CHEMISTRY

BOOKS - VK JAISWAL CHEMISTRY (HINGLISH)

d-BLOCK ELEMENTS

Level 1

1. $CrO_4^{2-} \underset{pH=Y}{\overset{pH=X}{\rightleftharpoons}} Cr_2O_7^{-2}$ The pH values of (X) and (Y) are respectively

A. $6, 8$

B. $6, 5$

C. $8, 6$

D. $7, 7$

Answer: A

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2. Manganese ions $\left(Mn^{2+}\right)$ can be oxidised by Persulphate ions $S_2O_8^{2-}$ according to the following half-equations,

$S_2O_8^{2-} + 2e^- \rightarrow 2SO_4^{2-}$

$Mn^{2+} + 4H_2O \rightarrow MnO_4^- + 4H_2O \rightarrow MnO_4^- + 8H^+ + 5e^-$

How many moles of $S_2O_8^{2-}$ are required to oxidise 1mole of Mn^{2+}?

A. 2.5

B. 2.0

C. 11.0

D. 0.4

Answer: A

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3. AgCl on fusion with sodium carbonate, gives :

A. Ag_2CO_3

B. Ag_2O

C. Ag

D. Ag_2C_2

Answer: C

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4. Write the chemical formula of rust.

A. Fe_2O_3

B. $FeO \cdot xH_2O$

C. $Fe_2O_3 \cdot xH_2O$

D. $Fe_3O_4 \cdot xH_2O$

Answer: C

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5. CrO_3 dissolves in aqueous NaOH to give:

A. $Cr_2O_7^{2-}$

B. CrO_4^{2-}

C. $Cr(OH)_3$

D. $Cr(OH)_2$

Answer: B

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6. Chemically philosopher of wool is

A. ZnO

B. BaO

C. $HgCl$

D. Hg_2Cl_2

Answer: A

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7. Boiling $CuCl_2$ with Cu in conc. HCl gives:

A. $CuCl$

B. $CuCl_2$

C. $H[CuCl_2]$

D. Cu_2Cl

Answer: A

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8. Thermal decomposition of zinc nitrate give:

A. Zn

B. ZnO

C. $Zn(NO_3)_2$

D. NO

Answer: B

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9. Malachite and azurite are used respectively are:

A. Blue and green pigment

B. Red and green pigment

C. Green and blue pigment

D. Green and red pigment

Answer: C

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10. Mercury containers are made of

A. Ag

B. Pb

C. Al

D. Fe

Answer: D

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11. The higher oxidation states of transition elements are found to be in the combination with A and B, which are:

A. F, O

B. O, N

C. O, S

D. F, Cl

Answer: A

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12. White vitriol is

A. ZnS

B. $ZnSO_4$

C. $ZnSO_4 \cdot 7H_2O$

D. $ZnCO_3$

Answer: C

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13. Among the following metals, the most dense is :

A. Osmium

B. Chromium

C. Platinum

D. Gold

Answer: A

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14. Silver nitrate is usually kept in coloured bottles because it is:

A. oxidised in air

B. decomposes in sunlight

C. explodes in sunlight

D. reacts with air in sunlight

Answer: B

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15. Which of the following is arranged in order of incresing melting point ?

A. $Zn < C\underline{t}Ni < Fe$

B. $Fe < Ni < C\underline{t}Zn$

C. $Ni < Fe < Zn < Cu$

D. $C\underline{t}Zn < Fe < Ni$

Answer: A

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16. Calomel is the name of

A. $HgCl_2$

B. Hg_2Cl_2

C. $HgCl_2 + Hg$

D. $Hg_2Cl_2 + Hg$

Answer: B

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17. The iron salt used in blue prints is :

A. FeC_2O_4

B. $Fe_2(C_2O_4)_3$

C. $K_4Fe(CN)_6$

D. $FeSO_4$

Answer: B

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18. Percentage of gold in 14 carat gold is :

A. 58

B. 80

C. 40

D. 14

Answer: A

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19. The maximum and minimum melting points of first and second transition series respectively are observed with

A. Cr and Zn

B. Cr and Hg

C. Cr and Cd

D. Mo and Cd

Answer: C

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20. ZnO shows yellow colour on heating due to

A. d-d transition

B. C-T spectra

C. Higher polarisation caused by Zn^{2+} ion

D. F-centres

Answer: D

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21. When steam is passed over red hot iron, the substance formed are:

A. $Fe_2O_3 + H_2$

B. $Fe_3O_4 + H_2$

C. $FeO + H_2$

D. $FeO + H_2 + O_2$

Answer: B

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22. Verdigris is

A. Basic copper acetate

B. Basic lead acetate

C. Basic lead

D. None

Answer: A

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23. The formula of corrosive sublimate is

A. $HgCl_2$

B. Hg_2Cl_2

C. Hg_2Cl

D. Hg_2Cl_3

Answer: A

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

A. I_2

B. IO_3^-

C. IO^-

D. IO_4^-

Answer: B

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25. Which of the following is the correct formula for a compound of scandium and oxygne?

A. Sc_2O

B. ScO

C. Sc_3O_2

D. Sc_2O_3

Answer: D

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26. Mercury on heating with aqua regia gives

A. $Hg(NO_3)_2$

B. $HgCl_2$

C. $Hg(NO_2)_2$

D. Hg_2Cl_2

Answer: B

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27. Chloroplatinic acid is

A. monobasic

B. dibasic

C. tribasic

D. tetrabasic

Answer: B

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28. Which of the following statements is incorrect?

A. Mercurous ion exists as Hg^{+}

B. Mercurous ion is diamagnetic and exists as dimer Hg_2^{2+}

C. Mercurous ion is colourless

D. There is a metallic bond between two Hg^{+} ions

Answer: A

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29. Iron is rendered passive by treatment with

A. dil.H_2SO_4

B. dil. HCl

C. conc.HNO_3

D. conc.H_2SO_4

Answer: C

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30. $Na_2CO_3 + Fe_2O_3 \rightarrow A + CO_2$, what is A in the reaction ?

A. $NaFeO_2$

B. Na_2FeO_3

C. Fe_3O_4

D. Na_2FeO_4

Answer: A

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31. Ferrous sulphate on heating gives:

A. SO_2 and SO_3

B. SO_2 Only

C. SO_3 Only

D. H_2S Only

Answer: A

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32. Photographic films or plates have ..... as an essential ingredient.

A. Silver Oxide

B. Silver Bromide

C. Silver Thiosulphate

D. Silver Nitrate

Answer: B

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33. In comparison of ferrous salts, ferric salts are:

A. more stable

B. less stable

C. equally stable

D. None of these

Answer: A

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34. Chrome yellow is chemically known as:

A. lead chromate

B. lead sulphate

C. lead iodide

D. basic lead acetate

Answer: A

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35. The property, which is not characteristic of transition metals:

A. variable oxidation states

B. tendency to form complexes

C. formation of coloured compounds

D. None of these

Answer: D

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36. Iron is protected by coating it with a thin layer of:

A. Cu

B. Zn

C. Pb

D. Mg

Answer: B

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37. An oxide of copper which is red in colour has the formula:

A. CuO

B. Cu_2O

C. CuO_2

D. Cu_2O_2

Answer: B

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38. In a transition series, as the atomic number increases, paramagnetism

A. increase gradually

B. decrease gradually

C. first increase to a maximum and then decrease

D. first decrease to a minimum and then increase

Answer: C

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39. The formula of azurite is :

A. $CuCO_3 \cdot Cu(OH)_2$

B. $2CuCO_3 \cdot Cu(OH)_2$

C. $CuCO_3 \cdot 2Cu(OH)_2$

D. $CuCO_4 \cdot Cu(OH)_2$

Answer: C

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40. Oxide of metal cation which is not amphoteric ?

A. Al^{3+}

B. Cr^{3+}

C. Fe^{3+}

D. Zn^{2+}

Answer: C

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41. The most abundant transition metal in earth crust is :

A. Zn

B. Fe

C. Hg

D. Au

Answer: B

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42. $CuSO_4$ solution + lime is called:

A. Luca's reagent

B. Befoed's reagent

C. Fihling solution A

D. Bordeaux mixture

Answer: D

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43. Preparation of looking mirrors involves the use of :

A. red lead

B. ammonical silver nitrate

C. ammonical $AgNO_3$+red lead

D. ammonical $AgNO_3$+red lead+HCHO

Answer: D

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44. When ammonia is added to cupric salt solution, the deep blue colour is observed it is due to the formation of:

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

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

C. $\left[Cu(H_2O)_2(NH_3)_2\right]^{2+}$

D. $\left[Cu(H_2O)_4\right]^{2-}$

Answer: B

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45. Philosopher's wool when heated with BaO at $100^{\circ}C$ gives the compounds:

A. $BaCdO_2$

B. $Ba + ZnO_2$

C. $BaO_2 + Zn$

D. $BaZnO_2$

Answer: D

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46. The electron which take part in order to exhibit variable oxidation states by transition metals are

A. ns only

B. (n-1)d only

C. ns and (n-1)d only but not np

D. (n-1)d and np only but not ns

Answer: C

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

A. $ZnCl_2$

B. $Zn(OH)_2$

C. ZnO

D. ZnH_2

Answer: B::C

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48. 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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49. Iron is rendered passive by treatment with

A. H_2SO_4(dil)

B. H_2PO_4

C. conc.HNO_3

D. HCl

Answer: C

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50. 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^- catalyst the reaction

Answer: A

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51. Gold dissolves in a aqua-regia forming:

A. Auric chloride

B. Aurous chloride

C. Chloroauric acid

D. Aurous nitrate

Answer: C

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52. The solubility of silver bromide in hypo solution due to the formation of

A. Ag_2SO_3

B. $Ag_2S_2O_3$

C. $[Ag(S_2O_3)]^-$

D. $[Ag(S_2O_3)]^{3-}$

Answer: D

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53. Metal used for making joints in jewellery is

A. Zn

B. Cu

C. Ag

D. Cd

Answer: D

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54. Zn and Cd metals do not show varible valency because:

A. They have only two electrons in the outmost subshells

B. Their d-subshells are completely filled

C. Their d-subshells are partially filled

D. They are relatively soft metals

Answer: B

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55. Zn and Cd metals do not show varible valency because:

A. They have only two electrons in the outmost subshells

B. Their d-subshells are completely filled

C. Their d-subshells are partially filled

D. They are relatively soft metals

Answer: B

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56. CrO_4^{2-} (yellow) changes to $Cr_2O_7^{2-}$ (orange) in pH=x and vice-versa in pH=y. Hence, x and y are:

A. $6, 8$

B. $6, 5$

C. $8, 6$

D. $7, 7$

Answer: A

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57. Manganese ions $\left(Mn^{2+}\right)$ can be oxidised by Persulphate ions $S_2O_8^{2-}$ according to the following half-equations,

$S_2O_8^{2-} + 2e^- \rightarrow 2SO_4^{2-}$

$Mn^{2+} + 4H_2O \rightarrow MnO_4^- + 4H_2O \rightarrow MnO_4^- + 8H^+ + 5e^-$

How many moles of $S_2O_8^{2-}$ are required to oxidise 1mole of Mn^{2+}?

A. 2.5

B. 2.0

C. 11.0

D. 0.4

Answer: A

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58. AgCl on fusion with Na_2CO_3 forms:

A. Ag_2CO_3

B. Ag_2O

C. Ag

D. Ag_2C_2

Answer: C

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59. Formula of Rust is :

A. Fe_2O_3

B. $FeO \cdot xH_2O$

C. $Fe_2O_3 \cdot xH_2O$

D. $Fe_3O_4 \cdot xH_2O$

Answer: C

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60. CrO_4 dissolves in aqueous NaOH to give :

A. $Cr_2O_7^{2-}$

B. CrO_4^{2-}

C. $Cr(OH)_3$

D. $Cr(OH)_2$

Answer: B

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61. Chemically philosopher of wool is :

A. ZnO

B. BaO

C. $HgCl$

D. Hg_2Cl_2

Answer: A

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62. Boiling $CuCl_2$ with Cu in conc. HCl gives:

A. $CuCl$

B. $CuCl_2$

C. $H[CuCl_2]$

D. Cu_2Cl

Answer: A

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63. Thermal decomposition of zinc nitrate give:

A. Zn

B. ZnO

C. $Zn(NO_3)_2$

D. NO

Answer: B

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64. Malachite and azurite are used respectively are:

A. Blue and green pigment

B. Red and green pigment

C. Green and blue pigment

D. Green and red pigment

Answer: C

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65. Mercury is transported in the containers made of :

A. Ag

B. Pb

C. Al

D. Fe

Answer: D

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66. The higher oxidation states of transition elements are found to be in the combination with A and B which are :

A. F, O

B. O, N

C. O, S

D. F, Cl

Answer: A

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67. White vitriol is

A. ZnS

B. $ZnSO_4$

C. $ZnSO_4 \cdot 7H_2O$

D. $ZnCO_3$

Answer: C

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68. Among the following metals, the most dense is :

A. Osmium

B. Chromium

C. Platinum

D. Gold

Answer: A

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69. Silver nitrate is usually kept in coloured bottles because it is:

A. oxidised in air

B. decomposes in sunlight

C. explodes in sunlight

D. reacts with air in sunlight

Answer: B

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70. Which of the following is arranged in order of increasing melting point?

A. $Zn < C\underline{t}Ni < Fe$

B. $Fe < Ni < C\underline{t}Zn$

C. $Ni < Fe < Zn < Cu$

D. $C\underline{t}Zn < Fe < Ni$

Answer: A

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71. Calomel is the name of :

A. $HgCl_2$

B. Hg_2Cl_2

C. $HgCl_2 + Hg$

D. $Hg_2Cl_2 + Hg$

Answer: B

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72. The iron salt used in blue prints is :

A. FeC_2O_4

B. $Fe_2(C_2O_4)_3$

C. $K_4Fe(CN)_6$

D. $FeSO_4$

Answer: B

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73. Percentage of gold in 14 carat gold is :

A. 58

B. 80

C. 40

D. 14

Answer: A

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74. The maximum and minimum melting points of first and second transition series respectively are observed with

A. Cr and Zn

B. Cr and Hg

C. Cr and Cd

D. Mo and Cd

Answer: C

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75. ZnO shows yellow colour on heating due to

A. d-d transition

B. C-T spectra

C. Higher polarisation caused by Zn^{2+} ion

D. F-centres

Answer: D

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76. When steam is passed over red hot iron, the substance formed are:

A. $Fe_2O_3 + H_2$

B. $Fe_3O_4 + H_2$

C. $FeO + H_2$

D. $FeO + H_2 + O_2$

Answer: B

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77. Verdigris is:

A. Basic copper acetate

B. Basic lead acetate

C. Basic lead

D. None

Answer: A

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78. Corrosive sublimate is :

A. $HgCl_2$

B. Hg_2Cl_2

C. Hg_2Cl

D. Hg_2Cl_3

Answer: A

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

A. I_2

B. IO_3^-

C. IO^-

D. IO_4^-

Answer: B

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80. Which of the following is the correct formula for a compound of scandium and oxygne?

A. Sc_2O

B. ScO

C. Sc_3O_2

D. Sc_2O_3

Answer: D

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81. Mercury on heating with aqua-regia gives:

A. $Hg(NO_3)_2$

B. $HgCl_2$

C. $Hg(NO_2)_2$

D. Hg_2Cl_2

Answer: B

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82. Chloroplatinic acid is:

A. monobasic

B. dibasic

C. tribasic

D. tetrabasic

Answer: B

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83. Which of the following statements is incorrect?

A. Mercurous ion exists as Hg^{+}

B. Mercurous ion is diamagnetic and exists as dimer Hg_2^{2-}

C. Mercurous ion is colourless

D. There is a metallic bond between two Hg^+ ions

Answer: A

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84. Fe is made passive by :

A. dil.H_2SO_4

B. dil. HCl

C. conc.HNO_3

D. conc.H_2SO_4

Answer: C

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85. $Na_2CO_3 + Fe_2O_3 \xrightarrow{\Delta} A + CO_2$ what is A in the reaction?

A. $NaFeO_2$

B. Na_2FeO_3

C. Fe_3O_4

D. Na_2FeO_4

Answer: A

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86. Ferrous sulphate on heating gives:

A. SO_2 and SO_3

B. SO_2 Only

C. SO_3 Only

D. H_2S Only

Answer: A

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87. Photographic films or plates have ..... as an essential ingredient.

A. Silver Oxide

B. Silver Bromide

C. Silver Thiosulphate

D. Silver Nitrate

Answer: B

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88. In comparison of ferrous salts, ferric salts are:

A. more stable

B. less stable

C. equally stable

D. None of these

Answer: A

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89. Chrome yellow is chemically known as:

A. lead chromate

B. lead sulphate

C. lead iodide

D. basic lead acetate

Answer: A

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90. The property, which is not characteristic of transition metals:

A. variable oxidation states

B. tendency to form complexes

C. formation of coloured compounds

D. None of these

Answer: D

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91. Iron is protected by coating it with a thin layer of:

A. Cu

B. Zn

C. Pb

D. Mg

Answer: B

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92. An oxide of copper which is red in colour has the formula:

A. CuO

B. Cu_2O

C. CuO_2

D. Cu_2O_2

Answer: B

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93. In a transition series, as the atomic number increase paramagnetism:

A. increase gradually

B. decrease gradually

C. first increase to a maximum and then decrease

D. first decrease to a minimum and then increase

Answer: C

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94. The formula of azurite is:

A. $CuCO_3 \cdot Cu(OH)_2$

B. $2CuCO_3 \cdot Cu(OH)_2$

C. $CuCO_3 \cdot 2Cu(OH)_2$

D. $CuCO_4 \cdot Cu(OH)_2$

Answer: C

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95. Oxide of metal cation which is not amphoteric?

A. Al^{3+}

B. Cr^{3+}

C. Fe^{3+}

D. Zn^{2+}

Answer: C

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96. The most abundant transition metal in earth crust is :

A. Zn

B. Fe

C. Hg

D. Au

Answer: B

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97. $CuSO_4$ solution +lime is called:

A. Luca's reagent

B. Befoed's reagent

C. Fihling solution A

D. Bordeaux mixture

Answer: D

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98. Preparation of looking mirrors involves the use of :

A. red lead

B. ammonical silver nitrate

C. ammonical $AgNO_3$+red lead

D. ammonical $AgNO_3$+red lead+HCHO

Answer: D

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99. When ammonia is added to cupric salt solution, the deep blue colour is observed it is due to the formation of:

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

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

C. $\left[Cu(H_2O)_2(NH_3)_2\right]^{2+}$

D. $\left[Cu(H_2O)_4\right]^{2-}$

Answer: B

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100. Philosopher's wool when heated with BaO at $100^{\circ}C$ gives the compounds:

A. $BaCdO_2$

B. $Ba + ZnO_2$

C. $BaO_2 + Zn$

D. $BaZnO_2$

Answer: D

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101. The electron which take part in order to exhibit variable oxidation states by transition metals are

A. ns only

B. (n-1)d only

C. ns and (n-1)d only but not np

D. (n-1)d and np only but not ns

Answer: C

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

A. $ZnCl_2$

B. $Zn(OH)_2$

C. ZnO

D. ZnH_2

Answer: B::C

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103. 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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104. Iron is rendered passive by treatment with:

A. H_2SO_4(dil)

B. H_2PO_4

C. conc.HNO_3

D. HCl

Answer: C

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105. When $KMnO_4$ solution is added to hot oxalic acid solution, the decolorisation 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^- catalyst the reaction

Answer: A

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106. Gold dissolves in a aqua-regia forming:

A. Auric chloride

B. Aurous chloride

C. Chloroauric acid

D. Aurous nitrate

Answer: C

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107. The solubility of silver bromide in hypo solution is due to the formation of:

A. Ag_2SO_3

B. $Ag_2S_2O_3$

C. $[Ag(S_2O_3)]^-$

D. $[Ag(S_2O_3)]^{3-}$

Answer: D

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108. Metal used for making joints in jewellery is:

A. Zn

B. Cu

C. Ag

D. Cd

Answer: D

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109. Zn and Cd metals do not show variable valency because:

A. They have only two electrons in the outmost subshells

B. Their d-subshells are completely filled

C. Their d-subshells are partially filled

D. They are relatively soft metals

Answer: B

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110. Zn and Cd metals do not show variable valency because:

A. They have only two electrons in the outmost subshells

B. Their d-subshells are completely filled

C. Their d-subshells are partially filled

D. They are relatively soft metals

Answer: B

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Level 2

1. Which of the following is known as Wilkinson's catalyst?

A. $[Ph_3P)_3RhCl]$

B. $TiCl_4 + (C_2H_5)_3Al$

C. $(C_2H_5)_4Pb$

D. $[PtCl_2(NH_3)_2]$

Answer: A

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2. Which of the following is not a consequence of the Lanthanoid contraction?

A. 5d series elements have a higher IE_1 than 3d or 4d series

B. Zr and Hf have a comparable size

C. Zr and Hf occurs together in the earth crust in their minerals

D. High density of the sixth period elements

Answer: D

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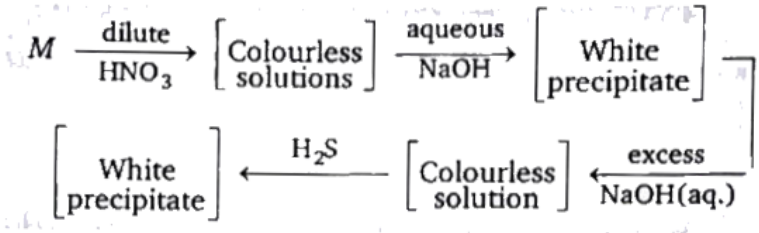
3. A metal M and its compound can give the following observable changes in a consequence of reactions



A. Mg

B. Pb

C. Zn

D. Sn

Answer: C

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4. Sodium thiosulphate is used to remove the unexposed AgBr from photographic films by forming a complex. In this complex of silver, the coordination number of silver is:

A. 2

B. 4

C. 6

D. 8

Answer: B

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5. Each of the following ion contains vanadium the +5 oxidation state except

A. VO_2^+

B. $V(OH)_4^+$

C. VO^{2+}

D. $[VO_3OH]^{2-}$

Answer: C

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6. Mercury (II) chloride solution on reaction with gaseous ammonia forms:

A. $Hg(NH_3)Cl \cdot HgO$

B. $Hg(NH_3)_2Cl_2$

C. $\left[Hg(NH_3)_2\right]Cl_2$

D. $\left[Hg(NH_3)_2\right]Cl$

Answer: A

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

B. to oxidise Fe^{2+} to ion (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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8. 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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9. The false statement about iron (III) hydroxide is that:

A. it is weaker base than $Fe(OH)_2$

B. with concentrated KOH, it forms a complex $K_3[Fe(OH)_6]$

C. it gradually losses water and transfer into Fe_2O_3

D. it exhibits amphoteric properties with its predominating acidic nature

Answer: B::D

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

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

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

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

A. $W = Ag, X = N_2O, Y = AgNO_3, Z = Na_2\left[Ag(S_2O_3)_2\right]$

B. $W = Ag_2O, X = NO, Y = AgNO_3, Z = Na_3\left[Ag(S_2O_3)_2\right]$

C. $W = Ag, X = NO_2, Y = AgNO_3, Z = Na_3\left[Ag(S_2O_3)_2\right]$

D. $W = Ag_2O, X = N_2, Y = AgNO_3, Z = Na\left[Ag(S_2O_3)_2\right]$

Answer: C

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11. The oxidation state of copper changes when aqueous copper (II) ions react with:

(I)$NaOH(aq)$ (II)$Fe(s)$ (III)$KI(aq)$

A. I, II, III

B. II only

C. II, III

D. I only

Answer: C

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12. The aqueous solution of transition metal salt changes colour from pink to blue, when concentrated hydrochloric acid is added to it. The changes in colour is due to:

A. evolution of hydrogen that changes the oxidation state of the metal ion

B. change in the coordination number of the metal ion from 6 to 4 and formation of new species in solution

C. formation of a coordination complex of the metal ion with hydrochloric acid

D. protonation of the metal ion

Answer: B

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13. Limestone is present in the blast furnance production of iron in order to:

(I) provide a source of CaO

(II) remove some impurities

(III) supply CO_2

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

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14. Paramagnetism is not exhibited by

A. $CuSO_4 \cdot 5H_2O$

B. $CuCl_2 \cdot 5H_2O$

C. CuI

D. $NiSO_4 \cdot 4H_2O$

Answer: C

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15. Which of the comparison Zn, Cd, Hg is/are incorrect?

(I) $ZnCl_2$ is ionic whereas $CdCl_2$ and $HgCl_2$ is covalent

(II) Zn and Cd dissolves in dilute acid HCl liberating H_2 but Hg can not

(III) Zn and cd forming with ppt. of $Zn(OH)_2$ and $Cd(OH)_2$ but Hg forms coloured ppt. of $Hg(OH)_2$.

(IV) All form A_2^{2+} type ion

A. Only III

B. I, III, IV

C. I and IV

D. All of these

Answer: B

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16. The oxoanion in which the oxidation state of the central atom is same as its group number in the periodic table is:

A. SO_2^{2-}

B. VO_2^-

C. MnO_4^{2-}

D. $Cr_2O_7^{2-}$

Answer: D

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17. Which compound is formed when iron reacts with carbon?

A. FeC_2

B. Fe_3C

C. FeC_3

D. Fe_2C

Answer: B

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18. Which of the following compound can produce Riemann's green with $Co(NO_3)_2$ solution?

A. ZnO

B. $3Zn(OH)_2 \cdot ZnCO_3$

C. $ZnSO_4$

D. All of these

Answer: D

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19. Which of the following electronic configuration is associated with the highest stable oxidation state?

A. $[Ar]3d^14s^2$

B. $[Ar]3d^54s^1$

C. $[Ar]3d^54s^2$

D. $[Ar]3d^64s^2$

Answer: C

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20. A blood red colour is obtained when ferric chloride solution reacts with:

A. KCN

B. $KSCN$

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

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

Answer: B

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21. Metal-Metal bonding is more frequent in 4d or 5d series than in 3d series due to

A. their greater enthelpies of atomisation

B. the larg size of the orbitals which participates in the metal-metal bond formation

C. their ability to involve both ns and (n-1)d electrons in the bond formation

D. the comparable size of 4d and 5d series elements

Answer: A

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22. The maximum and minimum melting points of first and second transition series respectively are observed with

A. Cr and Zn

B. Cr and Cd

C. Cr and Hg

D. Mo and Cd

Answer: B

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23. If a aqueous solution of copper (II) sulphate is saturated with ammoina, the blue compound ----- crystallises on evaporation.

A. $\left[Cu(NH_3)_4\right]SO_4 \cdot H_2O$ (square planar)

B. $\left[Cu(NH_3)_4\right]SO_4$(Tetrahedral)

C. $\left[Cu(NH_3)_6\right]SO_4$ (Octahedral)

D. $\left[Cu(SO_2)(NH_3)_5\right]$(Octahedral)

Answer: A

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24. In the extraction of copper, metal is formed in the Bessemer converter due to reaction

A. $2Cu_2O \rightarrow 4Cu + O_2$

B. $2CuO + CuS \rightarrow 3Cu + SO_2$

C. $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$

D. $Fe + Cu_2O \rightarrow FeO + 2Cu$

Answer: C

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25. The compound in which nickel has the lower oxidation states is :

A. $Ni(CO)_4$

B. $(CH_3COO)_2Ni$

C. NiO

D. $NiCl_2(PPh_3)_2$

Answer: A

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26. A metal M which is not affected by strong acids like conc. HNO_3, *conc.* H_2SO_4 and conc. Solution of alkalies like $NaOH, KOH$ forms MCI_3 which finds use for toning in photography. The metal M is

A. Ag

B. Hg

C. Au

D. Cu

Answer: C

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27. Copper (II) irons gives reddish brown precipitate with potassium ferrocyanide. The formula of the percipitate is:

A. $Cu_4\left[fe(CN)_6\right.$

B. $Cu_2\left[Fe(CN)_6\right]$

C. $Cu_3\left[Fe(CN)_6\right]$

D. $Cu_3\left[Fe(CN)_6\right]_2$

Answer: B

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28. Which of the following electronic configruation would be associated with the highest magnetic moment

A. $[Ar]3d^8$

B. $[Ar]3d^3$

C. $[Ar]3d^6$

D. $[Ar]3d^7$

Answer: C

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29. The correct statement about iron includes

(I) the oxidation state of iorn is $+6$ in K_2FeO_4

(II) that the iron shows $+2$ oxidation state with 6 electron in the 3d orbitals

(III) the common oxidation state of iron is $+3$ with five unpaired electron in the 3d orbital

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: A

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30. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following are the characteristic properties of interstitial compounds?

I. They have high melting points in comparison to pure metals.

II. They are very hard.

III. They retain metallic conductivity.

IV. They are chemically very reactive.

A. I, II, III

B. I, III

C. II, IV

D. IV only

Answer: A

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31. Tc the element below Mn in the periodic table, would be expected to have high values for its :

(I) boiling point , (II) melting point

(III) density

A. I, II, III

B. I, II

C. II, IV

D. IV only

Answer: A

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32. All Zn(+II) compounds are white because:

A. Zn^{2+} has a d^{10} configuration and the d-subshell is full

B. Zn^{2+} shows d-d transition

C. Zn^{2+} has no electron in the 4s-subshell

D. Zn is not a transition element

Answer: A

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33. Identify the wrong statement regarding copper sulphate :

A. It reacts with KI to give I_2

B. It reacts with KCl 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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34. The transition metals exhibit higher enthalphies of atomisation due to :

A. their ability to show variable oxidation states

B. the presence of incompletely filled d-subshell

C. their ability to exist in the solid state with unpaired electrons

D. strong interatomic interaction arises because of having large number of unpaired electrons in their atoms

Answer: D

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35. Which of the following are correct about Zn,Cd,Hg

I) They exhibit enthalpy of atomisation as the d-subshell is full

II) Zn,Cd do not show variable oxidation states, Hg can show +1,+2 states

III) Compounds of Zn, Cd, Hg are paramagnetic

IV) They are soft metals

A. I, II, III

B. I, III

C. II, IV

D. IV only

Answer: C

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36. When mercury (II) chloride is treated with excess of stannous chloride, the products obtained are :

A. liquid Hg and $SnCl_4$

B. Hg_2Cl_2 and $SnCl_4$

C. Hg_2Cl_2 and $[SnCl_4]^{2-}$

D. liquid Hg and $[SnCl_4]^{2-}$

Answer: A

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37. Which of the following is NOT a characteristic of the transition elements in the series from scandium to zinc?

A. The formation of coloured cations

B. The presence of at least one unpaired electron in a d-orbital of a cation

C. The ability of form complex ions

D. The possession of an oxidation state of +I

Answer: A::D

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38. Spiegeleisen is an alloy of

A. $Cu + Zn + Ni$

B. $Ni + Cr$

C. $Mn + Fe + C$

D. $Fe + Cr + Ni$

Answer: C

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39. The treatment of zinc with very dilute nitric acid produces:

A. NO

B. N_2O

C. NO_2

D. NH_4^+

Answer: D

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40. Sodium chromate, Na_2CrO_4 is made commerically by :

A. heating mixture of Cr_2O_3 and Na_2CO_3

B. heating mixture of chromate ore and sodium carbonate in the presence of oxygen

C. heating sodium dichromate with sodium carbonate

D. reacting NaOH with chromic acid

Answer: B

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41. Anhydrous mercurous chloride can be prepared by:

A. the reduction of $HgCl_2$ with $SnCl_2$ solution

B. the reaction of $HgCl_2$ with Hg

C. the reaction of Hg with concentrated HCl

D.

Answer: B

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42. When aqueous NaOH is added to an aqueous solution of chromium (III) ions, a green blue precipitate is first formed which re - dissolves to give a green solution. The green colour is due to

A. $\left[Cr(H_2O)_6\right]^{3+}$

B. CrO_4^{2-}

C. $\left[Cr(OH)_4\right]^{-}$

D. $\left[Cr(OH)_3(H_2O)_3\right]$

Answer: C

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43. $HgCl_2$ is a covalent compound, sparingly soluble in water, the solubility increase by the addition of chloride ions due to:

A. common ion effect

B. formation of complex $\left[HgCl_4\right]^{2-}$

C. weakening of Hg-Cl bonds

D. strong ion-dipole forces

Answer: B

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44. Amongst $TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2$ and $NiCl_4^{2-}$, which are the colourless species ? (atomic number of Ti = 22 , Co = 27, Cu = 29, Ni = 28)

A. CoF_6^{3-} and $NiCl_4^{2-}$

B. TiF_6^{2-} and CoF_6^{3-}

C. Cu_2Cl_2 and $NiCl_4^{2-}$

D. TiF_6^{2-} and Cu_2Cl_2

Answer: D

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45. Which of the following complex ion has a magnetic moment same as $\left[Cr(H_2O)_6\right]^{3+}$?

A. $\left[Mn(H_2O)_6\right]^{4+}$

B. $\left[Mn(H_2O)_6\right]^{3+}$

C. $\left[Fe(H_2O)_6\right]^{3+}$

D. $\left[Cu(H_3N)_4\right]^{2+}$

Answer: A

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46. Silver nitrate solution is kept in brown bottles in laboratory because:

A. it reacts with ordinary bottles

B. brown bottles cut the passage of light through

C. brown bottles do not react with it

D. ordinary bottles catalyst its decomposition

Answer: B

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47. Copper is very slowly oxidised on the surface in moist air, giving a green coating of vergiris is :

A. Cu_2O

B. $CuCO_3$

C. $Cu(CH_3COO)_2 \cdot Cu(OH)_2$

D. $CuSO_4$

Answer: C

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48. $Fe(OH)_2$ is precipitated from Fe(II) solutions as a while solid turns dark green and then brown due to the formation of:

A. $Fe(OH)_2$ and $Fe(OH)_3$

B. Only $Fe(OH)_3$

C. $Fe_2O_3 \cdot (H_2O)_n$

D. $Fe_2O_3 \cdot 2H_2O$

Answer: C

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49. Pure O_2 instead of air is used to oxidise the pig iron because:

A. Molten metal took up small amount of nitrogen which makes the steel brittle

B. Air is not as efficient to oxidise all the impurities to their respective oxides

C. Air contains moisture and will precipitate iron as Fe_2O_3

D. Iron reacts with air to $FeCO_3$

Answer: A

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50. 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. FFTT

B. FTTT

C. TFTF

D. TFTT

Answer: B

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51. For $(A) + K_2CO_3 + air \xrightarrow{Heat} (B)$

$(B) + CI_2 \rightarrow (C)$pink

Which of the following is correct ?

A. X=black,MnO_2, Y=Blue, CrO_4, Z=$KMnO_4$

B. X=Green, Cr_2O_3, Y=Yellow, K_2CrO_4, Z=$K_2Cr_2O_7$

C. X=black, MnO_2, Y=green, K_2MnO_4, Z=$KMnO_4$

D. X=black, Bi_2O_3, Y=colourless, $KBiO_2$, Z=$KBiO_3$

Answer: C

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52. Sodium thiosulphate, $Na_2S_2O_3.5H_2O$ is used in photography to

A. Reduce the silver bromide to metallic silver

B. Convert the metallic silver to silver salt

C. Reduce undecomposed AgBr as soluble silver thiosulphate complex

D. Remove reduced silver

Answer: C

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53. The advantage(s) of using O_2 rather than air in the steel industry is(are)

(I) there is a faster conversion , so a given plant can produce more steel in a day.

(II) larger quantities can be handled

(III) it gives a pure product and the surface is free from nitrides

A. I only

B. II and III only

C. II only

D. I, II and III

Answer: D

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54. When $AgNO_3$ comes in contact with skin, it leaves a black stain. This is because of:

A. HNO_3 produced by hydrolysis of $AgNO_3$

B. $AgOH$ produced by hydrolysis of $AgNO_3$

C. Its reduction of silver

D. Its oxidation to silver oxide

Answer: C

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55. The aqueous solution of copper(II) sulphate is slowly hydrolysis forming basic copper sulphate whose chemical composition is:

A. $CuSO_4 \cdot Cu(OH)_2$

B. $CuSO_4 \cdot CuO$

C. $CuSO_4 \cdot Cu(OH)_2 \cdot CuO$

D. $\left[Cu(H_2O)_4\right]SO_4 \cdot H_2O$

Answer: A

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56. Passivity of iron is due to formation of:

A. Fe_2O_3

B. Fe_3O_4

C. $FeSO_4$

D. None of these

Answer: B

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57. Zinc carbonate is precipitated from zinc sulphate solution by the addition of:

A. Na_2CO_3

B. $CaCO_3$

C. $MgCO_3$

D. $NaHCO_3$

Answer: D

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58. Mark the correct statements:

A. Hg forms an amalgam with iron

B. Hg vapour is non-poisonous

C. Hg is mono atomic and monovalent in mercurous compound

D. Oxysalts of mercury are thermally unstable

Answer: D

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59. Mercury is the only metal which is liquid at $0^{\circ} C$.this is due to

A. Very high ionisation energy and weak metallic bond

B. Low ionisation potential

C. High atomic weight

D. High vapour pressure

Answer: A

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60. 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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61. In context of the lanthanoids, which of the following statements is not correct?

A. Availability of 4f electrons results in the formation of compounds in +4 state of all the members of the series

B. There is a gradual decrease in the radii of the members with increasing atomic number in the series

C. All the members exhibit +3 oxidation state

D. Because of similar properties the separation of lanthanoids is not easy

Answer: A

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62. Properties common to the elements manganese, iron, cobalt, nickel nad copper include the ready formation by them all of

(I) coloured ions in aqueous solution

(II)oxides of nitrogen are formed on reaction with concentrated HNO_3

(III) chlorides of formula MCl_2 and MCl_3

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

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63. Which of the following process is not associated with steel making?

A. Bessemer process

B. Open-Hearth process

C. Kaldo process

D. Auto-oxidation

Answer: D

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64. Oxidation in absorbed by molten Ag, which is evolved on cooling and the silver particles are scattered, this phenomenon is known as:

A. silvering of mirror

B. spitting of silver

C. frosting of silver

D. hairing of silver

Answer: B

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65. Which of the following statements regarding copper salts is not true?

A. Copper(I) disproportionates to copper and copper (II) ion in aqueous solution

B. Copper(I) can be stabilised by the formation of insoluble complex compounds such as $CuCl_2^-$ and $Cu(CN)_2^-$

C. Copper(II) oxide is red powder

D. The water of crystallization of copper sulphate is five

Answer: C::D

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66. Zinc(II) ion on reaction with NaOH first give a white precipitate which dissolves in excess of NaOH due to the formation of :

A. ZnO

B. $Zn(OH)_2$

C. $\left[Zn(OH)_4\right]^{2-}$

D. $\left[Zn(H_2O)_4\right]^{2-}$

Answer: C

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67. The conversion of pig iron to steel frequently requires the addition of: (I) oxygen or iron oxide (II) transition elements (III)inner transition elements (IV)silica

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

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68. Dilute nitric acid on reaction with silver liberates:

A. NO gas

B. NO_2 gas

C. N_2 gas

D. O_2 gas

Answer: A

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69. Which of the following double salt does not exists?

A. $(NH_4)_2SO_4 \cdot CuSO_4 \cdot 6H_2O$

B. $(NH_4)_2SO_4 \cdot FeSO_4 \cdot 6H_2O$

C. $(NH_4)_2SO_4 \cdot ZmSO_4 \cdot 6H_2O$

D. $(NH_4)_2SO_4 \cdot NiSO_4 \cdot 6H_2O$

Answer: A

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70. When steam is passed over red hot iron, the substance formed are:

A. $Fe_2O_3 + H_2$

B. $H_2 + FeO$

C. $Fe_3O_4 + H_2$

D. $Fe_3O_4 + H_2$

Answer: C

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

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

A. III only

B. I, II, III

C. I, II

D. I only

Answer: C

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72. In the extraction of silver by Mac-arther cyanide process, a small of KNO_3 is also added as a flux. The function of KNO_3 is:

A. to oxidise Ag in the native form to Ag^+

B. to oxidise lead and zinc impurities

C. to form a complec with Ag^+ which is then reduced to metallic silver by using zinc

D. to oxidise the sulphur in the argentite ore to SO_2 which escapes from the reaction

Answer: B

View Text Solution

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

Whichf 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-voilet coloured compound which decomposes rapidly in aqueous solution into Cr^{3+} and dioxygen

C. Saturated solution of [Y] gives bright orange compound, chromic anhydride, with concentrated H_2SO_4

D. All of these

Answer: D

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74. $CuSO_4(aq) \xrightarrow{H_2S(\uparrow)} M(\downarrow) \xrightarrow[KCn]{\text{Excess}} N + O$

Then final products N and O are respectively.

A. $\left[Cu(CN)_4\right]^{3-}, (CN)_2$

B. $CuCN, (CN)_2$

C. $\left[Cu(CN)_4\right]^{2-}, (CN)_2$

D. $Cu(CN)_2, K_2S$

Answer: A

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75. Consider the following transformation :

$$2CuX_2 \xrightarrow{\text{Room temperature}} 2CuX + X_2(\uparrow)$$

Then X^- can be:

A. F^-, Br^-

B. Cl^-, Br^-

C. CN^-, I^-

D. Cl^-, F^-

Answer: C

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76. Acidified permanganate solution does not oxidise:

A. $C_2O_4^{2-}$ (aq.)

B. NO_3^- (aq.)

C. S^{2-} (aq.)

D. F^- (aq.)

Answer: C::D

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77. Which of the following salt on heating with solid $K_2Cr_2O_7$ and Conc. H_2SO_4 , orange red vapours are evolved which turn NaOH solution yellow.

A. $NaBr$

B. $NaCl$

C. $NaNO_3$

D. NaI

Answer: B

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78. Which of the following is called Wilkinson's catalyst?

A. $[Ph_3P)_3RhCl]$

B. $TiCl_4 + (C_2H_5)_3Al$

C. $(C_2H_5)_4Pb$

D. $[PtCl_2(NH_3)_2]$

Answer: A

View Text Solution

79. Which of the following is not a consequence of the Lanthanoid contraction?

A. 5d series elements have a higher IE_1 than 3d or 4d series

B. Zr and Hf have a comparable size

C. Zr and Hf occurs together in the earth crust in their minerals

D. High density of the sixth period elements

Answer: D

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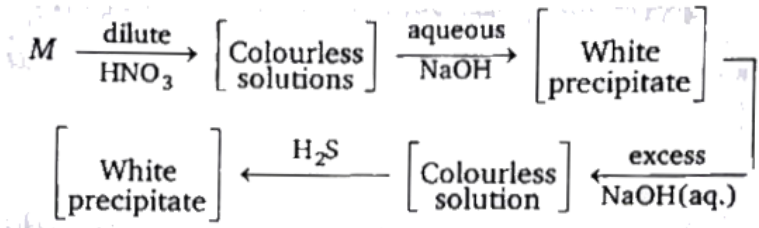
80. A metal M and its compound can give the following observable changes in a consequence of reactions



A. Mg

B. Pb

C. Zn

D. Sn

Answer: C

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81. Sodium thiosulphate is used to remove the unexposed AgBr from photographic films by forming a complex. In this complex of silver, the coordination number of silver is:

A. 2

B. 4

C. 6

D. 8

Answer: B

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82. Each of the following ion contains vanadium the +V oxidation state except:

A. VO_2^+

B. $V(OH)_4^+$

C. VO^{2+}

D. $[VO_3OH]^{2-}$

Answer: C

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83. Mercury (II) chloride solution on reaction with gaseous ammonia forms:

A. $Hg(NH_3)Cl \cdot HgO$

B. $Hg(NH_3)_2Cl_2$

C. $\left[Hg(NH_3)_2\right]Cl_2$

D. $\left[Hg(NH_3)_2\right]Cl$

Answer: A

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

B. to oxidise Fe^{2+} to ion (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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85. Which two sets of reactants best represent the amphoteric character of $Zn(OH)_2$?

Set1: $Zn(OH)_2(s)$ and $OH^-(aq)$

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

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

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

A. 1 and 2

B. 1 and 3

C. 2 and 4

D. 3 and 4

Answer: B

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86. The false statement about iron (III) hydroxide is that:

A. it is weaker base than $Fe(OH)_2$

B. with concentrated KOH, it forms a complex $K_3\left[Fe(OH)_6\right]$

C. it gradually losses water and transfer into Fe_2O_3

D. it exhibits amphoteric properties with its predominating acidic nature

Answer: B::D

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

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

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

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

Identify (W) to (Z).

A. $W = Ag, X = N_2O, Y = AgNO_3, Z = Na_2\left[Ag(S_2O_3)_2\right]$

B. $W = Ag_2O, X = NO, Y = AgNO_3, Z = Na_3\left[Ag(S_2O_3)_2\right]$

C. $W = Ag, X = NO_2, Y = AgNO_3, Z = Na_3\left[Ag(S_2O_3)_2\right]$

D. $W = Ag_2O, X = N_2, Y = AgNO_3, Z = Na\left[Ag(S_2O_3)_2\right]$

Answer: C

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88. The oxidation state of copper changes when aqueous copper (II) ions react with:

(I)$NaOH(aq)$ (II)$Fe(s)$ (III)$KI(aq)$

A. I, II, III

B. II only

C. II, III

D. I only

Answer: C

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89. The aqueous solution of transition metal salt changes colour from pink to blue, when concentrated hydrochloric acid is added to it. The changes in colour is due to:

A. evolution of hydrogen that changes the oxidation state of the metal ion

B. change in the coordination number of the metal ion from 6 to 4 and formation of new species in solution

C. formation of a coordination complex of the metal ion with hydrochloric acid

D. protonation of the metal ion

Answer: B

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90. Limestone is present in the blast furnance production of iron in order to:

(I) provide a source of CaO

(II) remove some impurities

(III) supply CO_2

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

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91. Paramagnesim is not exhibited by:

A. $CuSO_4 \cdot 5H_2O$

B. $CuCl_2 \cdot 5H_2O$

C. CuI

D. $NiSO_4 \cdot 4H_2O$

Answer: C

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92. Which of the comparison Zn, Cd, Hg is/are incorrect?

(I) $ZnCl_2$ is ionic whereas $CdCl_2$ and $HgCl_2$ is covalent

(II) Zn and Cd dissolves in dilute acid HCl liberating H_2 but Hg can not

(III) Zn and cd forming with ppt. of $Zn(OH)_2$ and $Cd(OH)_2$ but Hg forms coloured ppt. of $Hg(OH)_2$.

(IV) All form A_2^{2+} type ion

A. Only III

B. I, III, IV

C. I and III

D. All of these

Answer: B

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93. The oxoanion in which the oxidation state of the central atom is same as its group number in the periodic table is:

A. SO_2^{2-}

B. VO_2^-

C. MnO_4^{2-}

D. $Cr_2O_7^{2-}$

Answer: D

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94. Which compound is formed when iron reacts with carbon?

A. FeC_2

B. Fe_3C

C. FeC_3

D. Fe_2C

Answer: B

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95. Which of the following compound can produce Riemann's green with $Co(NO_3)_2$ solution?

A. ZnO

B. $3Zn(OH)_2 \cdot ZnCO_3$

C. $ZnSO_4$

D. All of these

Answer: D

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96. Which of the following electronic configuration is associated with the highest stable oxidation state?

A. $[Ar]3d^14s^2$

B. $[Ar]3d^54s^1$

C. $[Ar]3d^5 4s^2$

D. $[Ar]3d^6 4s^2$

Answer: C

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97. A blood red colour is obtained when ferric chloride solution reacts with:

A. KCN

B. $KSCN$

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

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

Answer: B

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98. Metal-Metal bonding is more frequent in 4d or 5d series than in 3d series due to

A. their greater enthelpies of atomisation

B. the larg size of the orbitals which participates in the metal-metal bond formation

C. their ability to involve both ns and (n-1)d electrons in the bond formation

D. the comparable size of 4d and 5d series elements

Answer: A

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99. The maximum and minimum melting points of first and second transition series respectively are observed with

A. Cr and Zn

B. Cr and Cd

C. Cr and Hg

D. Mo and Cd

Answer: B

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100. When an aqueous solution of copper (II) sulphate is saturated with ammonia, the blue compound crystallises on evaporation. The formula of this blue compound is:

A. $\left[Cu(NH_3)_4\right]SO_4 \cdot H_2O$ (square planar)

B. $\left[Cu(NH_3)_4\right]SO_4$(Tetrahedral)

C. $\left[Cu(NH_3)_6\right]SO_4$ (Octahedral)

D. $\left[Cu(SO_2)(NH_3)_5\right]$(Octahedral)

Answer: A

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101. In the extraction of copper, metal is formed in the Bessemer converter due to reaction

A. $2Cu_2O \rightarrow 4Cu + O_2$

B. $2CuO + CuS \rightarrow 3Cu + SO_2$

C. $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$

D. $Fe + Cu_2O \rightarrow FeO + 2Cu$

Answer: C

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102. The compound in which nickel has the lower oxidation states is :

A. $Ni(CO)_4$

B. $(CH_3COO)_2Ni$

C. NiO

D. $NiCl_2(PPh_3)_2$

Answer: A

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103. A metal M which is not affected by strong acids like conc. HNO_3, $conc.\ H_2SO_4$ and conc. Solution of alkalies like $NaOH$, KOH forms MCI_3 which finds use for toning in photography. The metal M is

A. Ag

B. Hg

C. Au

D. Cu

Answer: C

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104. Copper (II) irons gives reddish brown precipitate with potassium ferrocyanide. The formula of the percipitate is:

A. $Cu_4[fe(CN)_6$

B. $Cu_2[Fe(CN)_6]$

C. $Cu_3[Fe(CN)_6]$

D. $Cu_3[Fe(CN)_6]_2$

Answer: B

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105. Which of the following electronic configruation would be associated with the highest magnetic moment

A. $[Ar]3d^8$

B. $[Ar]3d^3$

C. $[Ar]3d^6$

D. $[Ar]3d^7$

Answer: C

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106. The correct statement about iron includes

(I) the oxidation state of iorn is $+6$ in K_2FeO_4

(II) that the iron shows $+2$ oxidation state with 6 electron in the 3d orbitals

(III) the common oxidation state of iron is $+3$ with five unpaired electron in the 3d orbital

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: A

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107. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following are the characteristic properties of interstitial compounds?

I. They have high melting points in comparison to pure metals.

II. They are very hard.

III. They retain metallic conductivity.

IV. They are chemically very reactive.

A. I, II, III

B. I, III

C. II, IV

D. IV only

Answer: A

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108. Tc the element below Mn in the periodic table, would be expected to have high values for its :

(I) boiling point , (II) melting point

(III) density

A. I, II, III

B. I, II

C. II, IV

D. IV only

Answer: A

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109. All Zn(+II) compounds are white because:

A. Zn^{2+} has a d^{10} configuration and the d-subshell is full

B. Zn^{2+} shows d-d transition

C. Zn^{2+} has no electron in the 4s-subshell

D. Zn is not a transition element

Answer: A

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110. Identify the wrong statement regarding copper sulphate :

A. It reacts with KI to give I_2

B. It reacts with KCl 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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111. The transition metals exhibit higher enthalphies of atomisation due to :

A. their ability to show variable oxidation states

B. the presence of incompletely filled d-subshell

C. their ability to exist in the solid state with unpaired electrons

D. strong interatomic interaction arises because of having large number of unpaired electrons in their atoms

Answer: D

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112. Which of the following are correct about Zn,Cd,Hg

I) They exhibit enthalpy of atomisation as the d-subshell is full

II) Zn,Cd do not show variable oxidation states, Hg can show +1,+2 states

III) Compounds of Zn, Cd, Hg are paramagnetic

IV) They are soft metals

A. I, II, III

B. I, III

C. II, IV

D. IV only

Answer: C

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113. When mercury (II) chloride is treated with excess of stannous chloride, the products obtained are :

A. liquid Hg and $SnCl_4$

B. Hg_2Cl_2 and $SnCl_4$

C. Hg_2Cl_2 and $[SnCl_4]^{2-}$

D. liquid Hg and $[SnCl_4]^{2-}$

Answer: A

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114. Which of the following is NOT a characteristic of the transition elements in the series from scandium to zinc?

A. The formation of coloured cations

B. The presence of at least one unpaired electron in a d-orbital of a cation

C. The ability of form complex ions

D. The possession of an oxidation state of +I

Answer: A::D

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115. Spiegeleisen is an alloy of

A. $Cu + Zn + Ni$

B. $Ni + Cr$

C. $Mn + Fe + C$

D. $Fe + Cr + Ni$

Answer: C

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116. The treatment of zinc with very dilute nitric acid produces:

A. NO

B. N_2O

C. NO_2

D. NH_4^+

Answer: D

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117. Sodium chromate, Na_2CrO_4 is made commerically by :

A. heating mixture of Cr_2O_3 and Na_2CO_3

B. heating mixture of chromate ore and sodium carbonate in the presence of oxygen

C. heating sodium dichromate with sodium carbonate

D. reacting NaOH with chromic acid

Answer: B

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118. Anhydrous mercurous chloride can be prepared by:

A. the reduction of $HgCl_2$ with $SnCl_2$ solution

B. the reaction of $HgCl_2$ with Hg

C. the reaction of Hg with concentrated HCl

D.

Answer: B

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119. When aqueous sodium hydroxide is added to an aqueous solution of chromium (III) ions, a green blue precipitate is first formed which re-dissolves to give a greeen solution. This green colour is due to :

A. $\left[Cr(H_2O)_6\right]^{3+}$

B. CrO_4^{2-}

C. $\left[Cr(OH)_4\right]^{-}$

D. $\left[Cr(OH)_3(H_2O)_3\right]$

Answer: C

View Text Solution

120. HgCl is a covalent compound, sparingly soluble in water, the solubility increase by the addition of chloride ions due to:

A. common ion effect

B. formation of complex $[HgCl_4]^{2-}$

C. weakening of Hg-Cl bonds

D. strong ion-dipole forces

Answer: B

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121. Amongst $TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2$ and $NiCl_4^{2-}$ the colourless species are:

A. CoF_6^{3-} and $NiCl_4^{2-}$

B. TiF_6^{2-} and CoF_6^{3-}

C. Cu_2Cl_2 and $NiCl_4^{2-}$

D. TiF_6^{2-} and Cu_2Cl_2

Answer: D

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122. Which of the following complex ion has a magnetic moment same as $\left[Cr(H_2O)_6\right]^{3+}$?

A. $\left[Mn(H_2O)_6\right]^{4+}$

B. $\left[Mn(H_2O)_6\right]^{3+}$

C. $\left[Fe(H_2O)_6\right]^{3+}$

D. $\left[Cu(H_3N)_4\right]^{2+}$

Answer: A

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123. Silver nitrate solution is kept in brown bottles in laboratory because:

A. it reacts with ordinary bottles

B. brown bottles cut the passage of light through

C. brown bottles do not react with it

D. ordinary bottles catalyst its decomposition

Answer: B

View Text Solution

124. Copper is very slowly oxidised on the surface in moist air, giving a green coating of vergiris is :

A. Cu_2O

B. $CuCO_3$

C. $Cu(CH_3COO)_2 \cdot Cu(OH)_2$

D. $CuSO_4$

Answer: C

View Text Solution

125. $Fe(OH)_2$ is precipitated from Fe(II) solutions as a while solid turns dark green and then brown due to the formation of:

A. $Fe(OH)_2$ and $Fe(OH)_3$

B. Only $Fe(OH)_3$

C. $Fe_2O_3 \cdot (H_2O)_n$

D. $Fe_2O_3 \cdot 2H_2O$

Answer: C

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126. Pure O_2 instead of air is used to oxidise the pig iron because:

A. Molten metal took up small amount of nitrogen which makes the steel brittle

B. Air is not as efficient to oxidise all the impurities to their respective oxides

C. Air contains moisture and will precipitate iron as Fe_2O_3

D. Iron reacts with air to $FeCO_3$

Answer: A

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127. Give the correct order of intitials T or F for following statements. Use T if statements is true and F if it is false.

(I)Sulphide ions reacts with $Na_2\left[Fe(CN)_5(NO)\right]$ to form a purple coloured compound $Na_2\left[Fe(CN)_5(NOS)\right]$. 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

(V) $LiAlH_4$ on hydrolysis will give H_2

A. FFTT

B. FTTT

C. TFTF

D. TFTT

Answer: B

View Text Solution

128. $(X) + K_2CO_3 + \text{Air} \xrightarrow{\text{heat}} (Y)$

$(Y) + Cl_2 \rightarrow (Z)$pink

Which of the following is correct?

A. X=black,MnO_2, Y=Blue, CrO_4, Z=$KMnO_4$

B. X=Green, Cr_2O_3, Y=Yellow, K_2CrO_4, Z=$K_2Cr_2O_7$

C. X=black, MnO_2, Y=green, K_2MnO_4, Z=$KMnO_4$

D. X=black, Bi_2O_3, Y=colourless, $KBiO_2$, Z=$KBiO_3$

Answer: C

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129. Sodium thiosulphate, $Na_2S_2O_3 \cdot 5H_2O$ is used in photography to:

A. Reduce the silver bromide to metallic silver

B. Convert the metallic silver to silver salt

C. Reduce undecomposed AgBr as soluble silver thiosulphate complex

D. Remove reduced silver

Answer: C

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130. The advantage(s) of using O_2 rather than air in the steel industry is(are)

(I) there is a faster conversion , so a given plant can produce more steel in a day.

(II) larger quantities can be handled

(III) it gives a pure product and the surface is free from nitrides

A. I only

B. II and III only

C. II only

D. I, II and III

Answer: D

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131. When $AgNO_3$ comes in contact with skin, it leaves a black stain. This is because of:

A. HNO_3 produced by hydrolysis of $AgNO_3$

B. $AgOH$ produced by hydrolysis of $AgNO_3$

C. Its reduction of silver

D. Its oxidation to silver oxide

Answer: C

View Text Solution

132. The aqueous solution of copper(II) sulphate is slowly hydrolysis forming basic copper sulphate whose chemical composition is:

A. $CuSO_4 \cdot Cu(OH)_2$

B. $CuSO_4 \cdot CuO$

C. $CuSO_4 \cdot Cu(OH)_2 \cdot CuO$

D. $\left[Cu(H_2O)_4\right]SO_4 \cdot H_2O$

Answer: A

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133. Passivity of iron is due to formation of:

A. Fe_2O_3

B. Fe_3O_4

C. $FeSO_4$

D. None of these

Answer: B

View Text Solution

134. Zinc carbonate is precipitated from zinc sulphate solution by the addition of:

A. Na_2CO_3

B. $CaCO_3$

C. $MgCO_3$

D. $NaHCO_3$

Answer: D

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135. Mark the correct statements:

A. Hg forms an amalgam with iron

B. Hg vapour is non-poisonous

C. Hg is mono atomic and monovalent in mercurous compound

D. Oxysalts of mercury are thermally unstable

Answer: D

View Text Solution

136. Mercury is the only metal which is liquid at 0° C. This is due to its:

A. Very high ionisation energy and weak metallic bond

B. Low ionisation potential

C. High atomic weight

D. High vapour pressure

Answer: A

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137. A white precipitate of AgCl dissolves in excess of :

(I)NH_3(aq) (II)$Na_2S_2O_3$ (III)NaCN

A. III only

B. I, II, III

C. I, II

D. I only

Answer: B

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138. In context of the lanthanoids, which of the following statement is not correct?

A. Availability of 4f electrons results in the formation of compounds in +4 state of all the members of the series

B. There is a gradual decrease in the radii of the members with increasing atomic number in the series

C. All the members exhibit +3 oxidation state

D. Because of similar properties the separation of lanthanoids is not easy

Answer: A

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139. Properties common to the elements manganese, iron, cobalt, nickel nad copper include the ready formation by them all of

(I) coloured ions in aqueous solution

(II)oxides of nitrogen are formed on reaction with concentrated HNO_3

(III) chlorides of formula MCl_2 and MCl_3

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

View Text Solution

140. Which of the following process is not associated with steel making?

A. Bessemer process

B. Open-Hearth process

C. Kaldo process

D. Auto-oxidation

Answer: D

View Text Solution

141. Oxidation in absorbed by molten Ag, which is evolved on cooling and the silver particles are scattered, this phenomenon is known as:

A. silvering of mirror

B. spitting of silver

C. frosting of silver

D. hairing of silver

Answer: B

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142. Which of the following statements regarding copper salts is not true?

A. Copper(I) disproportionates to copper and copper (II) ion in aqueous solution

B. Copper(I) can be stabilised by the formation of insoluble complex compounds such as $CuCl_2^-$ and $Cu(CN)_2^-$

C. Copper(II) oxide is red powder

D. The water of crystallization of copper sulphate is five

Answer: C::D

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143. Zinc(II) ion on reaction with NaOH first give a white precipitate which dissolves in excess of NaOH due to the formation of :

A. ZnO

B. $Zn(OH)_2$

C. $\left[Zn(OH)_4\right]^{2-}$

D. $\left[Zn(H_2O)_4\right]^{2-}$

Answer: C

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144. The conversion of pig iron to steel frequently requires the addition of:

(I) oxygen or iron oxide (II) transition elements (III)inner transition elements (IV)silica

A. I, II, III

B. I, II

C. II, III

D. I only

Answer: B

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145. Dilute nitric acid on reaction with silver liberates:

A. NO gas

B. NO_2 gas

C. N_2 gas

D. O_2 gas

Answer: A

View Text Solution

146. Which of the following double salt does not exists?

A. $(NH_4)_2SO_4 \cdot CuSO_4 \cdot 6H_2O$

B. $(NH_4)_2SO_4 \cdot FeSO_4 \cdot 6H_2O$

C. $(NH_4)_2SO_4 \cdot ZmSO_4 \cdot 6H_2O$

D. $(NH_4)_2SO_4 \cdot NiSO_4 \cdot 6H_2O$

Answer: A

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147. When steam is passed over red hot iron, the substance formed are:

A. $Fe_2O_3 + H_2$

B. $H_2 + FeO$

C. $Fe_3O_4 + H_2$

D. $Fe_3O_4 + H_2$

Answer: C

View Text Solution

148. The oxoanion which contains all equivalent $M - O$ bond is:

(I)Cr_4^{2-} (II)MnO_4^- (III)$Cr_2O_7^{2-}$

A. III only

B. I, II, III

C. I, II

D. I only

Answer: C

View Text Solution

149. In the extraction of silver by Mac-arther cyanide process, a small of KNO_3 is also added as a flux. The function of KNO_3 is:

A. to oxidise Ag in the native form to Ag^+

B. to oxidise lead and zinc impurities

C. to form a complec with Ag^+ which is then reduced to metallic silver by using zinc

D. to oxidise the sulphur in the argentite ore to SO_2 which escapes from the reaction

Answer: B

View Text Solution

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

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-voilet coloured compound which decomposes rapidly in aqueous solution into Cr^{3+} and dioxygen

C. Saturated solution of [Y] gives bright orange compound, chromic anhydride, with concentrated H_2SO_4

D. All of these

Answer: D

View Text Solution

151. $CuSO_4(aq) \xrightarrow{H_2S(\uparrow)} M(\downarrow) \xrightarrow[KCn]{\text{Excess}} N + O$

Then final products N and O are respectively.

A. $\left[Cu(CN)_4\right]^{3-}, (CN)_2$

B. $CuCN, (CN)_2$

C. $\left[Cu(CN)_4\right]^{2-}, (CN)_2$

D. $Cu(CN)_2, K_2S$

Answer: A

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152. Consider the following transformation :

$$2CuX_2 \xrightarrow{\text{Room temperature}} 2CuX + X_2(\uparrow)$$

Then X^- can be:

A. F^-, Br^-

B. Cl^-, Br^-

C. CN^-, I^-

D. Cl^-, F^-

Answer: C

View Text Solution

153. Acidified permanganate solution does not oxidise:

A. $C_2O_4^{2-}$ (aq.)

B. NO_3^- (aq.)

C. S^{2-} (aq.)

D. F^{-} (aq.)

Answer: C::D

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154. Which of the following soled salt on heating with solid $K_2Cr_2O_7$ and conc. H_2SO_4 orange red vapours are evolved which turn aquous NaOH solution yellow?

A. $NaBr$

B. $NaCl$

C. $NaNO_3$

D. NaI

Answer: B

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Level 3

1. In salts of polyatomic anion, as polarising power of cation increase, thermal stability of the salt decrease and decomposed species may further undergo redox reaction

Q. Which of the followinng species undergoes non-redox thermal decomposition reaction on heating?

A. $FeSO_4$

B. $SnSO_4$

C. $H_2C_2O_4$

D. Na_2HPO_4

Answer: D

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2. In salts of polyatomic anion, as polarising power of cation increase, thermal stability of the salt decrease and decomposed species may further undergo redox reaction

Q. Water soluble salt(x) was heated into three products A, B and C and B and C are two different paramagnetic gases. A is red in hot condition, then salt(x) is :

A. $Hg(NO_3)_2$

B. FeC_2O_4

C. $ZnSO_4$

D. $Pb(NO_3)_2$

Answer: D

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3. Light green (compound 'A') $\xrightarrow{\Delta}$ white $\text{Residue(B)} \underset{\text{Temp.}}{\overset{\text{high}}{C}} + D + E$

(i)'D' and 'E' are two acidic gas.

(ii) 'D' is passed through $HgCl_2$ solution to give yellow ppt.

(iii) 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

(iv) A is water soluble and addition of $HgCl_2$ in it, yellow ppt. is obtained but white ppt does not turn into grey on addition of excess solution of 'A'

Q. 'D' and 'E' are respectively.

A. SO_2 and SO_3

B. SO_3 and SO_2

C. SO_2 and CO_2

D. CO_2 and CO

Answer: B

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4.

$Lightgreen(Compound'A') \xrightarrow{\Delta} WhiteResidue'(B)' \xrightarrow[\text{Temp}]{\text{High}} C + D +$

$i)$ 'D' and 'E' are two acidic gases.

ii) 'D' is passed through $HgCl_2$ solution to give yellow pt.

$iii)$ 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

$iv)$ A is water soluble and addition of $HgCl_2$ 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 oxide

B. Basic mercury(II) sulphite

C. Basic mercury (II) sulphate

D. Mercuric iodine

Answer: C

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5.

$$Lightgreen(Compound\,'A') \xrightarrow{\Delta} White Residue\,'(B)\,' \xrightarrow[\text{Temp}]{\text{High}} C + D +$$

$i)$ 'D' and 'E' are two acidic gases.

ii) 'D' is passed through $HgCl_2$ solution to give yellow pt.

$iii)$ 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

$iv)$ A is water soluble and addition of $HgCl_2$ 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. dil.H_2SO_4

C. Conc.CH_3COOH

D. Boiled conc. HCl

Answer: D

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6.

$Lightgreen(Compound'A') \xrightarrow{\Delta} WhiteResidue'(B)' \xrightarrow[\text{Temp}]{\text{High}} C + D +$

$i)$ 'D' and 'E' are two acidic gases.

ii) 'D' is passed through $HgCl_2$ solution to give yellow pt.

$iii)$ 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

$iv)$ A is water soluble and addition of $HgCl_2$ 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. 0

B. 2

C. 7

D. 5

Answer: C

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7. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to

SO_3:

$$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$$

It is thought theta the actual oxidation process takes place in two stages.

In the first step, V^{5+} in the presence of oxide ions converts SO_2 to SO_3.

At the same time, V^{5+} is reduced to V^{4+}.

$$2V^{5+} + O^{2-} + SO_2 \rightarrow 2V^{4+} + SO_3$$

In the second step, V^{5+} is regenerated from V^{4+} by oxygen:

$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. Transition metals and their compounds catalyse reactions because:

A. They have completely filled s-subshell

B. They have a comparable size due to poor shielding of d-subshell

C. They introduce an entirely new reaction mechanism with a lower activation energy

D. They have variable oxidation states differ by two units

Answer: C

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8. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

$$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$$

It is thought thta the actual oxidation process takes place in two stages. In the first step, V^{5+} in the presence of oxide ions converts SO_2 to SO_3. At the same time, V^{5+} is reduced to V^{4+}.

$$2V^{5+} + O^{2-} + SO_2 \rightarrow 2V^{4+} + SO_3$$

In the second step, V^{5+} is regenerated from V^{4+} by oxygen:

$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. During the course of the reaction:

A. Catalyst undergoes changes in oxidation state

B. Catalyst increase the rate constant

C. Catalyst is regenerated in its original form when the reactants form the products

D. All are correct

Answer: D

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9. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

$$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$$

It is thought thta the actual oxidation process takes place in two stages. In the first step, V^{5+} in the presence of oxide ions converts SO_2 to SO_3. At the same time, V^{5+} is reduced to V^{4+}.

$$2V^{5+} + O^{2-} + SO_2 \rightarrow 2V^{4+} + SO_3$$

In the second step, V^{5+} is regenerated from V^{4+} by oxygen:

$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. Catalytic activity in transition metals depends on:

A. Their ability to exist in different oxidation states

B. The size of the metal atoms

C. The number of empty atomic orbitals available

D. None of these

Answer: A

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10. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

$$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$$

It is thought thta the actual oxidation process takes place in two stages.

In the first step, V^{5+} in the presence of oxide ions converts SO_2 to SO_3.

At the same time, V^{5+} is reduced to V^{4+}.

$$2V^{5+} + O^{2-} + SO_2 \rightarrow 2V^{4+} + SO_3$$

In the second step, V^{5+} is regenerated from V^{4+} by oxygen:

$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. Which of the following ion involved in the above process will show paramagnetism?

A. V^{5+}

B. V^{4+}

C. O^{2-}

D. VO_3^-

Answer: B

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11. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. In the laboratory, MnO_2 is made by:

A. heating Mn in O_2

B. oxidising Mn^{2+} in air

C. electrolytic oxidation of $MnSO_4$

D. precipitating MnO_2 from solution when performing titration of $KMnO_4$ in alkaline medium

Answer: D

Watch Video Solution

12. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. When MnO_2 is fused with KOH in the presence of air, the product formed is:

A. Purple colour $KMnO_4$

B. Green colour K_2MnO_4

C. Colourless MnO_4^-

D. None of these

Answer: B

Watch Video Solution

13. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. MnO_2 dissolves in concentrated HCl to form:

A. Mn^{4+} ion and Cl_2

B. Mn^{2+} ion and Cl_2

C. $[MnCl_4]^{2-}$ and Cl_2

D. only $[MnCl_4]^{2-}$

Answer: B

Watch Video Solution

14. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent,

and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. In which of the following species, the colour is due to charge transfer?

(I) $\left[Mn(OH)_4\right]^{2-}$ (II) MnO_4^{2-} (III) MnO_4 (IV) $KMnO_4$

A. I, II, III

B. II, IV

C. I, III

D. only IV

Answer: D

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15. 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

$K_4[Fe(CN)_6]$

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

Watch Video Solution

16. 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 $[Fe(H_2O)_6]^{2+}$ ion. $Fe(+II)$ compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4[Fe(CN)_6]$

$K_3[Fe(CN)_6]$ 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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17. 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

B. I, III

C. II, III

D. I only

Answer: A

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18. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.FeI_3 does not exist because:

A. of large size

B. Fe^{3+} oxidise I^- to I_2

C. of low lattice energy

D. iodine is not highly electronegative enough to oxidise Fe to Fe^{3+}

Answer: B

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19. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.Anhydrous $FeCl_3$ can be prepared by reaction of:

A. Fe with dry chlorine

B. Fe with dil.HCl in the presence of O_2

C. $Fe(OH)_3$ with conc. HCl

D. Fe_2O_3 with conc. HCl

Answer: A

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20. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.$FeCl_3$ solution added to $K_4\left[Fe(CN)_6\right]$ gives A while with $KSCN$ gives B. A and B respectively are:

A. $Fe_3\left[Fe(CN)_6\right]_2, Fe(CNS)_3$

B. $Fe_4\left[Fe(CN)_6\right]_2, KFe(CNS)_3$

C. $Fe_4\left[Fe(CN)_6\right]_3, K_3\left[Fe(CNS)_6\right]$

D. $Fe_4\left[Fe(CN)_6\right]_3, K_3\left[Fe(SCN)_6\right]$

Answer: D

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21. In salts of polyatomic anion, as polarising power of cation increase, thermal stability of the salt decrease and decomposed species may further undergo redox reaction

Q. Which of the followinng species undergoes non-redox thermal decomposition reaction on heating?

A. $FeSO_4$

B. $SnSO_4$

C. $H_2C_2O_4$

D. Na_2HPO_4

Answer: D

View Text Solution

22. In salts of polyatomic anion, as polarising power of cation increase, thermal stability of the salt decrease and decomposed species may further undergo redox reaction

Q. Water soluble salt(x) was heated into three products A, B and C and B and C are two different paramagnetic gases. A is red in hot condition, then salt(x) is :

A. $Hg(NO_3)_2$

B. FeC_2O_4

C. $ZnSO_4$

D. $Pb(NO_3)_2$

Answer: D

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23. Light green (compound 'A') $\xrightarrow{\Delta}$ white $\text{Residue(B)} \underset{\text{Temp.}}{\overset{\text{high}}{C}} + D + E$

(i)'D' and 'E' are two acidic gas.

(ii) 'D' is passed through $HgCl_2$ solution to give yellow ppt.

(iii) 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

(iv) A is water soluble and addition of $HgCl_2$ in it, yellow ppt. is obtained but white ppt does not turn into grey on addition of excess solution of 'A'

Q. 'D' and 'E' are respectively.

A. SO_2 and SO_3

B. SO_3 and SO_2

C. SO_2 and CO_2

D. CO_2 and CO

Answer: B

View Text Solution

24. Light green (compound 'A') $\xrightarrow{\Delta}$ white $\text{Residue(B)} \underset{\text{Temp.}}{\overset{\text{high}}{C}} + D + E$

(i)'D' and 'E' are two acidic gas.

(ii) 'D' is passed through $HgCl_2$ solution to give yellow ppt.

(iii) 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

(iv) A is water soluble and addition of $HgCl_2$ in it, yellow ppt. is obtained but white ppt does not turn into grey on addition of excess solution of 'A'

Q. Yellow ppt in the above observation is :

A. Mercuric oxide

B. Basic mercury(II) sulphite

C. Basic mercury (II) sulphate

D. Mercuric iodine

Answer: C

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25. Light green (compound 'A') $\xrightarrow{\Delta}$ white $\text{Residue(B)} \underset{\text{Temp.}}{\overset{\text{high}}{C}} + D + E$

(i)'D' and 'E' are two acidic gas.

(ii) 'D' is passed through $HgCl_2$ solution to give yellow ppt.

(iii) 'E' is passed through water first and then H_2S is passed, white

turbidity is obtained.

(iv) A is water soluble and addition of $HgCl_2$ in it, yellow ppt. is obtained but white ppt does not turn into grey on addition of excess solution of 'A'

Q. 'C' is soluble in :

A. dil. HCl

B. dil.H_2SO_4

C. Conc.CH_3COOH

D. Boiled conc. HCl

Answer: D

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26. Light green (compound 'A') $\xrightarrow{\Delta}$ white $\text{Residue(B)} \underset{\text{Temp.}}{\overset{\text{high}}{C}} + D + E$

(i)'D' and 'E' are two acidic gas.

(ii) 'D' is passed through $HgCl_2$ solution to give yellow ppt.

(iii) 'E' is passed through water first and then H_2S is passed, white turbidity is obtained.

(iv) A is water soluble and addition of $HgCl_2$ in it, yellow ppt. is obtained but white ppt does not turn into grey on addition of excess solution of 'A'

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

A. 0

B. 2

C. 7

D. 5

Answer: C

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27. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

$$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$$

It is thought theta the actual oxidation process takes place in two stages.

In the first step, V^{5+} in the presence of oxide ions converts SO_2 to SO_3.

At the same time, V^{5+} is reduced to V^{4+}.

$$2V^{5+} + O^{2-} + SO_2 \rightarrow 2V^{4+} + SO_3$$

In the second step, V^{5+} is regenerated from V^{4+} by oxygen:

$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. Transition metals and their compounds catalyse reactions because:

A. They have completely filled s-subshell

B. They have a comparable size due to poor shielding of d-subshell

C. They introduce an entirely new reaction mechanism with a lower activation energy

D. They have variable oxidation states differ by two units

Answer: C

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28. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

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The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. During the course of the reaction:

A. Catalyst undergoes changes in oxidation state

B. Catalyst increase the rate constant

C. Catalyst is regenerated in its original form when the reactants form the products

D. All are correct

Answer: D

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29. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

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The overall process is, of curse, the sum of these two steps:

$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$

Q. Catalytic activity in transition metals depends on:

A. Their ability to exist in different oxidation states

B. The size of the metal atoms

C. The number of empty atomic orbitals available

D. None of these

Answer: A

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30. Transition metal and their compounds are used as catalyst in industry and in biological system. For example, in the Contact Process, vanadium compounds in the +5 state $\left(V_2O_5 \text{ or } VO_3^-\right)$ are used to oxidise SO_2 to SO_3:

$SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$

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At the same time, V^{5+} is reduced to V^{4+}.

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$$2V^{4+} + \frac{1}{2}O_2 \rightarrow 2V^{5+} + O^{2-}$$

The overall process is, of curse, the sum of these two steps:

$$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$$

Q. Which of the following ion involved in the above process will show paramagnetism?

A. V^{5+}

B. V^{4+}

C. O^{2-}

D. VO_3^-

Answer: B

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31. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. In the laboratory, MnO_2 is made by:

A. heating Mn in O_2

B. oxidising Mn^{2+} in air

C. electrolytic oxidation of $MnSO_4$

D. precipitating MnO_2 from solution when performing titration of $KMnO_4$ in alkaline medium

Answer: D

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32. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. When MnO_2 is fused with KOH in the presence of air, the product formed is:

A. Purple colour $KMnO_4$

B. Green colour K_2MnO_4

C. Colourless MnO_4^-

D. Purple colour $KMnO_4$

Answer: B

View Text Solution

33. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent, and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. MnO_2 dissolves in concentrated HCl to form:

A. Mn^{4+} ion and Cl_2

B. Mn^{2+} ion and Cl_2

C. $[MnCl_4]^{2-}$ and Cl_2

D. only $[MnCl_4]^{2-}$

Answer: B

View Text Solution

34. MnO_2 is the most important oxide of manganese , MnO_2 occurs natually as the black coloured mineral pyrolusite. It is an oxidising agent,

and decomposes to Mn_3O_4 on heating to 530°C. It is used in the preparation of potassium permanaganate and in the productioon of Cl_2 gas. Over half million tonnes per year of MnO_2 is used in dry batteries.

Q. In which of the following species, the colour is due to charge transfer?

(I) $\left[Mn(OH)_4\right]^{2-}$ (II) MnO_4^{2-} (III) MnO_4 (IV) $KMnO_4$

A. I, II, III

B. II, IV

C. I, III

D. only IV

Answer: D

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35. Iron (+II) is one of the most important oxidation states and salts are called ferrous salts. Most of the $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_{6\square}^{2+}\right.$ ion. Fe(+II) compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like

$K_4[Fe(CN)_6]$.

Q. 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

View Text Solution

36. Iron (+II) is one of the most important oxidation states and salts are called ferrous salts. Most of the $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_{6\square}^{2+}\right.$ ion. Fe(+II) compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4[Fe(CN)_6]$.

Q. $K_3[Fe(CN)_6]$ 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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37. Iron (+II) is one of the most important oxidation states and salts are called ferrous salts. Most of the $Fe(+II)$ salts are pale green and contain $\left[Fe(H_2O)_{6\square}^{2+}\right.$ ion. Fe(+II) compounds are easily oxidised by air and so are difficult to obtain pure Fe^{2+} form many complexes like $K_4\left[Fe(CN)_6\right]$.

Q.$FeSO_4$ 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_3^- and the conc. H_2SO_4 is run down the side of the test tube. It the mixture gets hot or is shaken.

(I) the brown colour disappear (II)NO is evolved (III) a yellow solution in $Fe_2(SO_4)_3$ is formed

A. I, II, III

B. I, III

C. II, III

D. I only

Answer: A

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38. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.FeI_3 does not exist because:

A. of large size

B. Fe^{3+} oxidise I^- to I_2

C. of low lattice energy

D. iodine is not highly electronegative enough to oxidise Fe to Fe^{3+}

Answer: B

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39. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.Anhydrous $FeCl_3$ can be prepared by reaction of:

A. Fe with dry chlorine

B. Fe with dil.HCl in the presence of O_2

C. $Fe(OH)_3$ with conc. HCl

D. Fe_2O_3 with conc. HCl

Answer: A

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40. Iron forms iron halides salts by reacting the metal directly with halogen. FeI_3 does not exist. FeF_3 is white soled inspite of five unpaired electrons with d^5 configuration . $FeCl_3$ is soluble in water and is used as a mordant in dyeing industry.

Q.$FeCl_3$ solution added to $K_4\left[Fe(CN)_6\right]$ gives A while with $KSCN$ gives B. A and B respectively are:

A. $Fe_3\left[Fe(CN)_6\right]_2, Fe(CNS)_3$

B. $Fe_4\left[Fe(CN)_6\right]_2, KFe(CNS)_3$

C. $Fe_4\left[Fe(CN)_6\right]_3, K_3\left[Fe(CNS)_6\right]$

D. $Fe_4\left[Fe(CN)_6\right]_3, K_3\left[Fe(SCN)_6\right]$

Answer: D

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ONE OR MORE ANSWER IS/ARE CORRECT

1. What changes occur when acidified CrO_4^{2-} ion react with H_2O_2 solution in presence of ether solvent?

A. Orange colour of solution turns blue

B. Oxidation state of Cr-atom decrease

C. Oxidation state of Cr-atom remains constant

D. Orange colour of solution turns green

Answer: A::C

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2. Mercury is a liquid at 0° C because of

A. very high ionisation energy

B. weak metallic bonds

C. high heat of hydration

D. high heat of sublimation

Answer: A::B

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3. An element of 3d-transition series shows two oxidation states x and y, differing by two units. Then:

A. compounds in oxidation state x are ionic if $x > y$

B. compounds in oxidation state x are ionic if $x < y$

C. compounds in oxidation state y are covalents if $x < y$

D. compounds in oxidation state y are covalents if $x > y$

Answer: B::C

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4. The metal oxide which decomposes on heating, is:

A. ZnO

B. Al_2O_3

C. Ag_2O

D. HgO

Answer: C::D

Watch Video Solution

5. Which of the following acids attack(s) on copper and silver?

A. dilute HNO_3

B. dilute HCl

C. conc. H_2SO_4

D. aqua regia

Answer: A::C::D

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6. Which of the following statements are true for Mohr's salt?

A. It decolourizes $KMnO_4$ solution

B. It is a double salt

C. It is colourless salt

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Watch Video Solution

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A. The Chief ore of zinc is cinnabar

B. Mac-Arther's process is used to extract silver

C. $Na_2S_2O_3$ is used to remove the unexposed AgBr from the photographic films

D. Nessler's reagent is complex of zinc in +2 oxidation state

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B. The purest form of commerical iron is wrought iron

C. Anhydrous ferrous sulphate is called as yellow vitriol

D. Iron is the most aboundant transition metal

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A. It reacts with $NaOH$ and glucose to give Cu_2O

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Watch Video Solution

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B. $Fe > Zn > Cr$

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Watch Video Solution

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

A. $Cr_2O_7^{2-}$ is oxidising agent

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

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21. What changes occur when acidified CrO_4^{2-} ion react with H_2O_2 solution in presence of ether solvent?

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A. very high ionisation energy

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C. high heat of hydration

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C. MnO_4^{2-} is stongly oxidising and stable only in very strong alkali. In dilute alkali, water or acidic solutions it disproportionates

D. $KMnO_4$ does not act as oxidising agent in alkaline medium

Answer: A::C

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B. MnO_4^{2-}

C. NO_2

D. ClO_4^-

Answer: A::B::C

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A. the colour of anhydrous $CuSO_4$ is blue

B. "splitting of silver" can be prevented by covering the surface of molten silver with charcoal

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D. Lanthanium is first electron of third transition series

Answer: A::B::D

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C. AgI

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Answer: C::D

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A. $Mn > Fe > Cr$

B. $Fe > Zn > Cr$

C. $Cr > Fe > Zn$

D. $Cr > Mn > Fe$

Answer: C::D

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

A. $Cr_2O_7^{2-}$ is oxidising agent

B. SO_3^{2-} is reducing agent

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

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A. placing copper metal in aqueous solution of $HgCl_2$

B. treating aqueous solution of $HgCl_2$ with excess of stannous chloride

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

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ASSERTION-REASON TYPE QUESTIONS

1. Assertion: Melting point of Mn is more than that of Fe.

Reason : Mn has higher number of unpaired e^2 than Fe in atomic state.

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

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

C. If assertion is false but reason is true

D. If assertion is true but the reason is false

Answer: D

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2. $Cu^{+}_{(aq.)}$ has less stable nature than $Cu^{2+}_{(aq.)}$ but $Fe^{3+}_{(aq.)}$ is more stable than $Fe^{2+}_{(aq.)}$.

Half-filled and completely filled, sub-shell are more stable.

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

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3. Assertion: Zn gives H_2 gas with dil. HCl and also with dil. H_2SO_4.

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4. Assertion: $KMnO_4$ has different equivalent wieghts in acid, neutral or alkaline medium.

Reason: In different, change in oxidation number shown by maganese is altogether different.

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Answer: A

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6. 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.

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Reason : The solution contains two complex ions i.e., $\left[Cu(H_2O)_4\right]^{2+}$ and $[CuCl_4]^{2-}$ in equilibrium.

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SUBJECTIVE PROBLEMS

1. Calculate the magnetic moment of a high-spin octahedral complex that has six electrons in 3d-orbitals

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2. How many π-bonds are presennt in ferrocene?

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3. The magnetic moment of a transition metal ion is 3.87BM. The number of unpaired electrons present in it is

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5. How many $\pi -$ bonds are present in ferrocene?

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MATCH THE COLUMN

1. Entries of Column-I are to be matched with entries of Coloumn-II. Each entry of Column-I may have the matching with one or more than one entries of Column-II.

Column-I contains four statements following reason and Column-II consists of four options P, Q, R, S

Answer the following

P-If both statement and reason are true and reason is correct explanation of statement.

Q-If both statement and reason are true and reason is not correct explanation of statement.

R-If statement is correct and reason is incorrect.

S-If both statement and reason are incorrect.

Column-I	Column-II
(A) **Statement** : The reaction of oxalic acid with acidified $KMnO_4$ is first slow and then speeds up by itself. **Reason** : $KMnO_4$ decomposes into MnO_2 in sunlight.	(P)
(B) **Statement** : Anh. $ZnCl_2$ can't be made by heating $ZnCl_2 \cdot 2H_2O$. **Reason** : It undergoes hydrolysis to produce $Zn(OH)_2$ and HCl.	(Q)
(C) **Statement** : $KMnO_4$ is not used as a primary standard substance. **Reason** : It is deliquescent in nature.	(R)
(D) **Statement** : $K_2Cr_2O_7$ has orange colour due to polarisation. **Reason** : In dichromate ion all Cr—O bonds are identical.	(S)

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2. Entries of Column-I are to be matched with entries of Coloumn-II. Each entry of Column-I may have the matching with one or more than one entries of Column-II.

Column-I	Column-II
(A) Kipp's apparatus waste	(P) $(NH_4)_2SO_4 \cdot FeSO_4 \cdot 6H_2O$
(B) Green coloured compound	(Q) $Cu(OH)_2 \cdot CuCO_3$
(C) leave(s) brown residue on heating	(R) $FeSO_4$ solution
(D) leave(s) black residue on heating	(S) $CuCl_2 \cdot 2H_2O$

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3. Entries of Column-I are to be matched with entries of Coloumn-II. Each entry of Column-I may have the matching with one or more than one entries of Column-II.

Column-I	Column-II w x y z
(A) $wMnO_4^-(aq) + xIO_3^-(aq) + H_2O(l) \longrightarrow yMnO_2(s) + zIO_4^-(aq) + 2OH^-(aq)$	(P) 1, 2, 1, 2
(B) $wCu(OH)_2(s) + xN_2H_4(aq) \longrightarrow y\,Cu(s) + zH_2O(l) + N_2(g)$	(Q) 3, 4, 3, 1
(C) $CrO_4^{2-}(aq) + wFe(OH)_2(s) + xH_2O(l) \longrightarrow yFe(OH)_3(s) + zCr(OH)_4^-(aq) + OH^-(aq)$	(R) 2, 1, 2, 4
(D) $wClO_4^-(aq) + xH_2O_2(aq) \longrightarrow y\,ClO_2^-(aq) + zH_2O(l) + 2O_2(g)$	(S) 2, 3, 2, 3
	(T) 2, 1, 1, 3

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4. Entries of Column-I are to be matched with entries of Coloumn-II. Each entry of Column-I may have the matching with one or more than one

entries of Column-II.

Column-I	Column-II
(A) $Co^{2+}(aq)$	(P) Pink / light pink
(B) $Mn^{2+}(aq)$	(Q) Purple
(C) $V^{2+}(aq)$	(R) Outer orbital complex and magnetic moment = $\sqrt{15}$ BM.
(D) $Ti^{3+}(aq)$	(S) Inner orbital complex and magnetic moment = $\sqrt{3}$ BM.
	(T) Paramagnetic

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