

Q1: a) $\text{Glucose Sample (C, H, O)} + \text{O}_2 \xrightarrow{\text{combustion}} \text{CO}_2 + \text{H}_2\text{O}$

0.1014g 0.1486g 0.0609g

Molecular weight = 180
 @ M_r (molar mass) = 180 g mol^{-1} .

$\text{CO}_2 \rightarrow \text{C}$

$$\frac{n_{\text{C}}}{n_{\text{CO}_2}} = \frac{1}{1} \Rightarrow n_{\text{C}} = n_{\text{CO}_2} = \left(\frac{0.1486}{44}\right) \text{ mol}$$

$$= 3.4 \times 10^{-3} \text{ mol}$$

$$m_{\text{C}} = (3.4 \times 10^{-3})(12) = 0.0408 \text{ g}$$

$\text{H}_2\text{O} \rightarrow 2\text{H}$

$$\frac{n_{\text{H}}}{n_{\text{H}_2\text{O}}} = \frac{2}{1} \Rightarrow n_{\text{H}} = 2 \times n_{\text{H}_2\text{O}} = \left(2 \times \frac{0.0609}{18}\right) \text{ mol}$$

$$= 6.8 \times 10^{-3} \text{ mol}$$

$$m_{\text{H}} = 6.8 \times 10^{-3} \text{ g}$$

$\therefore m_{\text{O}} = 0.1014 - (0.0408 + 6.8 \times 10^{-3}) \text{ g} = 0.0538 \text{ g}$

$$\therefore n_{\text{O}} = \left(\frac{0.0538}{16}\right) = 3.4 \times 10^{-3} \text{ mol.}$$

$n_{\text{C}} : n_{\text{H}} : n_{\text{O}} = 3.4 \times 10^{-3} : 6.8 \times 10^{-3} : 3.4 \times 10^{-3}$

$$= 1 : 2 : 1$$

\therefore Empirical formula = CH_2O //

Molecular formula, $(\text{CH}_2\text{O})^n = 180$

$$(12 + 2 + 16)n = 180$$

$$30n = 180$$

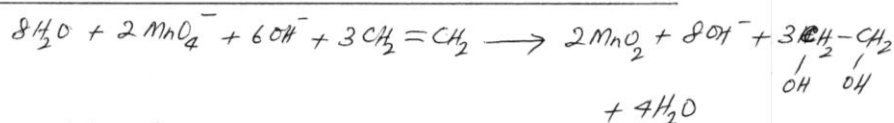
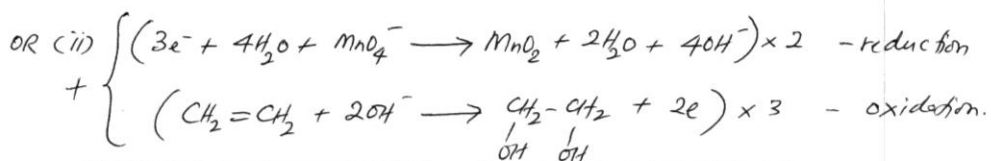
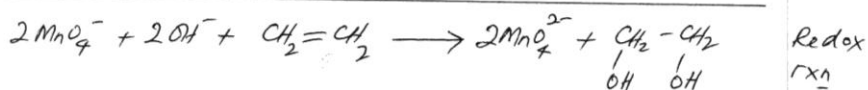
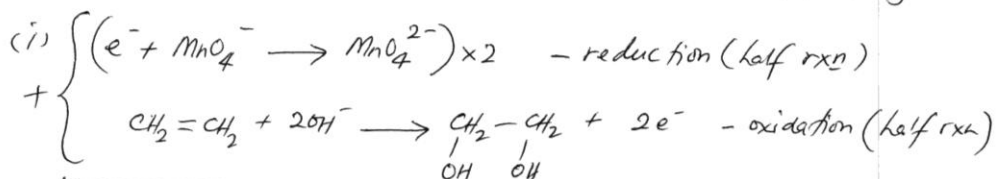
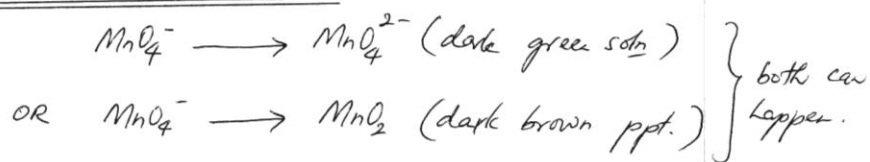
$$n = \frac{180}{30} = 6$$

\therefore Molecular formula = $(\text{CH}_2\text{O})_6$ @ $\text{C}_6\text{H}_{12}\text{O}_6$ //

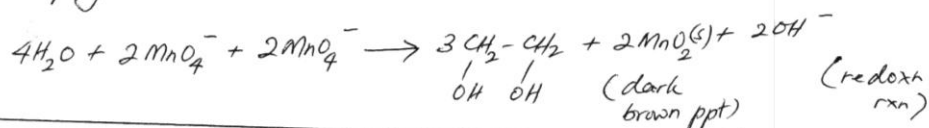
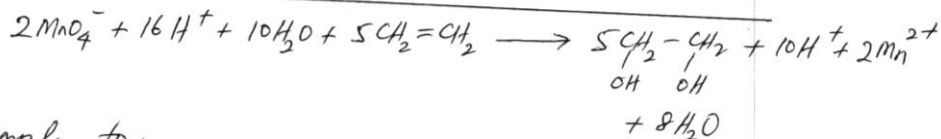
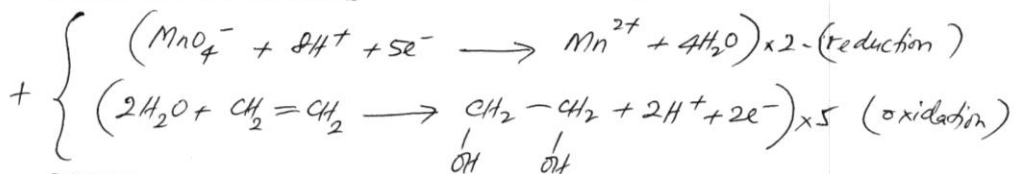
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Q1 (b) Under alkaline conditions :

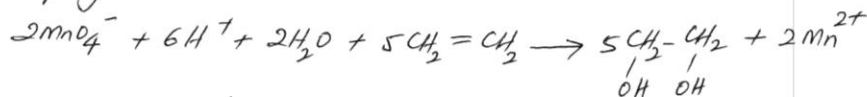
(Q1)



simply to:

* Under acid conditions ($\text{MnO}_4^- \longrightarrow \text{Mn}^{2+}$)

simply to:




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