

# Polymers

## Question1

Which of the following set of polymers are used as fibre?

(i) Teflon(ii) Starch(iii) Terylene(iv) Orlon

**KCET 2024**

**Options:**

- A. (i) and (ii)
- B. (ii) and (iii)
- C. (iii) and (iv)
- D. (i) and (iv)

**Answer: C**

**Solution:**

The polymers that are used as fibers are :

**Terylene** : Also known as polyester, this is a synthetic polymer that is widely used as a fiber in textiles due to its durability, resistance to stretching and shrinking, and quick-drying properties.

**Orlon** : This is a trade name for polyacrylonitrile, a synthetic polymer that is used to make acrylic fibers, known for their wool-like feel and used for sweaters, hats, and other garments.

Therefore, the correct option is :

**Option C** : (iii) and (iv)

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## Question2

The biodegradable polymer obtained by polymerisation of glycine and aminocaproic acid is

**KCET 2024**

**Options:**

- A. nylon 6
- B. PHBV
- C. nylon-2, nylon-6
- D. nylon-6, 10

**Answer: C**

**Solution:**

The biodegradable polymer Nylon-2, nylon 6, is an alternating polyamide copolymer of glycine  $[\text{H}_2\text{N} - \text{CH}_2 - \text{COOH}]$  and amino caproic acid  $[\text{H}_2\text{N}(\text{CH}_2)_5\text{COOH}]$ .

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## Question3

Which of the following monomers form biodegradable polymers ?

**KCET 2023**

**Options:**

- A. Ethylene glycol and phthalic acid
- B. Caprolactum and 1, 3-butadiene
- C. Phenol and formaldehyde
- D. 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

**Answer: D**



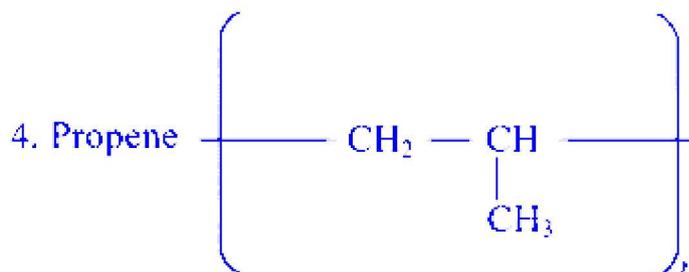
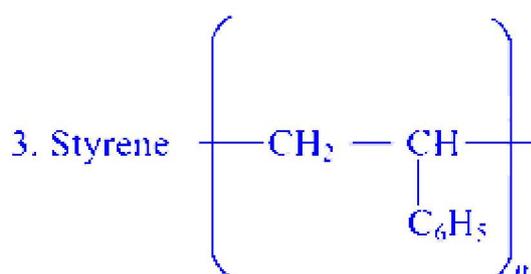
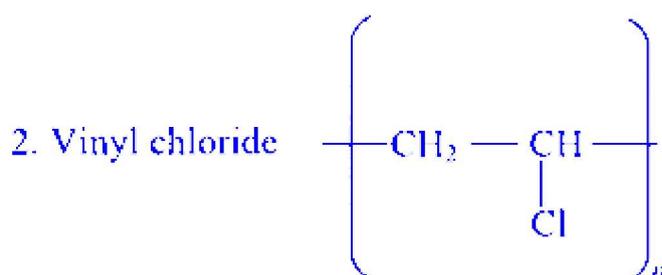
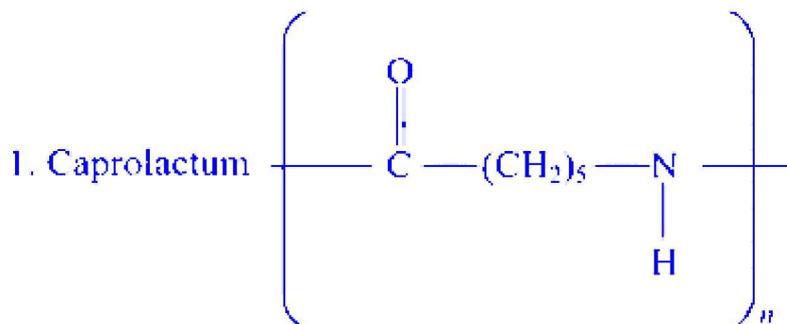


D. 1-d, 2-c, 3-b, 4-a

**Answer: D**

**Solution:**

The correct match is 1-d, 2-c, 3-b, 4-a.



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## Question5

Which of the following is correctly matched?

## KCET 2022

### Options:

- A. Teflon - Caprolactum
- B. Bakelite - Novolac
- C. Polyester - Tetrafluoroethene
- D. Nylon - Acrylonitrile

**Answer: B**

### Solution:

The correct pair is bakelite and novolac. It is formed by the polymerisation of phenol and formaldehyde monomer. While teflon is the polymer of tetrafluoroethylene, polyester is the polymer of ethyleneglycol and terephthalic acid and nylon is polymer of caprolactum.

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## Question 6

**Which of the following polymer has strongest intermolecular forces of attraction?**

## KCET 2020

### Options:

- A. Neoprene
- B. Terylene
- C. Polythene
- D. Polystyrene

**Answer: B**

### Solution:



Neoprene have the weakest intermolecular forces as it is an elastomer. There are only few cross-links between the chains.

Terylene have strong intermolecular forces like dipole-dipole interaction. It is a fibre type of polymer.

Polyster and polythene are thermoplastic types of polymer. They have intermolecular forces, which are intermediate between those of elastomers and fibres.

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## Question 7

Which of the following monomers can undergo condensation polymerisation?

**KCET 2020**

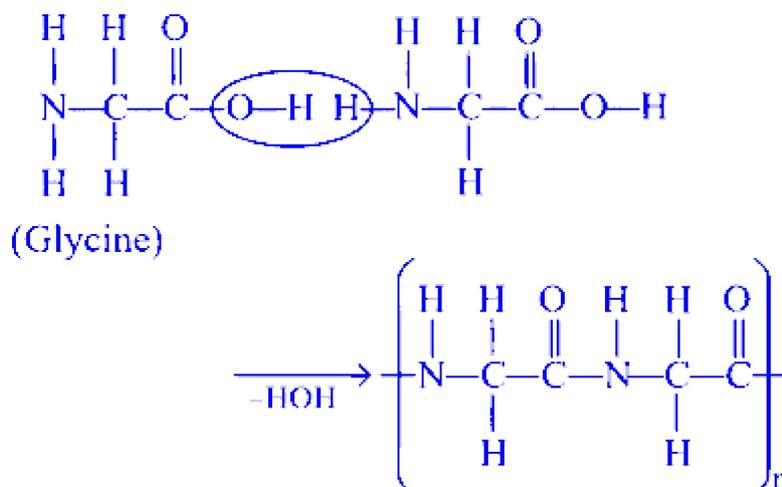
**Options:**

- A. Styrene
- B. Glycine
- C. Isoprene
- D. Propene

**Answer: B**

**Solution:**

Glycine undergo condensation polymerisations while styrene, isoprene and propene undergo addition polymerisation.



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## Question8

The polymer containing five methylene groups in its repeating unit is

**KCET 2019**

**Options:**

- A. nylon 6/6
- B. nylon 6
- C. dacron
- D. bakelite

**Answer: B**

**Solution:**

The polymer containing five methylene groups in its repeating unit is nylon-6. Name and chemical structure of given polymers are as follows:

Name	Chemical structure
Nylon 6, 6	$\text{-(NH(CH}_2\text{)}_6\text{NHCO(CH}_2\text{)}_4\text{CO)}_n\text{-}$
Nylon-6	$\left[ \begin{array}{c} \text{O} \\ \parallel \\ \text{C} - (\text{CH}_2)_5 - \text{N} - \text{H} \end{array} \right]_n$
Dacron	$\left( \text{OCH}_2\text{CH}_2\text{O} - \overset{\text{O}}{\parallel}{\text{C}} - \text{C}_6\text{H}_4 - \overset{\text{O}}{\parallel}{\text{C}} \right)_n$
Bakelite	$\left( \text{C}_6\text{H}_3(\text{OH})_2 - \text{CH}_2 - \text{C}_6\text{H}_3(\text{OH})_2 - \text{CH}_2 \right)_n$



## Question9

Cis-1, 4-polyisoprene is called

KCET 2019

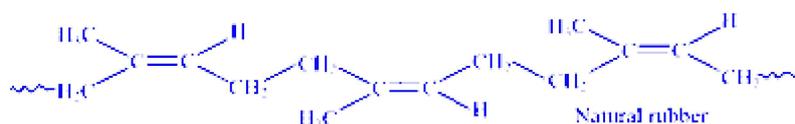
Options:

- A. buna- N
- B. neoprene
- C. buna-S
- D. natural rubber

**Answer: D**

**Solution:**

cis-1, 4 polyisoprene is also called natural rubber. It is a linear polymer of isoprene. In natural rubber, various chains are held together by van der waals' interactions and has coiled structure.



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## Question10

Which one of the following is a polyamide polymer?

KCET 2018

Options:

- A. Terylene
- B. Nylon-6, 6
- C. Buna-S
- D. Bakelite

**Answer: B**

## Solution:

Nylon-6,6 is a polyamide as it is made by the monomers adipic-acid  $[\text{HOOC} - (\text{CH}_2)_4\text{COOH}]$  and hexamethylene diamine



∴ (b) is the correct answer.

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## Question 11

Among the following, the branched chain polymer is

**KCET 2018**

Options:

- A. polyvinyl chloride
- B. bakelite.
- C. low density polythene
- D. high density polythene

**Answer: C**

## Solution:

The correct answer is Option C: low density polythene.

Here's why:

- Low density polythene (LDPE) has a branched molecular structure. These branches prevent the polymer chains from packing closely together, resulting in a lower density and less crystalline structure.
- In contrast:
  - Polyvinyl chloride (PVC) has a linear structure with chlorine atoms attached.
  - Bakelite is a thermosetting polymer with a cross-linked network.
  - High density polythene (HDPE) is mostly linear with very few branches, allowing for a more tightly packed and crystalline arrangement.

Thus, among the options provided, low density polythene is the branched chain polymer.

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## Question12

$(\text{CH}_3)_3\text{SiCl}$  is used during polymerisation of organosilicons because

**KCET 2018**

**Options:**

- A. the chain length of organosilicon polymers can be controlled by adding  $(\text{CH}_3)_3\text{SiCl}$
- B.  $(\text{CH}_3)_3\text{SiCl}$  improves the quality and yield of the polymer
- C.  $(\text{CH}_3)_3\text{SiCl}$  does not block the end terminal of silicone polymer
- D.  $(\text{CH}_3)_3\text{SiCl}$  acts as a catalyst during polymerisation

**Answer: A**

**Solution:**

The correct answer is Option A.

Here's why:

During the polymerization of organosilicons, controlling the chain length is very important to achieve polymers with the desired molecular weight and properties.

$(\text{CH}_3)_3\text{SiCl}$  (trimethylsilyl chloride) is used as an end-capping agent. It reacts with the reactive end groups (usually silanol groups,  $-\text{Si}-\text{OH}$ ) on the growing polymer chain, thereby terminating further chain growth.

By effectively "capping" the chain ends, the addition of  $(\text{CH}_3)_3\text{SiCl}$  controls the chain length of the polymer.

The other options are not correct because:

Option B: While end-capping can indirectly improve the quality of the polymer by preventing uncontrolled reactions, the primary role is not to improve yield or quality directly.

Option C: This is incorrect since  $(\text{CH}_3)_3\text{SiCl}$  actually blocks (caps) the end of the silicone polymer.

Option D: It does not act as a catalyst in the polymerization process.

Thus, Option A is the correct reason for using  $(\text{CH}_3)_3\text{SiCl}$  during the polymerization of organosilicons.

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## Question13

**Ziegler-Natta catalyst is used to prepare**

## KCET 2018

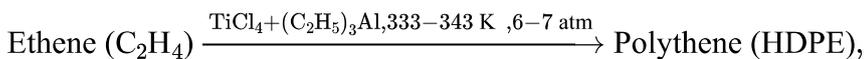
### Options:

- A. low-density polythene
- B. teflon
- C. high density polythene
- D. nylon-6

**Answer: C**

### Solution:

Ziegler-Natta catalyst is composed of  $\text{TiCl}_4$  and  $(\text{C}_2\text{H}_5)_3\text{Al}$ . This catalyst is specifically used to produce high-density polyethylene (HDPE). The polymerization reaction proceeds as follows:



In this reaction, ethene monomers ( $\text{CH}_2 = \text{CH}_2$ ) are polymerized under the influence of the Ziegler-Natta catalyst and specific conditions of temperature (333-343 K) and pressure (6-7 atm) to form high-density polyethylene chains  $(\text{CH}_2 - \text{CH}_2)_n$ .

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## Question14

**Which of the following is not a biodegradable polymer?**

## KCET 2017

### Options:

- A. Glyptol
- B. Polyhydroxy butyrate - CO -  $\beta$ -hydroxy valerate
- C. PHBV
- D. Nylon 2-nylon-6

**Answer: A**

### Solution:



Glyptol is not a biodegradable polymer. The common example of aliphatic biodegradable polymers are polyhydroxy butyrate CO-beta hydroxyl valerate (PHBV), nylon-2- nylon-6 etc.

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## Question15

**The monomer used in novolac, a polymer used in paints**

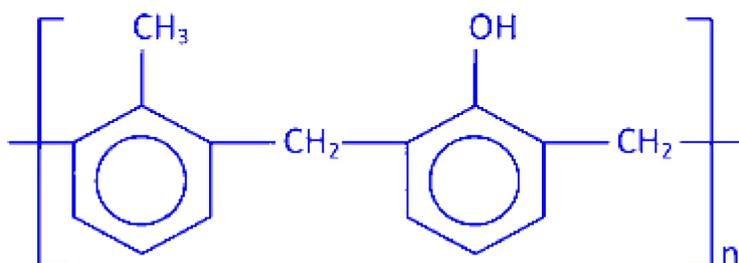
**KCET 2017**

**Options:**

- A. melamine and formaldehyde
- B. phenol and formaldehyde
- C. butadiene and acrylo nitrile
- D. butadiene and styrene

**Answer: B**

**Solution:**



Novolacs are phenol formaldehyde resins with formaldehyde to phenol molar ratio of less than one. The polymerisation is brought to completion using acid catalysis such as oxalic acid, hydrochloric acid or sulphonate.

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