

First determine the limiting reactant

$$r_{\text{theoretical}} = \frac{n_{VO}}{n_{Fe_2O_3}} = \frac{2}{3} = 0.67$$

$M_r(VO) = 66.941$

$$r_{\text{experimental}} = \frac{n_{VO}}{n_{Fe_2O_3}} = \frac{(2.50/66.941)}{(6.25/159.691)}$$

$M_r(Fe_2O_3) = 159.691$   
 $M_r(V_2O_5) = 181.878$

$$= 0.95 \leftarrow \text{larger value than } 0.67$$

$$\therefore r_{\text{exp.}} > r_{\text{theoretical}}$$

So VO is in excess

$Fe_2O_3 = \text{Limiting Reactant}$

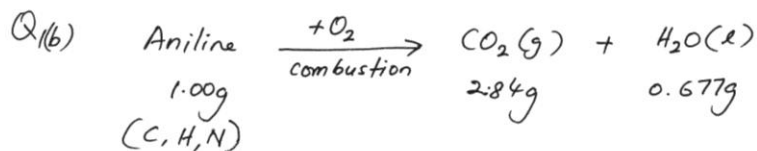
$$\frac{n_{V_2O_5}}{n_{Fe_2O_3}} = \frac{1}{3} \Rightarrow n_{V_2O_5} = \frac{1}{3} \times n_{Fe_2O_3}$$

Limiting Reactant  $\rightarrow$

$$\left( \frac{m}{181.878} \right) = \frac{1}{3} \times \frac{6.25}{159.691}$$

$$\therefore m_{V_2O_5} = \left( \frac{6.25 \times 181.878}{159.691 \times 3} \right) g$$

$$= 2.37g \text{ (Ans) //}$$



$$n_C = n_{CO_2} = \frac{2.84}{44} = 0.0645 \text{ mol} \quad \therefore m_C = (0.0645 \times 12) g$$

$$= 0.774g$$

$$n_H = 2 \times n_{H_2O} = \left( 2 \times \frac{0.677}{18} \right) = 0.0752 \text{ mol}$$

$$\therefore m_H = 0.0752g$$

$$\therefore m_N = 1.00 - (0.774 + 0.0752) g \quad \left. \vphantom{m_N} \right\} n_N = \frac{0.1508}{14} = 0.011 \text{ mol}$$

$$= 0.1508g$$

$\frac{1}{2}$

Sem1 (1999/2000) : Stoichiometry

$$Q_1(6) \text{ Cont.} \quad n_C : n_H : n_N$$

$$0.0645 \text{ mol} : 0.0752 \text{ mol} : 0.0110 \text{ mol}$$

$$\left(\frac{0.0645}{0.0110}\right) : \left(\frac{0.0752}{0.0110}\right) : 1$$

$$5.9 : 6.8 : 1$$

$$6 : 7 : 1$$



$$\text{Empirical formula (aniline)} = C_6H_7N$$

$$(C_6H_7N)_n = 93$$

$$93n = 93$$

$$n = 1$$

$$\text{Molecular formula (aniline)} = C_6H_7N$$

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