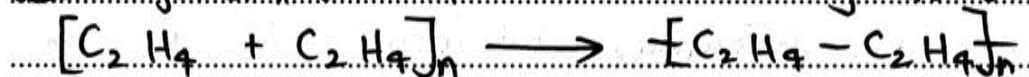


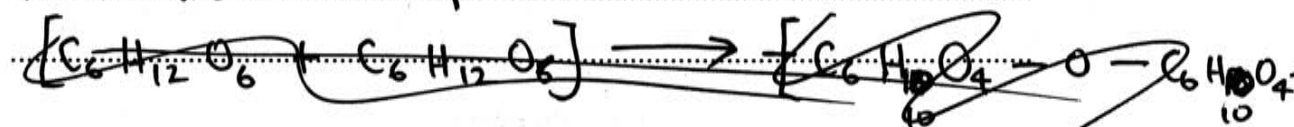
Question 30 (8 marks)

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

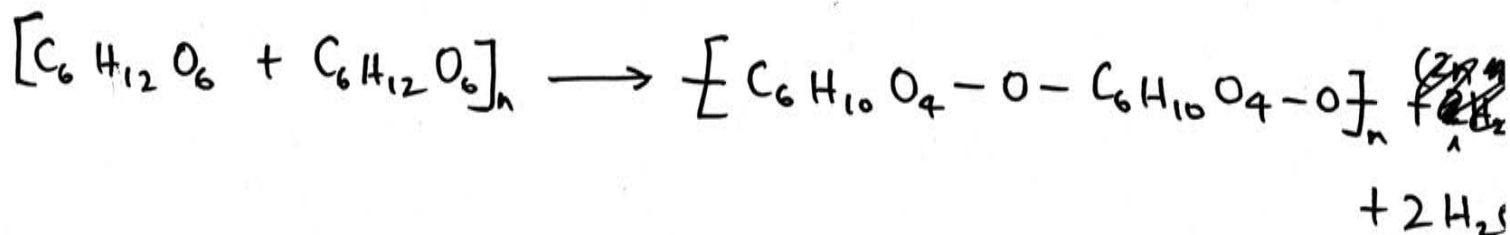
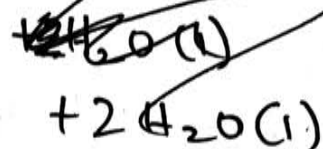
In the polymerisation of ethylene, its monomers add together, ^{to form polyethylene} without the loss of any atoms:



In the polymerisation of glucose, its monomers add together to form cellulose, losing ~~small~~ atoms as they form water molecules and are eliminated from the final product:



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

Low Density Polyethylene has much chain branching, where methyl groups replace hydrogens on the polymer chain, giving it a soft, malleable properties as chains cannot pack tightly together. Polyvinylchloride has much chain stiffening due to ~~the~~ ^{the} chlorine atoms attached to each of its monomers, giving it a more rigid, harder properties. Polystyrene, similarly has chain stiffening, but also lacks the chain branching of low density polyethylene, making its chains pack together densely to give a brittle polymer, and giving it transparent qualities, unlike the other polymers.

End of Question 30