$	(p) Liquid at room temperature

B.

Compound	Characteristics
$(B) CaCl_2$	(q) Has the highest MP among the compounds given

C.

Compound	Characteristics
$(C) FeCl_3$	(r) Aqueous solution is acidic

D.

Compound	Characteristics
$(D) ZnCl_2$	(s) Undergoes hydrolysis
	(t) Solid at room temperature

Answer: $A \to p, r, s; B \to q, t; C \to r, s, t; D \to r, s, t$

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18. Match the following :

A.

Compound	Characteristics
$(A) KMnO_4$	(p) Liberates I_2 in acidic or Neutral medium

B. Compound Characteristics
$(B) K_2Cr_2O_7$ (q) Colored due to charge transfer transition

C. Compound Characteristics
$(C) CuSO_4$ (r) Colored due to $d \rightarrow d$ transition

D. Compound Characteristics
$(D) ZnCl_2$ (s) On heating with conc. H_2SO_4 liberated O_2
(t) Decolorised by $NaHSO_3$ + dil.HCl

Answer: $A \rightarrow p, q, s, t; B \rightarrow p, q, s, t; C \rightarrow p, r, t; D \rightarrow p, q, s, t$

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19. Match the following : Choose the correct answer :

A. (1) D,Q,U,W (2) A,P,T,V,W
(3)B,R,T,V,W (4) C,S,T,V

B. (1) A,P,U,W (2) B,Q,V,W
(3)C,S,U,W (4) B,R,V,W

C. (1) C,R,V,W (2) B,R,T,V
(3) D,Q,V,W (4) A,Q,V,W

D. (1) B,S,V,W (2) C,S,T,W
(3) D,S,V,W (4) A,P,T,V,W

Answer: 1

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20. Match the following :

A.

List-I	List -II
$(A)\left[Pt(NH_3)_2Cl_2\right]$	(p)Dipole moment

B.

List-I	List -II
$(b)K_3\left[Cr(OX)_3\right]$	(q)Polarimeter

C.

List-I	List -II
$(C)\left[Co(NH_3)_4Cl_2\right]$	(r)Precipitation with$AgNO_3$

D.

List-I	List -II
$(D)\left[Co(en)_2Cl_2\right]$	(s)Precipitation with$AgNO_3$
	(t)Anion exchange Resin

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

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21. Match the following :

Indicate the color produced in the following reactions. Shade the color code .

A.

	R	B	G	Y
$(A)FeCl_3 + NH_4SCN + dil.\ HCl$	1	2	3	4

B.

	R	B	G	Y
$(B) FeSO_4 + K_4[Fe(CN)_6]$	1	2	3	4

C.

	R	B	G	Y
$(C) Pb(NO_3)_2 + K_2CrO_4$	1	2	3	4

D.

	R	B	G
$(D) K_2Cr_2O_7 + \text{conc.} H_2SO_4 + H_2O_2 + \text{Isoamyl alcohol}$	1	2	3

Answer: $A \to 1; B \to 2, C \to 4, D \to 2$

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Integral

1. How many of the following reactions cannot occur?

$(1) Fe + 2HCl \to FeCl_2 + H_2 \uparrow$

$(2) Cu + 2HCl \to CuCl_2 + H_2 \uparrow$

$(3) Cu + ZnSO_4 \to CuSO_4 \to CuSO_4 + Zn \downarrow$

$(4) Zn + 2AgNO_3 \to Zn(NO_3)_2 + 2Ag \downarrow$

$(5) Cu + 2AgNO_3 \to Cu(NO_3)_2 + 2Ag \downarrow$

$(6) Fe + CuSO_4 \to FeSO_4 + Cu \downarrow$

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2. How many of the following will give O_2 on heating ?

$KMnO_4$, $K_2Cr_2O_7$, ZnO, Na_2O,

PbO_2, Pb_3O_4, $Pb(NO_3)_2$, NH_4NO_3

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3. Total number of reagents give below reacted with $KI_{(aq)}$ to produce I_2:

$CuSO_4$ $Hg(NO_3)_2$

ConcentrateH_2SO_4ConcentrateH_3PO_4

$KMnO_4/H^+$ $K_2Cr_2O_7/H^+$

Cl_2 water acidify bleaching powder

$Pb(NO_3)_2 NaNo_2 + HCl(\text{dil.})$

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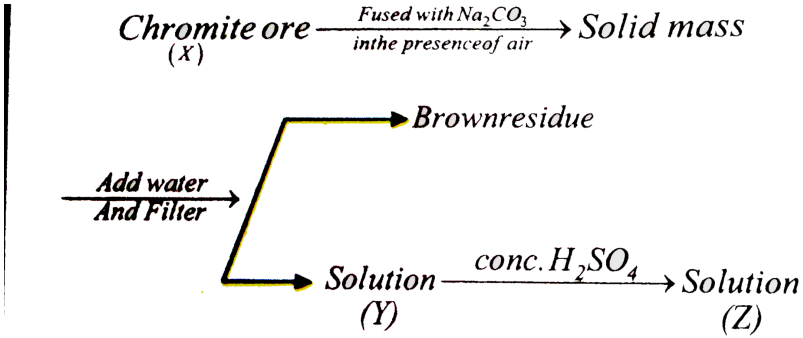
4. Following steps are involved in manufacturing of potassium dichromate



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Level Vi

1. Identify the statement which is correct for copper sulphate

A. It reacts with NaOH and Glucose to give Cu_2O (brick red ppt)

B. It reacts with Kci to give Cu_2Cl

C. It gives CuO ono strong heating

D. It reacts with KI to gives I_2

Answer: A,C,D

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2. When caustic soda is added in excess to a mercurous chloride in HCl then what all are obtained ?

A. Hg

B. Hg_2O

C. HgO

D. HgO_2

Answer: A,C

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3. When silver nitrate is reacted with excess of I_2 in aqueous solution then which of the following compounds are formed ?

A. $AgIO_3$

B. AgI

C. HIO_3

D. HNO_3

Answer: B,C,D

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4. In solid $CuSO_4.5H_2O$

A. Cu^{2+} ion is coordinate bonded to four water molecules

B. One H_2O molecule is $H-$ bonded

C. It has four types of bonds, Ionic, covalent, coordinate and H- bond

D. Five molecules of H_2O are coordinate bonded to Cu^{2+}

Answer: A,B,C

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5. Which of the following statement (s) is / are not correct

A. The blue colour of aqueous $CuCl_2$ is due to $\left[Cu(H_2O)_4\right]^{2+}$

B. The yellow colour of aqueous $CuCl_2$ is due to $[CuCl_4]^{2-}$

C. The green colour of aqueous $CuCl_2$ is due to the presence of both $\left[Cu(H_2O)_4\right]^{+}$ and $[CuCl_4]^{1-}$

D. The blue colour of aqueous $CuCl_2$ is due to $[CuCl_4]^{3-}$

Answer: C,D

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6. Which of the following on heating with $K_2Cr_2O_7$ and conc. H_2SO_4 with organge red color vapours ?

A. NaCl

B. $ZnCl_2$

C. Hg_2Cl_2

D. $AgCl$

Answer: A,B

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7. Which of the following compounds are red in color ?

A. Ag_2CrO_4

B. CrO_2Cl_2

C. $K_2Cr_2O_7$

D. Cu_2O

Answer: A,B,C,D

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8. The black colored compounds are

A. Fe_2O_3

B. FeO

C. Cu_2O

D. CuO

Answer: B::D

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9. Which of the following give a precipitate when added to a NaCl solution ?

A. $AgNO_3$

B. $Hg(NO_3)_2$

C. $Hg_2(NO_3)_2$

D. $Pb(NO_3)_2$

Answer: A,C,D

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10. Which of the following give characteristics color reaction with H_2O_2 in acidic medium ?

A. $K_2Cr_2O_7$

B. $Ti(SO_4)_2$

C. VSO_4

D. $CuSO_4$

Answer: A,B,C

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11. Which of the following can produce I_2 when reacted with KI and dil. H_2SO_4 ?

A. $KMnO_4$

B. $K_2Cr_2O_7$

C. MnO_2

D. PbO_2

Answer: A,B,C,D

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12. Which of the following liberate Cl_2 when heated with conc. HCl ?

A. $KMnO_4$

B. MnO_2

C. SnO_2

D. PbO_2

Answer: A,B,D

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13. $1.245g$ of $CuSO_4.xH_2O$ was dissolved in water and H_2S was passed until CuS was completely precipitated. The H_2SO_4 Produced in the filtrated required 10 ml of 1N NaOH solution . x cannot be

A. 3

B. 10

C. 5

D. 6

Answer: A,B,D

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14. Which of the following can turn acid $K_2Cr_2O_7$ to green ?

A. Fe^{2+}

B. SO_3^{2-}

C. SO_4^{2-}

D. Fe^{3+}

Answer: A,B

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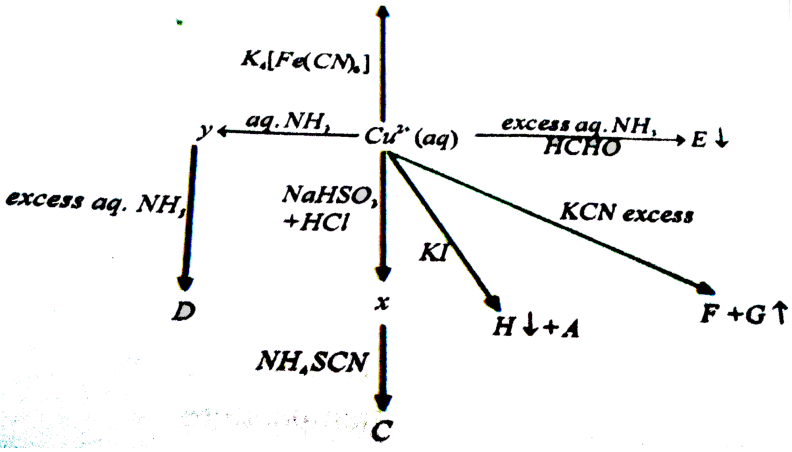
Passage 1



1.

The color of 'C' is

A. Bown

B. Red lead $(q)PbO_2$

C. Black

D. White

Answer: D

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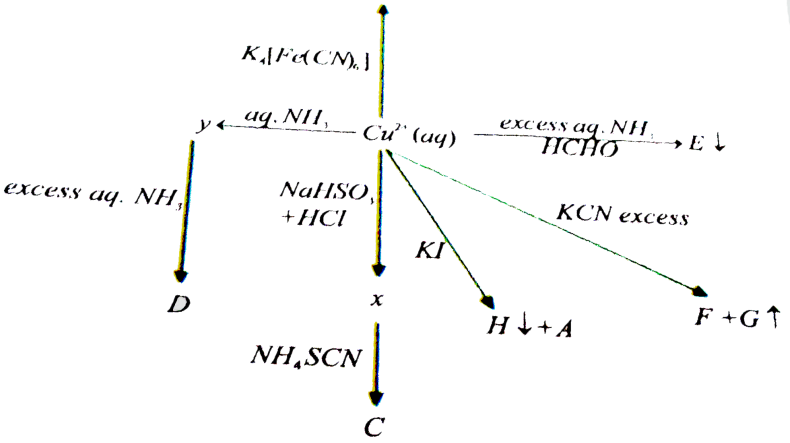

2.

The color of B is

A. Brown

B. Yellow

C. Black

D. Blue

Answer: A

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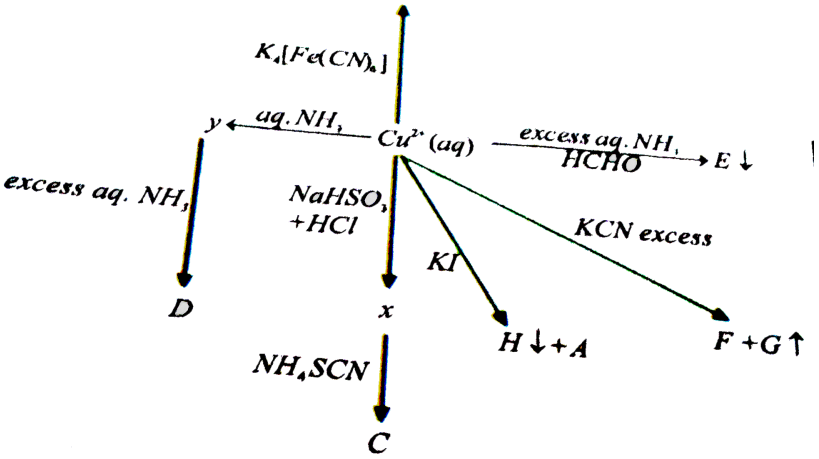

3.

The geometry of the complex 'D' in the solid state is

A. Tetrahedral

B. Square planar

C. Octahedral

D. Square pyramid

Answer: B

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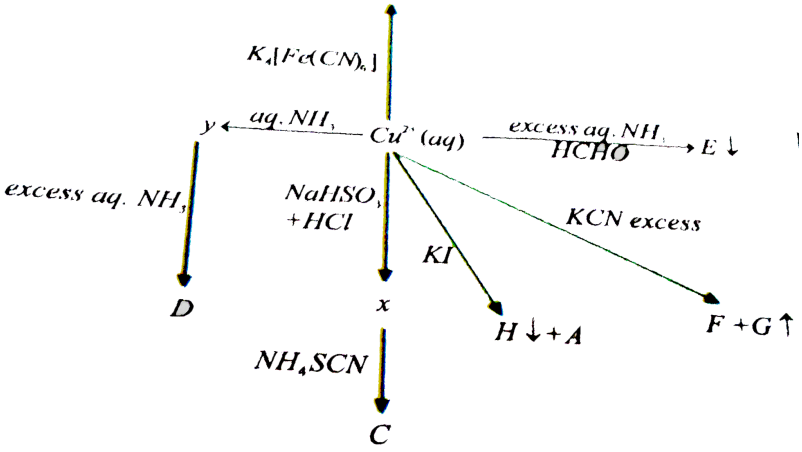
4.



The oxidation state of Cu in the 'E' is

A. $+1$

B. $+2$

C. 0

D. -1

Answer: A

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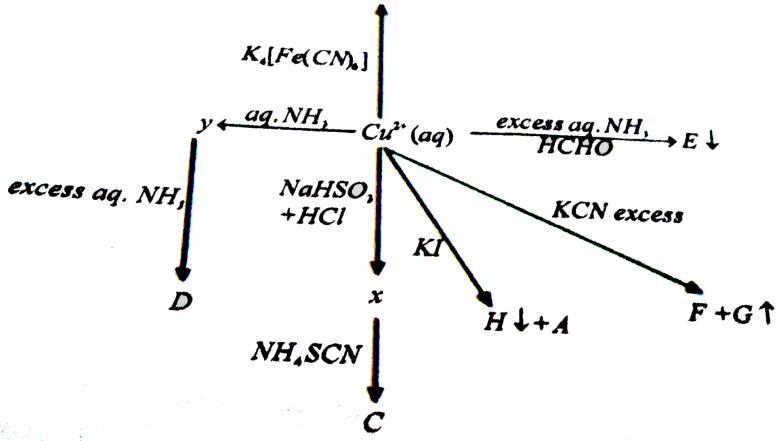
5.



The coordination number and oxidation state of copper in 'F' is

A. $6, +1$

B. $4, +2$

C. $6, +2$

D. $4, +1$

Answer: D

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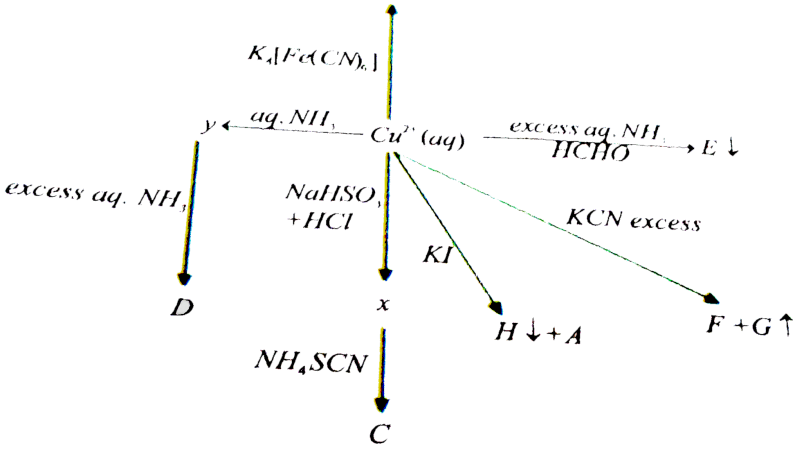

6.

When 'I' is what is 'A'

A. Cu_2I_2

B. CuI_2 is formed

C. I_2

D. $[CuI_4]^{2-}$

Answer: C

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7. Copper is the most noble of first row transition metals and occurs in small deposits in serveral countries. Ores of copper include chalcanthite $(CuSO_4.5H_2O)$, atacanite $\left[Cu_2Cl(OH)_3\right]$, cuprite (Cu_2O), copper glance (Cu_2S), and malachite $\left[Cu_2(OH)_2CO_3\right]$. However, $80\,\%$ of the world copper production comes from the ore chalcopyrite $(CuFeS_2)$. The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

Partial roasting of chalcopyrite produces

A. Cu_2S and FeO

B. Cu_2O and FeO

C. CuS and Fe_2O_3

D. Cu_2O and Fe_2O_3

Answer: B

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Passage 2

1. Into iron pyrites in water, air was bubbled for a long time. Green crystal (A) and another substance (B) were produced. 'A' in solution was treated with conc. HNO_3 and B. The solution was evaporated and crystallized, pale yellow crystals of 'C' was produced .

To the solution of A and C, $K_3[Fe(CN)_6]$ and $K_4[Fe(CN)_6]$ were added respectively.

The colors produced are

A. Red, Green

B. Blue, Blue

C. Red, Red

D. Green, Green

Answer: B

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2. Into iron pyrites in water, air was bubbled for a long time. Green crystal (A) and another substance (B) were produced. 'A' in solution was treated with conc. HNO_3 and B. The solution was evaporated and crystallized, pale yellow crystals of 'C' was produced .

The reagent that gives red color with a solution of C is

A. NH_4CNO

B. NH_4SCN

C. $K_4\left[Fe(CN)_6\right]$

D. $K_3\left[Fe(CN)_6\right]$

Answer: B

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3. Into iron pyrites in water, air was bubbled for a long time. Green crystal (A) and another substance (B) were produced. 'A' in solution was treated with conc. HNO_3 and B. The solution was evaporated and crystallized,

pale yellow crystals of 'C' was produced .

B is

A. $FeSO_4$

B. $Fe_2(SO_4)_3$

C. H_2SO_4

D. H_2S

Answer: C

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4. Into iron pyrites in water, air was bubbled for a long time. Green crystal (A) and another substance (B) were produced. 'A' in solution was treated with conc. HNO_3 and B. The solution was evaporated and crystallized, pale yellow crystals of 'C' was produced .

'A' is

A. Fe_2O_3

B. FeO

C. $Fe_2(SO_4)_3$

D. $FeSO_4$

Answer: D

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5. Copper is the most noble of first row transition metals and occurs in small deposits in serveral countries. Ores of copper include chalcanthite $(CuSO_4.5H_2O)$, atacanite $\left[Cu_2Cl(OH)_3\right]$, cuprite (Cu_2O), copper glance (Cu_2S), and malachite $\left[Cu_2(OH)_2CO_3\right]$. However, $80\,\%$ of the world copper production comes from the ore chalcopyrite $(CuFeS_2)$. The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

Iron is removed from chalcopyrite as.

A. FeO

B. FeS

C. Fe_2O_3

D. $FeSiO_3$

Answer: D

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6. 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

A. Fe

B. Cu

C. Ni

D. CO

Answer: B

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Passage 3

1. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

'C' on heating gave

A. NH_3 as a titrant and B as indicator

B. N_2

C. NO_2

D. CO_2

Answer: B

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2. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

Compound (B) will be

A. NaCl

B. $Na_2Cr_2O_7$

C. $(NH_4)_2Cr_2O_7$

D. NH_4Cl

Answer: B

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3. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

$\xrightarrow[\Delta]{\text{Furnace}} A + CO_2 \uparrow + Fe_2O_3$. The 'y' in the stoichiometrically balanced equation is

A. 3

B. 7

C. 6

D. 2

Answer: B

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4. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

The correct statement is

A. Dichromate ion is stable is basic medium

B. Dichromate is stable in acidic medium

C. Chromate is stable in acidic medium

D. Chromate undergoes hydrolysis to dichromate

Answer: B

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5. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

B was obtained by fractional crystallization. The compound crystallized first was

A. $Na_2Cr_2O_7.2H_2O$

B. $NaCl$

C. Na_2CO_3

D. $Na_2SO_4.10H_2O$

Answer: D

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6. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

Quick lime is added during heating because

A. To make the mass acidic

B. To make the mass porous

C. To make the mass hard

D. To make the mass wet

Answer: B

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7. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

A is used in the

A. Leather Tanning

B. flux

C. water softner

D. sizing agent

Answer: A

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8. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

The oxidation states of chromium in x,A and C are

A. $+6,\ +6,\ +6$

B. $+3,\ +3,\ +3$

C. $+3,\ +6,\ +6$

D. $+3,\ +3,\ +6$

Answer: C

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9. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

The oxidation state of iron in 'x' is

A. $+2$

B. $+3$

C. $+1$

D. 0

Answer: A

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10. Chrome iron ore (x) was heated with dry Na_2CO_3 in the presence of quick lime and air in a furnace. The mixture was extracted with water and filtered. The filtrate was yellow(A) which on adding conc. H_2SO_4 turned to orange red. The solution was evaporated and cooled. The crystals of B were obtained. To the crystals in aqueous solution, NH_4Cl was added. On fractional crystallization, orange red crystals (C) is formed.

When alkali is added to B, the species formed is

A. $Cr_2O_7^{2-}$

B. Cr^{3+}

C. CrO_4^{2-}

D. Cr^{4+}

Answer: C

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11. Copper is the most noble of first row transition metals and occurs in small deposits in serveral countries. Ores of copper include chalcanthite $(CuSO_4.5H_2O)$, atacanite $\left[Cu_2Cl(OH)_3\right]$, cuprite (Cu_2O), copper glance (Cu_2S), and malachite $\left[Cu_2(OH)_2CO_3\right]$. However, $80\,\%$ of the world copper production comes from the ore chalcopyrite $(CuFeS_2)$. The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

In self-reduction, the reducing species is.

A. S

B. O^{2-}

C. S^{2-}

D. SO_2

Answer: B

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12. 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. $Al(NO_3)_2$

D. $Pb(NO_3)_2$

Answer: A

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Integer Type Questions

1. How many of the following can be oxidized by acid $KMnO_4$ solution ?

$(1)Fe^{2+}$ (2) Ni^{2+} (3) Zn^{2+} (4) Sn^{2+}

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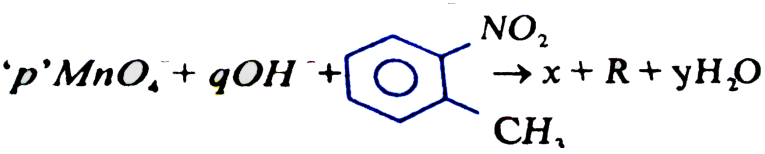
2.



Complete the reaction and find out $(p+q)=R+4$, the value of R is

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3. $Cr_2O_7^{2-}+xH^++yI^-\rightarrow 2Cr^{3+}+I_2+H_2O$

Balance the eequation.$(x-y)$ is

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4. $Pb_3O_4+\underset{\text{Conc.}}{xHCl}\xrightarrow[\Delta]{}A+B\uparrow+H_2O.$ 'x' is

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5. $Pb_3O_4 + HNO_3 \rightarrow A + B + H_2O$. A is soluble in water. The oxidation state of lead in B is

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6. The number of mercury atoms in iodide of Millons base is x and the oxidation state of each mercury atom is y. Then $(x + y)$ is

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7. When excess conc. HCl is added to $SnCl_4H_2[SnCl_x]$ is formed. $'x'$ is

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8. Number of salts among the following that will give metal on heating

$Zn(NO_3)_2, AgNO_3, Cu(NO_3)_2, Hg(NO_3)_2$

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Previous Iit Jee Question

1. in neutral or faintly alkaline solution, 8 moles of permanganate anion quantitatively oxidize thiosulphate anions to produce X moles of a sulphur containing product. The magnitude of X is

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

$$S_2O_3^{2-} \xrightarrow{Ag^+} \underset{(\text{Clear solution})}{X} \xrightarrow{Ag^+} \underset{(\text{White ppt.})}{Y} \xrightarrow{\text{With time}} \underset{(\text{Black ppt.})}{Z}$$

A. $\left[Ag(S_2O_3)_2\right]^{3-}, Ag_2S_2O_3, Ag_2S$

B. $\left[Ag(S_2O_3)_3\right], Ag_2SO_3, Ag_2S$

C. $\left[Ag(SO_3)_2\right]^{3-}, Ag_2S_2O_3, Ag$

D. $\left[Ag(SO_3)_3\right]^{3-}, Ag_2SO_4, Ag$

Answer: A

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3. 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 a brown residue

Answer: C

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4. In the dichromate dianion,

A. 4 Cr-O bonds are equivalen

B. 6 Cr-O bonds are equivalen

C. all Cr-O bonds are equivalent

D. all Cr-O bonds are nonequivalent

Answer: B

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5. The chemical process in the production of steel from haematite ore involves

A. reduction

B. oxidation

C. reduction followed by oxidation

D. oxidation followed by reduction

Answer: C

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6. Anhydrous ferric chloride is prepared by

A. heating hydrated ferric chloride at a high temperature in a stream of air

B. heating metallic iron in a stream of dry chlorine gas

C. reaction of metallica iron with hydrochloric acid

D. reaction of metallic iron with nitric acid

Answer: B

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7. When MnO_2 fused with KOH, a coloured compound is formed . The product and its colour is:

A. K_2MnO_4,purple green

B. $KMnO_4$, purple

C. Mn_2O_3, brown

D. Mn_3O_4, black

Answer: A

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8. The product of oxidation of I^- with MnO_4^- in alkaline medium is:

A. IO_3^-

B. I_2

C. IO^-

D. IO_4^-

Answer: A

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9. Ammonium dichromate on heating liberates a gas. The same gas will be obtained by :

A. heating NH_4NO_2

B. heating NH_4NO_3

C. treating H_2O_2 with $NaNO_2$

D. treating Ma_3N_2 with H_2O

Answer: A

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

A. Cu^{2+} get reduced to form $\left[Cu(NH)_4\right]^{3-}$

B. $\left[Cu(CN)_4\right]^{2-}$

C. CuCN

D. $Cu(CN)_2$

Answer: A

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11. Potassium manganate (K_2MnO_4) is formed when

A. chlorine is passed into aqueous $KMnO_4$ solution

B. manganese dioxide is fused with potassium hydroxide in air

C. formaldehyde reacts with potassium permanganate in presence of a strong alkali

D. potassium permanganate reacts with conc. Sulphuric acid

Answer: B::C

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Passage 4

1. When a metal rod M is dipped into an aqueous colourless concetrated 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.

Q. The final solution contains.

A. $\left[Pb(NO_3)_4\right]^{2+}$ and $[CoCl_4]^{2-}$

B. $\left[Al(NH_3)_2\right]^{3+}$ and $\left[Cu(NH_3)_4\right]^{2+}$

C. $\left[Al(NH_3)_2\right]^{+}$ and $\left[Cu(NH_3)_4\right]^{2+}$

D. $\left[Al(NH_3)_2\right]^{+}$ and $\left[Ni(NH_3)_6\right]^{2+}$

Answer: C

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Passage 5

1. The number of water molecule(s) derectly bonded to the metal centre in $CuSO_{4.5}H_2O$ is

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Passage 6

1. The oxidation number of Mn in the product of alkaline oxidative fusion of MnO_2 is

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Passage 7

1. What happen when a solution of potassium chromate is treated with an excess of dil. Nitic acid?

A. $Cr_2O_7^{2-}$ and H_2O are formed

B. CrO_4^{2-} is reduced to $+3$ state of Cr

C. CrO_4^{2-} is oxidized to $+7$ state of Cr

D. Cr^{3+} and $Cr_2O_7^{2-}$ are formed

Answer: A

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Passage 8

1. Heating mixture of $Cu_2O$and Cu_2S will give

A. Cu_2SO_3

B. $CuO + CuS$

C. $Cu + SO_3$

D. $Cu + SO_2$

Answer: D

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Passage 9

1. The oxidation state of chrominium in the final product formed in the reaction between KI and acidified potassium dichromate soluttion is

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Passage 10

1. Calomel (H_2Cl_2) on reaction with ammonium hydroxide gives

A. HgO

B. Hg_2O

C. $NH_2 - Hg - Hg - Cl$

D. $HgNH_2Cl$

Answer: D

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Passage 11

1. Amount of oxalic acid present in a solution can be determined by its titration with $KMnO_4$ solution in the presence of H_2SO_4. The titration gives unsatisfactory result when carried out in the presence of HCl because HCl

A. gets oxidised by oxalic acid to chlorine

B. furnished H^+ ions in addition to those from oxalic acid

C. reduces permanganate to Mn^{2+}

D. Oxidation oxalic acid to carbon dioxide and water

Answer: C

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Passage 12

1. Iron exhibits $+2$ and $+3$ oxidation states. Which of the following statements about iron is incorrect?

A. Ferrous oxide is more basic in nature then the ferric oxide

B. Ferrous compounds are relatively more ionic than the corresponding ferric compounds

C. Ferrous compounds are less volatile than the corresponding ferric compounds

D. Ferrous compounds are more easily hydrolysed than the corresponding ferric com pounds.

Answer: D

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Passage 13

1. Four successive members of first row transition element are listed belw.

Which one of them is expected to have highest $E_{\frac{M^{3+}}{\left(M^{2+}\right)^{\ominus}}}$ value?

A. $Cr(Z=24)$

B. $Mn(Z=25)$

C. $Fe(Z=26)$

D. $Co(Z=27)$

Answer: D

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