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Chapter : 15. POLYMERS

Level-1:Questions

1) What are polymers?

A: These are referred to as Macromolecules which are formed by joining of repeating structural units on a large scale.

2) Give two examples each of natural and of synthetic polymers.

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A: Natural polymers e.g.:- proteins, starch

Synthetic polymers e.g.:- Polythene, Nylon-6,6

3) What are biodegradeable polymers? Give one example.

A: Polymers which are degraded easily by environmental processes.

e.g.: PHBV

4) How are the polymer classified on the basis of structure?

A: They are three types based on the structure of polymers

a) Linear polymers b) branched polymers c) cross linked polymers.

5) Define the term 'polymerisation'.

A: The process of making polymer from monomers.

6) What are the monomers for the following polymers:

i) Polythene ii) PVC iii) Teflon iv) Polystyrene

A: i) Ethene ii) Vinyl chloride iii) Tetrafluoroethene iv)Styrene

7) In which classes, the polymers are classified on the basis of molecular forces?

A: Elastomers, Fibres, thermoplastic and thermosetting polymers

8) Give an example of elastomer.

A: Neoprene

9) Identify the polymer.

-A-A-A-A-A-

A: Homopolymer

10)Define the term " homopolymerisation".

A: The process of making polymer by adding one kind of monomers

11) Identify the polymer.

-A-B-A-B-A-B-A-B-

A: Copolymer

12) Why rubbers are called "Elastomers"?

A: They can be stretched and retract to its original position after the release of force.

13)Differentiate between Thermoplastic and Thermosetting polymers.

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A: Thermoplastic polymers:-They can be reshaped again and again.

Thermosetting polymers:-Once it is moulded and it cannot be remelted and reused

14) Is (-NH-CHR-Co-)n is a homopolymer or copolymer?

A: It is a homopolymer.

15) What is vulcanized rubber?

A: Adding sulphur to rubber to make it hard called 'Vulcanised rubber'

16) How can natural rubber be made more tough?

A: By adding Sulphur.

17) What are natural polymers?

A: Polymers mostly found in plants and animals.

18) What are synthetic polymers?

A: Man made polymers.

19) What are polyamides and polyesters? Give one example of each.

A: Polyamides are polymers made with amide linkages and polyesters are polymers made with ester linkages

20) Classify the following as homopolymers and copolymers:

Polythene, PVC, PTFE, Buna-S, polystyrene, Buna-N

A: Homopolymers:- Polythene, PTFE, Polystyrene

Copolymers:- Buna-S and Buna-N

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Level-2:

1) Explain the term'Copolymerisation' and give two examples.

A: The polymerization in which Polymer is made up of two different monomer units are called copolymers: e.g. Buna-N, Buna-S

2) Give the monomers for the following polymers:
Buna-N, Buna-S, natural rubber, Neoprene,

A:

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Polymer	Monomer(s)
Buna-N	1,3-Butadiene and acrylonitrile
Buna-S	1,3-Butadiene and Styrene
Natural rubber	Isoprene
Neoprene	Chloroprene

3) Discuss the main purpose of vulcanization of rubber.

A: Natural rubber become soft at high temperature, brittle at low temperature and show higher water absorption capacity. It is nonresistant to attack by oxidizing agent. In order to improve these properties a process of vulcanization is carried out.

4) Classify the following as addition and condensation polymer: PHBV, Dacron, Teflon, neoprene, PVC, Bakelite.

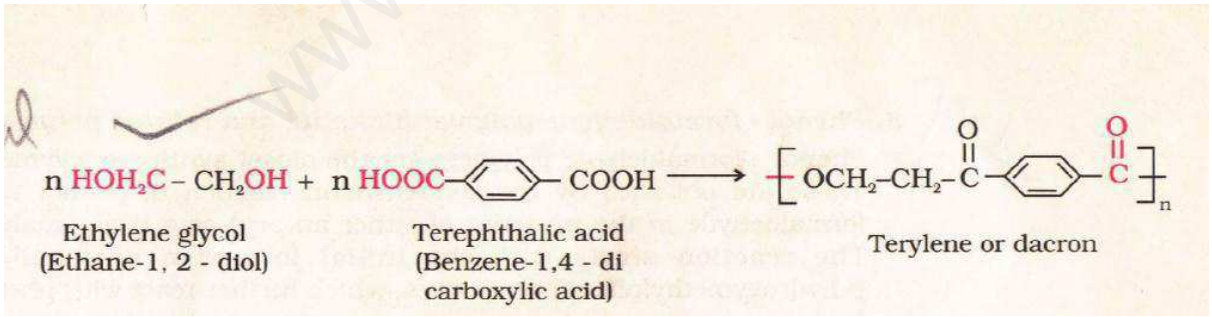
A: Addition polymers:-Teflon, Neoprene, PVC
Condensation polymers:- PHBV, Dacron, Bakelite

5) Arrange the following polymers in increasing order of their inter molecular forces.
a) PVC, Natural rubber, Terylene
b) Nylon-6,6, Neoprene, PVC
c) Nylon6, Buna-N, Teflon

A: a)Natural rubber < PVC < Terelyne
b) Neoprene< PVC < Nylon-6,6
c) Buna-N < Teflon < Nylon6

6) (a) Write the structures of the monomers of Dacron.
(b) Give one example of a synthetic rubber.
(c) Arrange the following polymers in the increasing order of tensile strength Nylon 6, Buna – S, Polythene.

A: a)



(b) Buna N
(c) Buna S Polythene Nylon 6

7) Give the name and structure of reagent used for initiating a free radical chain reaction .
A: Benzoyl peroxide, C6H5CO-O-OCC6H5

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8) Arrange the following polymers in increasing order of their intermolecular forces: Nylon6,Neoprene,polyvinyl chloride.
A: Neoprene< polyvinyl chloride< Nylon6

9.How is dacron obtained from ethylene glycol and terephthalic acid?
Ans: It is the condensation product of ethylene glycol and terephthalic acid carried out at 420 to 460K in the presence of catalyst mixture of zinc acetate and antimony trioxide

10)Write names of monomers of the following polymers.a)(-CF2-CF2-)n b)(CH2-CH(cl)-)n.

A: a)Tetra fluoro ethane b) vinyl chloride

Level-3 Questions

1. What is the main constituent of bubble gum?
   Ans- Styrene-butadiene copolymer (SBR).

2. What is a plasticizer?
   Ans- The substances which are added to increase the softness of hard polymers.

3. Draw the structures of the monomer of PAN.
   Ans: CH_2=CH-CN
4. Give the name of polymer which is used for making non- stick utensils.
   Ans: Teflon(CF_2=CF_2)
5. What is the % of sulphur using during in vulcanization of rubber ?
   Ans: 3% to 5%

5) Give the common and the IUPAC name of the monomer of natural rubber.
   Ans: cis-Isoprene& 2-methyl-1,3-butadiene

6)Discuss the two main purpose of vulcanization of rubber.
   Ans: (i) It makes the rubber hard.
   (ii) It is more elastic.
   (iii)It has more wear and tear resistance.

7)Explain the term *Thermo setting polymers* and give one example.
   Ans: *Thermo setting polymers:* These polymers are cross linked or heavily branched molecules, which on heating undergo extensive cross linking in moulds and again become infusible. These cannot be reused. Some common examples are bakelite, urea-formaldelyde resins, etc.

8)Why should one always use purest monomer in free radical polymerisation?
   Ans: Impurities of other substances if present, may inhibit or hinder the chain propagation.

9)How is dacron obtained from ethylene glycol and terephthalic acid?
   Ans: It is the condensation product of ethylene glycol and terephthalic acid carried out at 420 to 460K in the presence of catalyst mixture of zinc acetate and antimony trioxide

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