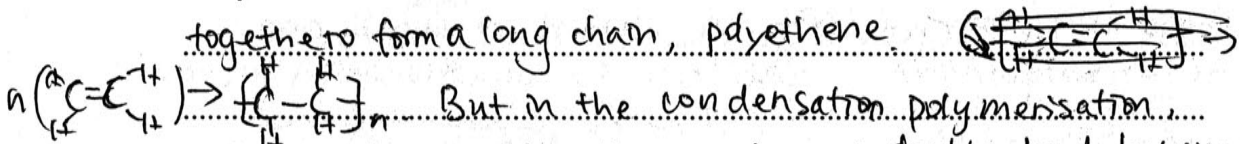


Question 30 (8 marks)

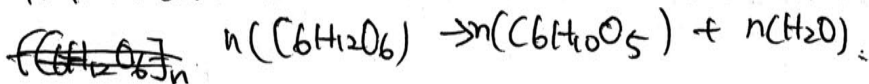
- (a) Compare the process of polymerisation of ethylene and glucose. Include relevant chemical equations in your answer. 3

The process of polymerisation of ethylene is called addition polymerisation and the process of glucose is condensation polymerisation.

In the addition polymerisation, ethene monomers join together under heat ^{and catalyst} and pressure with broken of double bonds and thus the monomers can join together to form a long chain, polyethene.



But in the condensation polymerisation, glucose join together without broken of double bond but they release a water molecule. The monomers join together to form cellulose.



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.

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Ethene is the monomer used to ~~produce~~^{make} polyethene.
Polyethene has two forms, high-density polyethene (HDPE) and low-density polyethene (LDPE). ~~HDPE~~ HDPE is produced without branches so they they can pack closely together ~~with~~^{with} a higher melting point. ~~These~~ ~~are~~ Therefore they're strong and rigid. These properties give them uses as garbage bins and rigid toys.
LDPE is produced with significant alkyl branches so they cannot pack closely together as can HDPE. Therefore they're softer with a low melting point.
They can be used in ~~the~~ cling wrap and plastic bags.
Both of HDPE and LDPE are resistant to ~~water~~^{water} and non-biodegradable. Cellulose is a condensation polymer made from glucose. The H bonds ~~within the mo~~^{Between the} chains rigid, linear and resistant to chemical attack. Therefore they can be used in the production of fabrics.

End of Question 30