| Daily Tutorial Sheet-13 | Level-3 |
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**147.(% of $K_2Cr_2O_7$ = 14.61%; % of $KMnO_4$ = 85.4%)**

Let 'a' g of $K_2Cr_2O_7$ and (0.5 – a)g $KMnO_4$ be present in mixture.

Eq. of $Na_2S_2O_3 = \frac{100 \times 0.15}{1000} = 0.015$

Eq. of $K_2Cr_2O_7 + KMnO_4 \equiv$ Eq. of iodine $\equiv$ Eq. of $Na_2S_2O_3$

Eq. weight of $K_2Cr_2O_7 = \frac{294}{6} = 49$

Eq. weight of $KMnO_4 = \frac{158}{5} = 31.6$

Equivalents of $K_2Cr_2O_7 + KMnO_4$ = Equivalents of $Na_2S_2O_3$

$$\frac{a}{49} + \frac{0.5 - a}{31.6} = 0.015$$

$a = 0.0732$

$\% K_2Cr_2O_7 = \frac{0.0732 \times 100}{0.5} = 14.6\%$

$\% KMnO_4 = 85.4\%$

**148.(65.4)**

$2KClO_3 \longrightarrow 2KCl + 3O_2$ ; $2CO + O_2 \longrightarrow 2CO_2$ ;

$n_{CO} = \frac{PV}{RT} = \frac{750/760 \times 0.02}{0.0821 \times 300} \times 1000 = 0.8\,m\,moles$

$n_{O_2} = 0.4\,m\,moles$ ; $n_{KClO_3} = \frac{0.8}{3}\,m\,moles$

Mass of $KclO_3 = \frac{0.8 \times 10^{-3}}{3} \times 122.5 = 0.0326g$

% purity $= \frac{0.0326}{0.05} \times 100 = 65.4\%$

**149.(% of $MnO_2$ = 48.9 ; % of $O_2$ = 9%)**

Meq of oxalic acid which reacted with $MnO_2 = 18\,meq$

$\therefore$ meq of $O_2$ available $= 18$

$\Rightarrow \frac{18}{1000} = \frac{x}{32/4}$ (n-factor for $O_2 = 4$)

$\Rightarrow x = 0.144\,g$

So, % of $O_2 = \frac{0.144}{1.6} \times 100 = 9\%$

Meq of $MnO_2 = 18$

$\frac{18}{1000} = \frac{x \times 2}{87}$ (n-factor of $MnO_2 = 2$)

$x = 0.783g$

So, % of $MnO_2 = \frac{0.783}{1.6} \times 100 = 48.9\%$

**150.(17.136)**

Normality of $KMnO_4$ solution $= 0.0245 \times 5 = 0.1225\,N$

Eq. of $KMnO_4$ used $= \frac{0.1225 \times 25}{1000} = 3.0625 \times 10^{-3}$

Eq. of $H_2O_2$ in 10 mL = $3.0625 \times 10^{-3}$

Eq. of $H_2O_2$ in 100 mL = $3.0625 \times 10^{-2}$

Eq. of $H_2O_2$ in 10 mL (original) = $3.0625 \times 10^{-2}$

(on dilution equivalents of substance does not change)

Moles of $H_2O_2$ in original 10 mL $= \dfrac{3.0625 \times 10^{-2}}{2} = 1.53 \times 10^{-2}$ (n factor of $H_2O_2 = 2$)

Moles of $H_2O_2$ in 1 mL of original 10 mL = $\dfrac{1.53 \times 10^{-2}}{10} = 1.53 \times 10^{-3}$

Moles of $O_2$ that it would give up on decomposing $= \dfrac{1.53 \times 10^{-3}}{2} = 7.65 \times 10^{-4}$

$[H_2O_2 \longrightarrow H_2O + \frac{1}{2}O_2]$

Volume of $O_2$ at STP in mL $= 7.65 \times 10^{-4} \times 22400 = 17.136$

Volume strength = 17.136

**151.(9)** All can act as oxidizing agents because corresponding atom is in higher oxidation state.

$\overset{0}{F}_2, \overset{0}{O}_3, K\overset{+7}{Cl}O_4, Ba_2\overset{+8}{Xe}O_6, \overset{+5}{Bi}_2O_5, \overset{+8}{Os}O_4, \overset{+7}{Mn}_2O_7, H\overset{+5}{N}O_3, H\overset{0}{O}F$

**152.** Eq. of NaOH = 50 × 0.2 = 10

Eq. of HCl = 5 × 1 = 5

Eq. of NaOH left after reaction with HCl = 10 – 5 = 5

$FeCl_3 + NaOH \rightarrow Fe(OH)_3 \downarrow \xrightarrow{\Delta} Fe_2O_3$

$FeCl_3$ reacts with NaOH to give $Fe(OH)_3$ which on ignition gives $Fe_2O_3$

$\therefore$ Eq. of NaOH used for $FeCl_3$ = Eq. of $Fe(OH)_3$

= Eq. of $Fe_2O_3$ = 15 × 0.1 = 1.5

$\therefore$ Eq. of NaOH left finally = 5 – 1.5 = 3.5

Normality of NaOH in the resultant solution $= \dfrac{3.5}{70} = 0.05$

$$\frac{W_{Fe_2O_3}}{M_{Fe_2O_3}} \times 6 = 1.5$$ (n-factor for $Fe_2O_3$ = 6)

$$\therefore \quad W_{Fe_2O_3} = \frac{1.5 \times 160}{6} = 40\,g$$