Daily Tutorial Sheet 4	JEE Advanced (Archive)

46. $AgBr + 2Na_2S_2O_3 \longrightarrow \underset{\text{Sodium argentothiosulphate}}{Na_3[Ag(S_2O_3)_2]} + NaBr$

47. $(NH_4)_2S_2O_8 + 2H_2O + MnSO_4 \rightarrow MnO_2 + 2H_2SO_4 + (NH_4)_2SO_4$

48. $3MnO_4^{2-} + 4H^+ \longrightarrow MnO_2 + 2MnO_4^- + 2H_2O$

49. $3SO_2 + Cr_2O_7^{2-} + 2H^+ \longrightarrow 2Cr^{3+} + 3SO_4^{2-} + H_2O$

50.(A) $2KMnO_4 + 16HCl \rightarrow 2KCl + 2MnCl_2 + 8H_2O + 5Cl_2$

51.(C) Solder is an alloy. It is made up of $Sn = 67\%$ and $Pb = 33\%$.

52.(C) We get a yellow filtrate (due to presence of CrO_4^{2-} ion in it) and a brown residue of $Fe(OH)_3$.

53.(A) HgS does not dissolve in hot dil HNO_3.

54. The electronic configuration of Zn and Cu are :

Zn : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$

Cu: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

From the above configuration it is clear that first ionisation energy of Zn is greater than that of Cu (because of $4s^2$ and $4s^1$ configuration of Zn and Cu respectively.) More energy is needed to remove an electron of $4s^2$ than that of $4s^1$.

The second I.E. of Cu is higher than that of Zn because for Cu^{2+} the configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$ and for Zn^+ the configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$, it is easier to remove $4s^1$ electron of Zn^+ than a 3d-electron from $3d^{10}$ (stable configuration).

55. $\underset{\text{(Argentite)}}{Ag_2S} + 4KCN \longrightarrow \underset{\text{Potassium argentocyanide}}{4K[Ag(CN)_2]} + \underset{\text{potassium sulphide}}{K_2S}$

56.(A) In acidic medium MnO_4^- oxidises SO_3^{2-} to SO_4^{2-}.

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

$$SO_3^{2-} + H_2O \rightarrow SO_4^{2-} + 2H^+ + 2e^-] \times 5$$

$$2MnO_4^- + 5SO_3^{2-} + 6H^+ \rightarrow 2Mn^{2+} + 5SO_4^{2-} + 3H_2O$$

Hence, 2 moles of $MnO_4^- \equiv 5$ moles of SO_3^{2-}

or $\frac{2}{5}$ moles of $MnO_4^- \equiv 1$ mole of SO_3^{2-}

57.(B) The green coloured compound blown in air is Cr_2O_3.

$$(NH_4)_2Cr_2O_7 \xrightarrow{\text{heat}} Cr_2O_3 + N_2 + 4H_2O$$

58. **(i)** $AgBr + \underset{\text{(Hypo)}}{2Na_2S_2O_3} \longrightarrow \underset{\text{(Soluble)}}{Na_3\left[Ag(S_2O_3)_2\right]} + NaBr$

(ii) $CoCl_2 + 7KNO_2 + 2CH_3COOK \longrightarrow \underset{\text{(yellow ppt)}}{K_3[Co(NO_2)_6]} + 2CH_3COOK + 2KCl + NO + H_2O$

59. $2KMnO_4 + Cu_2O + 2KOH + H_2O \longrightarrow 2Cu(OH)_2 + 2K_2MnO_4$

60. $Zn + 2OH^- + BrO_4^- + H_2O \longrightarrow \left[Zn(OH)_4\right]^{2-} + BrO_3^-$