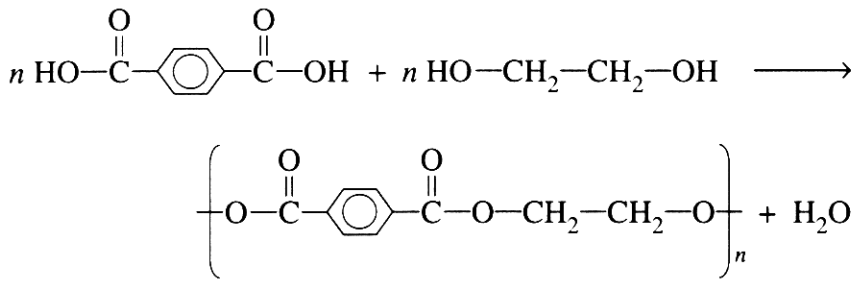
Marks

Question 18 (6 marks)

(a) Name the type of polymerisation shown in the following reaction: **1**



condensation polymerisation

(b) Assess current developments in the use of biopolymers. **5**

Biopolymers are naturally occuring polymers which are extracted from organic plant materials, such as rayon and other such textiles fibres. The use of biopolymers in various industries (rubber, textiles) are very advantageous as they are biodegradable hence reducing long-term waste and it is obtained from renewable natural resources. However, along with the rapid expansion of technology, scientists have been able to polymerise synthetic materials through polymerisation, producing various products such as PVC, polyethylene, polystyrene, etc. The production of biopolymers, however, still cost ten times as much compared to synthetic polymers which are nowadays more greatly favored. The disadvantages of using synthetic polymers in industries are that they are non-biodegradable and extracted from a non-renewable resource (petroleum) that is currently declining in supply. As a result, recent advances experimented in blending biopolymers with synthetic ones to maintain its preffered uses while they are still biodegradable. Current successful methods involve applied genetic engineering to make bacterias produce synthetic raw materials for making polymers - the PHA and PHB bacterias - which is in turn, also biodegradable and thus reducing environmental concerns.