Question 30 (8 marks)

(a) Compare the process of polymerisation of ethylene and glucose. Include relevant chemical equations in your answer. **3**

[ethylene + ethylene + ethylene] C_2H_4 → $\left[\begin{array}{cc} H & H \\ C & C \\ H & H \end{array}\right]_n$

→ polyethylene.

$\left[\begin{array}{cc} H & H \\ C & C \\ H & H \end{array}\right]_n$ polyethylene. (addition reaction)

- hydrocarbon polymer
- ~~Has a double bond making it very~~ reused in medical purpose.

eg glucose:

sugar polymer.

$C_6H_{12}O_6$ → $[C_6H_{12}O_6]_n$ (condensation reaction)

- this polymer is widely used in medicine
- has the ability to be fermented by yeast to produce ethanol.

Question 30 continues on page 22

Question 30 (continued)

(b) Explain the relationship between the structures and properties of THREE different polymers from ethylene and glucose, and their uses. **5**

polyethyle – is very useful as plastics, there is two types of polyethyle LDPE and HDPE LDPE use high pressures to obtains its structure and flexibility property. HDPE use high temps ~~300~~ (80° – 300° C) to obtain its hardness and structure. polyethylene belongs to the alkene group therefore can be saturated using HBr and HOBr, as for glucose it can't be saturated. glucose has polar – and non-polar properties, ~~the~~ but ~~they~~ both polymers have covalent bonds which makes them good solvents.

End of Question 30