

# Polymers

## Question1

' X ' is a polymer, which is mainly used for making unbreakable cups and laminated sheets. The monomers of ' X ' are

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Options:

A.

urea and formaldehyde

B.

ethylene glycol and phthalic acid

C.

phenol and formaldehyde

D.

1,3-butadiene and styrene

**Answer: C**

**Solution:**

**Given:**

Polymer 'X' is mainly used for making **unbreakable cups** and **laminated sheets**.

**We're asked:** What are the **monomers** of polymer X?

**Step 1: Identify the polymer**

- **Unbreakable cups** and **laminated sheets** are typically made from **melamine-formaldehyde** or **phenol-formaldehyde** type resins.



- However, **phenol-formaldehyde resin** (commonly known as **Bakelite**) is specifically known for:
- Being **hard and brittle**
- Used in **electrical switches, unbreakable crockery, laminated sheets**, etc.

## Step 2: Match with monomers

Bakelite (phenol-formaldehyde resin) is formed by:

Phenol + Formaldehyde  $\longrightarrow$  Phenol-formaldehyde resin (Bakelite)

Hence, the monomers are **phenol** and **formaldehyde**.

**Correct Answer:**

Option C: phenol and formaldehyde

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## Question2

**Which one of the following is not an example of condensation polymer?**

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**Options:**

A. Terylene

B. Nylon 6,6

C. Bakelite

D. Polystyrene

**Answer: D**

**Solution:**

Polystyrene is not an example of condensation polymerisation. It is prepared by free radical addition polymerisation.

Condensation polymerisation is a form of a step-growth polymerisation where smaller molecules react with each other to form large structural unit while releasing by product such as water.

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### Question3

What are ' X ' and ' Y ' respectively in the following reactions ?

Polymer used in making of safety helmets

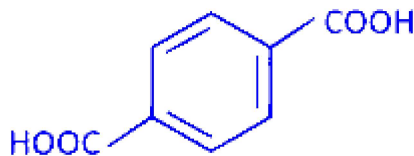
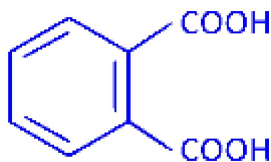


Polymer used in manufacture of paints

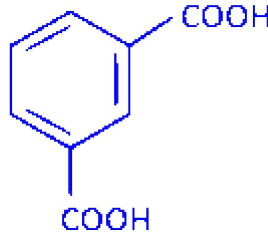
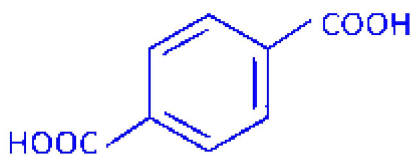
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Options:

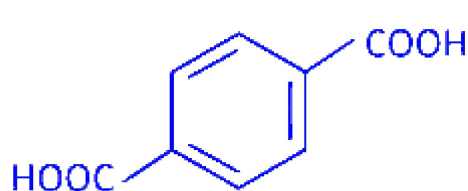
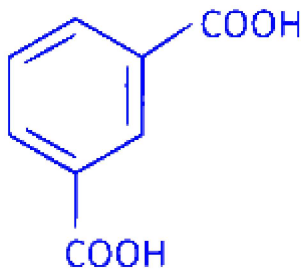
A.



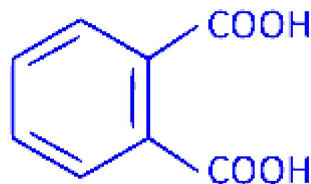
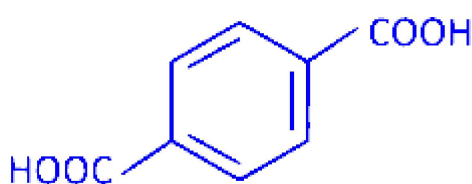
B.



C.



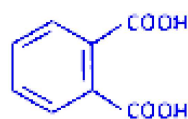
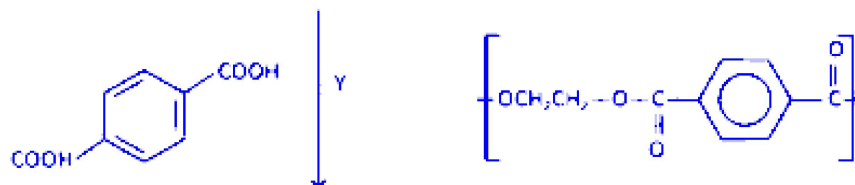
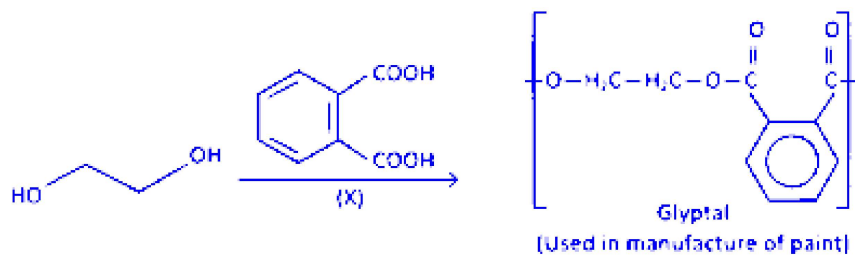
D.



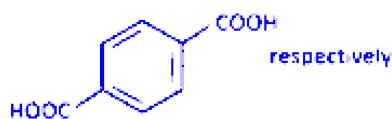
**Answer: A**



## Solution:



and

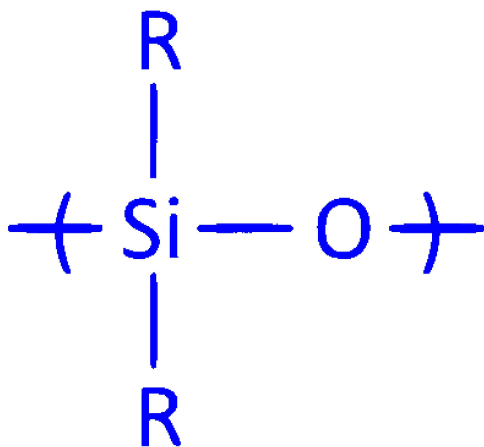


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## Question4

**Assertion(A)** Silicones are used for water proofing of fabrics.

**Reason(R)** The repeating unit in silicones is



The correct answer is

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**Options:**

- A. Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
- B. Both (A) and (R) are correct and ( B ) is the correct explanation of (A).



C. (A) is not correct but (R) is correct

D. (A) is correct but (R) is not correct.

**Answer: A**

### Solution:

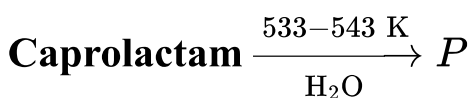
Both A and R are correct but R is not the correct explanation of A. The correct explanation is,

The low surface tension of silicones, coupled with the molecular orientation of non-polar methyl groups, create highly hydrophobic barrier that repels water molecules.

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## Question5

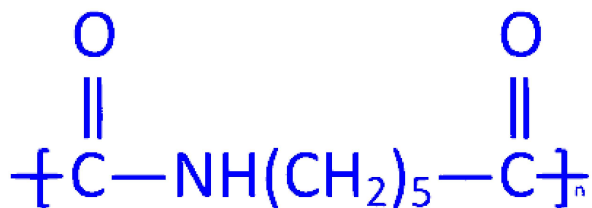
Identify the structure of the polymer 'P' formed in the given reaction



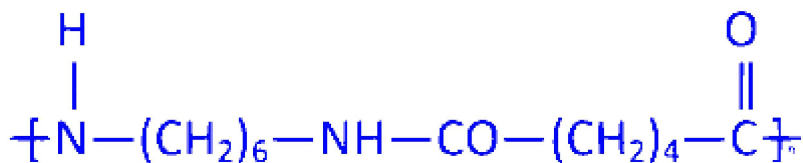
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Options:

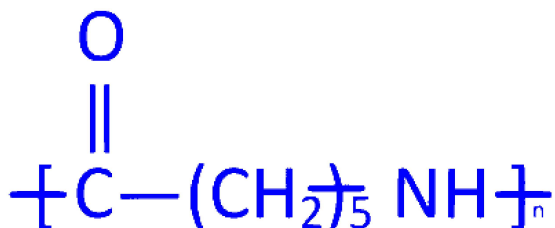
A.



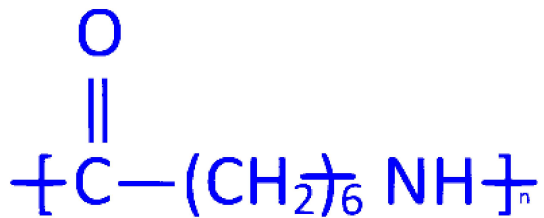
B.



C.



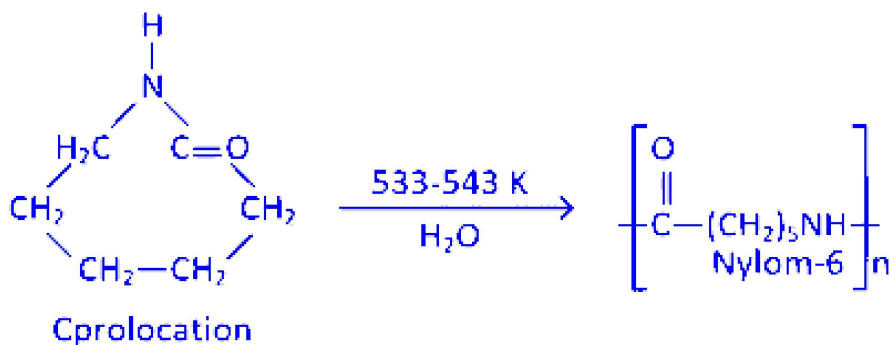
D.



**Answer: C**

**Solution:**

When caprolactum is heated with water at a higher temperature, Polymer nylon-6 is obtained. The reaction is as follows,



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## Question6

The monomer which is present in both bakelite and melamine polymers is

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**Options:**

- A. methanal
- B. methanol
- C. phenol
- D. ethane-1,2-diol



**Answer: A**

## Solution:

Methanal is the common monomer of bakelite and melamine polymer.

Bakelite has phenol and methanal as monomer units. Melamine has melamine and methanal as monomer units.

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## Question 7

### Match the following.

List-I (Monomer/s)

A.  $\text{CF}_2=\text{CF}_2$

B.  $\text{NH}_2(\text{CH}_2)_6\text{NH}_2, \text{HO}_2\text{C}(\text{CH}_2)_4\text{CO}_2\text{H}$

C.  $\text{C}_6\text{H}_5\text{OH}, \text{HCHO}$

List-I (Monomer/s)

D.  $\text{CH}_2=\text{CH}(\text{Cl})-\text{CH}=\text{CH}_2$

List-II (Name of polymer)

I. Neoprene

II. Bakelite

III. Teflon

List-II (Name of polymer)

IV. Nylon 6,6

### The correct answer is

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#### Options:

A. A - II ; B - III ; C - I ; D - IV

B. A - III ; B - IV ; C - II ; D - I

C. A - III ; B - IV ; C - I ; D - II

D. A-III ; B - I ; C-IV ; D-II

**Answer: B**

## Solution:

The correct match is A-III, B-IV, C-II, D-I.

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## Question 8

Match the following

List-I (Polymer)		List-II (Monomers)	
(A)	Bakelite	(I)	2-methyl-1, 3-butadiene
(B)	Natural rubber	(II)	Glycine + aminocaproic acid
(C)	Glyptal	(III)	Phenol + formaldehyde
(D)	Nylon 2-nylon 6	(IV)	Phthalic acid + ethylene glycol

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**Options:**

A. A-IV, B-I, C-II, D-III

B. A-III, B-I, C-IV, D-II

C. A-III, B-II, C-IV, D-I

D. A-II, B-III, C-I, D-IV

**Answer: B**

**Solution:**

The correct match is A-III, B-I, C-IV, D-II.

Bakelite is a polymer made up of monomers, phenol and formaldehyde.

Natural rubber is a polymer made up of monomers 2 -methyl-1,3-butadiene.

Glyptal is formed from monomeric units phthalic acid and ethylene glycol.

Nylon-2-nylon-6 is formed from glycine and aminocaproic acid monomers.

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## Question9

Amongst the following, how many of them come under the category of elastomers? Natural rubber, polyethene, vulcanized rubber, bakelite, polyvinylchloride, buna-N, nylon-6, neoprene

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Options:

A. 4

B. 5

C. 3

D. 6

Answer: A

Solution:

Let's analyze the list one by one to identify which ones are elastomers:

**Natural rubber** – It is a classic elastomer, mainly composed of cis-1,4-polyisoprene.

**Polyethene** – This is a thermoplastic polymer, not known for rubber-like elasticity.

**Vulcanized rubber** – Vulcanization is a process applied to rubber (often natural rubber) to enhance its elasticity and strength, so it remains an elastomer.

**Bakelite** – This is a thermosetting plastic, not an elastomer.

**Polyvinylchloride (PVC)** – Typically a thermoplastic, it does not exhibit the high elasticity characteristic of elastomers.

**Buna-N** – Also known as nitrile rubber, it is a synthetic elastomer commonly used for its oil resistance.

**Nylon-6** – A polyamide that is a thermoplastic, not classified as an elastomer.

**Neoprene** – Another synthetic rubber well known for its elastic properties, making it an elastomer.

From the list, the elastomers are:

Natural rubber

Vulcanized rubber



Buna-N

Neoprene

Thus, there are 4 elastomers.

The correct answer is: Option A (4).

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