

QUESTION BANK OF POLYMERS

ONE MARKS QUESTION:

- 1) What does PVC stand for?
Poly Vinyl Chloride
- 2) Name a synthetic polymer which is an ester?
Polyester
- 3) Write the monomer units of Bakelite.
Phenol and Formaldehyde
- 4) The process of heating natural rubber in presence of sulphur is known as _____
Vulcanisation
- 5) Define thermoplastics.
The plastic which can be reshaped again and again by heating.
- 6) Write an equation for the preparation of Teflon.
 $n\text{CF}_2=\text{CF}_2 \quad (\text{CF}_2-\text{CF}_2)_n$
- 7) What does PMMA stand for?
Poly methyl metha acrylate
- 8) What are the monomer units of Nylon 66.
Hexamethylene diammine and Terephthalic acid
- 9) What is a copolymer?
The polymer composed of two different monomer units.
- 10) Why is Bakelite a thermosetting polymer?
It can't be reshaped again and again by applying heat.

TWO MARKS QUESTION:

- 11) Write a short note on biodegradable polymer with the help of an example.
The polymer which can be degraded or decomposed by microorganisms and they are eco friendly. Nylon2 Nylon 6 and PHBV
- 12) Write the monomeric structures of Melamine resin and Nylon 6.
Bakelite: Melamine and formaldehyde
Nylon 6: Caprolactum
- 13) Differentiate between addition and condensation polymerization.

Addition Polymerization	Condensation Polymerization
Monomer units simple add to each other	Monomer units condenses to form a polymer
By products does not form	Simple byproducts forms

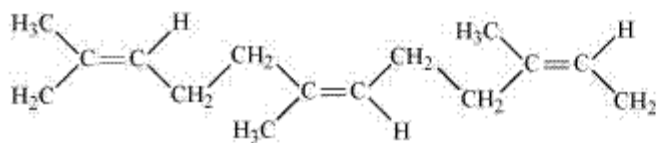
- 14) In which classes, the polymers are classified on the basis of molecular forces?

On the basis of magnitude of intermolecular forces present in polymers, they are classified into the following groups:

- (i) Elastomers
- (ii) Fibres
- (iii) Thermoplastic polymers
- (iv) Thermosetting polymers

15) How does the presence of double bond in rubber molecule influence its reactivity and structure?

Natural rubber is a linear cis-polyisoprene in which the double bonds are present between C₂ and C₃ of the isoprene units.



Natural rubber

Because of this cis-configuration, intermolecular interactions between the various strands of isoprene are quite weak. As a result, various strands in natural rubber are arranged randomly. Hence, it shows elasticity.

16) Write the monomers of Glyptal and PAN.

Glyptal: Phthalic acid and ethylene glycol

PAN: Acrylo Nitrile

THREE MARKS QUESTION:

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

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:

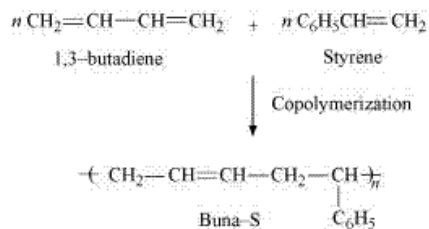
These polymers have many cross-linking bonds that give rise to a network-like structure. These polymers contain bi-functional and tri-functional monomers and strong covalent bonds between various linear polymer chains. Examples of such polymers include bakelite and melmac.



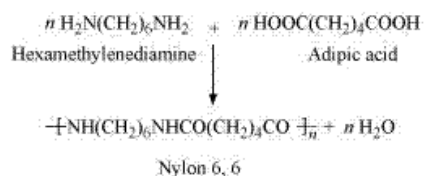
Concept Insight: Based on Structure: Linear, Branched, Cross linked.

18) Write the polymerization reaction of Nylon 66 and Buna S.

The process of forming polymers from two or more different monomeric units is called copolymerization. Multiple units of each monomer are present in a copolymer. The process of forming polymer Buna-S from 1, 3-butadiene and styrene is an example of copolymerization



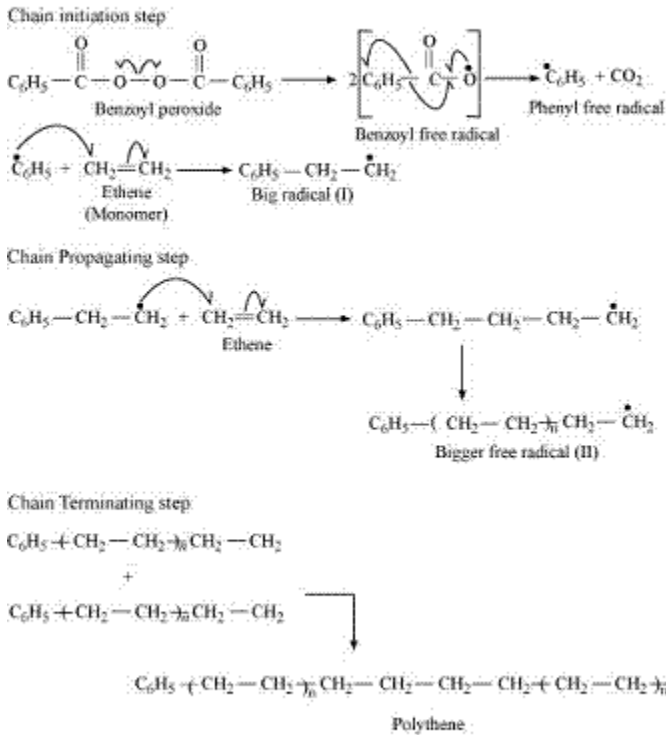
Nylon 6, 6 is also a copolymer formed by hexamethylenediamine and adipic acid.



19) Write the free radical polymerization of ethane.

Polymerization of ethene to polythene consists of heating or exposing to light a mixture of ethene with a small amount of benzoyl peroxide as the initiator.

The reaction involved in this process is given below:



Concept Insight: A free radical initiator is Benzoyl peroxide, acetyl peroxide, tert-butyl peroxide.

20) Differentiate between LDPE and HDPE.

LDPE was the first PE to be developed. It has low-density levels and only a small amount of branching. It is very flexible and easy to clean. It is often used to make plastic film wrap and plastic bags. Additionally, it is used to make plastic items that need to be molded, such as plastic bottles used in labs and some prostheses.

HDPE has higher density levels; it is also characterized by a linear structure consisting of no branching. That makes HDPE stronger and more resistant to chemicals. It is most commonly used for items requiring blow molding techniques, such as toys, automobile parts and bottles. It is also used to create cutting boards since it meets FDA food service standards

21) Write the names and structure of the monomers of the following polymers:
Buna S, Buna N, Neoprene and Dacron

Polymer		Monomer	Structure of monomer
i	Buna-S	1, 3-butadiene	$\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$
		Styrene	$\text{C}_6\text{H}_5\text{CH} = \text{CH}_2$
ii	Buna-N	1, 3-butadiene	$\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$
		Acrylonitrile	$\text{CH}_2 = \text{CH} - \text{CN}$
iii	Neoprene	Chloroprene	$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_2 = \text{C} - \text{CH} = \text{CH}_2 \end{array}$
iv	Dacron	Ethylene glycol	$\text{HOH}_2\text{C} - \text{CH}_2\text{OH}$
		Terephthalic acid	$\text{COOH} - \text{C}_6\text{H}_4 - \text{COOH}$ 