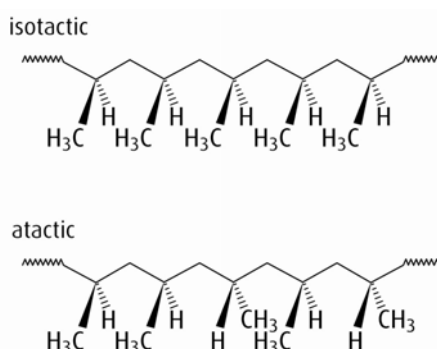


Marking scheme for Core Worksheet – Option C

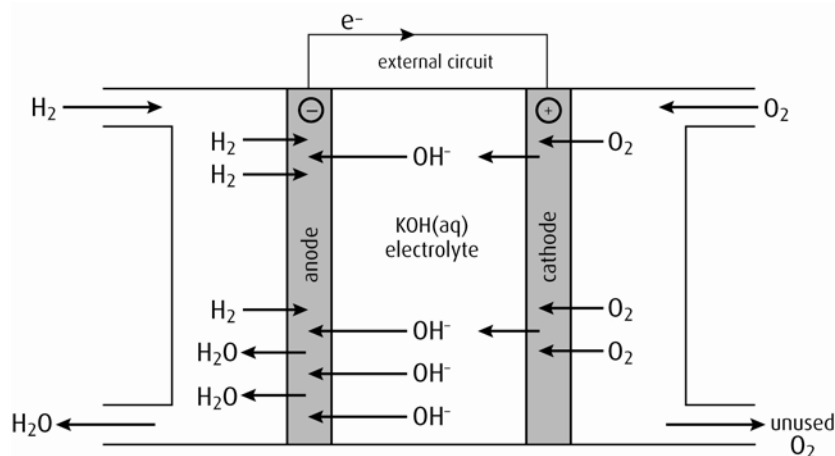
- 1 a** A graphite anode [1]
 B alumina/ Al_2O_3 + cryolite electrolyte [1]
 C (molten) aluminium [1]
 D graphite cathode [1]
- b** anode: $2\text{O}^{2-} \rightarrow \text{O}_2 + 4\text{e}^-$ [1]
 cathode: $\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$ [1]
 1 mark maximum if electrodes not labelled
- c** oxygen reacts with the carbon of the anode [1]
 to produce CO_2 [1]
- d** Al has lower density, meaning that aeroplanes can be lighter. [1]
- 2 a** isotactic – all methyl groups on same side of chain [1]
 atactic – methyl groups arranged randomly relative to chain [1]



- b** isotactic has higher melting point [1]
 regular arrangement of methyl groups allows chains to pack together more closely [1]
 stronger intermolecular forces between chains [1]
- 3** heterogeneous catalyst – reactants in a different phase/state to catalyst [1]
 homogeneous catalyst – reactants in same phase/state as catalyst [1]
 suitable examples of each type [1]
- heterogeneous catalyst provides a surface on which reaction can occur – the reactants are adsorbed on to surface [1]
- homogeneous catalysts form an intermediate with reactant/catalyst changes oxidation state allowing formation of an intermediate [1]

- 4 a 1 mark for each label (anode, cathode and external circuit arrow)

[3]



- b anode: $\text{H}_2 + 2\text{OH}^- \rightarrow 2\text{H}_2\text{O} + 2\text{e}^-$ [1]

- cathode: $\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^- \rightarrow 4\text{OH}^-$ [1]

1 mark maximum if electrodes not labelled

- 5 open single-walled carbon nanotube – all hexagons of C atoms [1]

- capped nanotube – hexagons and pentagons in cap [1]