

(Chapter 15)(Polymers)

XII

Intext Questions

Question 15.1:

What are polymers?

Answer

Polymers are high molecular mass macromolecules, which consist of repeating structural units derived from monomers. Polymers have a high molecular mass ($10^3 - 10^7 u$). In a polymer, various monomer units are joined by strong covalent bonds. These polymers can be natural as well as synthetic. Polythene, rubber, and nylon 6, 6 are examples of polymers.

Question 15.2:

How are polymers classified on the basis of structure?

Answer

Polymers are classified on the basis of structure as follows:

1. Linear polymers:

These polymers are formed of long straight chains. They can be depicted as:



For e.g., high density polythene (HDP), polyvinyl chloride, etc.

2. Branched chain polymers:

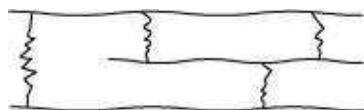
These polymers are basically linear chain polymers with some branches. These polymers are represented as:



For e.g., low density polythene (LDP), amylopectin, etc.

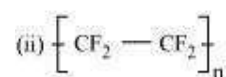
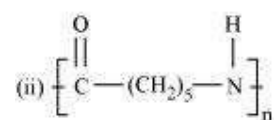
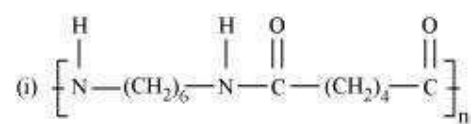
3. Cross-linked or Network polymers:

These polymers have many cross-linking bonds that give rise to a network-like structure. These polymers contain bi-functional and tri-functional monomers and strong covalent bonds between various linear polymer chains. Examples of such polymers include bakelite and melmac.



Question 15.3:

Write the names of monomers of the following polymers:



Answer

(i) Hexamethylenediamine $[\text{H}_2\text{N} - (\text{CH}_2)_6 - \text{NH}_2]$ and adipic acid $[\text{HOOC} - (\text{CH}_2)_4 - \text{COOH}]$

(ii)



(iii) Tetrafluoroethene $(\text{CF}_2 = \text{CF}_2)$

Question 15.4:

Classify the following as addition and condensation polymers: Terylene, Bakelite, Polyvinyl chloride, Polythene.

Answer

Addition polymers:

Polyvinyl chloride, polythene

Condensation polymers:

Terylene, bakelite

Question 15.5:

Explain the difference between Buna-N and Buna-S.

Answer

Buna – N is a copolymer of 1, 3–butadiene and acrylonitrile.

Buna – S is a copolymer of 1, 3–butadiene and styrene.

Question 15.6:

Arrange the following polymers in increasing order of their intermolecular forces.

(i) Nylon 6, 6, Buna-S, Polythene.

(ii) Nylon 6, Neoprene, Polyvinyl chloride.

Answer

Different types of polymers have different intermolecular forces of attraction. Elastomers or rubbers have the weakest while fibres have the strongest intermolecular forces of attraction. Plastics have intermediate intermolecular forces of attraction. Hence, the increasing order of the intermolecular forces of the given polymers is as follows:

(i) Buna – S < polythene < Nylon 6, 6

(ii) Neoprene < polyvinyl chloride < Nylon 6