

Polymers

Set – 1

Table 15.1: Some Other Commercially Important Polymers

Name of Polymer	Monomer	Structure	Uses
Polypropene	Propene	$\left(\text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} \right)_n$	Manufacture of ropes, toys, pipes, fibres, etc.
Polystyrene	Styrene	$\left(\text{CH}_2 - \underset{\text{C}_6\text{H}_5}{\text{CH}} \right)_n$	As insulator, wrapping material, manufacture of toys, radio and television cabinets.
Polyvinyl chloride (PVC)	Vinyl chloride	$\left(\text{CH}_2 - \underset{\text{Cl}}{\text{CH}} \right)_n$	Manufacture of rain coats, hand bags, vinyl flooring, water pipes.
Urea-formaldehyde Resin	(a) Urea (b) Formaldehyde	$\left(\text{NH} - \text{CO} - \text{NH} - \text{CH}_2 \right)_r$	For making unbreakable cups and laminated sheets.
Glyptal	(a) Ethylene glycol (b) Phthalic acid	$\left(\text{OCH}_2 - \text{CH}_2 - \text{OOC} \begin{array}{c} \diagup \\ \text{C}_6\text{H}_4 \\ \diagdown \end{array} \text{CO} \right)_n$	Manufacture of paints and lacquers.
Bakelite	(a) Phenol (b) Formaldehyde	$\left(\text{C}_6\text{H}_4(\text{OH}) - \text{CH}_2 - \text{C}_6\text{H}_4(\text{OH}) - \text{CH}_2 \right)_n$	For making combs, electrical switches, handles of utensils and computer discs.

Q1. Glyptal is a polymer made up of:

- A. Ethylene glycol and Phthalic acid
- B. Ethylene glycol and Formaldehyde
- C. Urea and Phthalic acid
- D. Urea and Formaldehyde

Ans. (A)

Q2. Polymer made up of phenol and formaldehyde is also known as:

- A. Glyptal
- B. Polystyrene
- C. Bakelite
- D. Urea-formaldehyde resin

Ans. (C)



Q3. No. of OH group present in Bakelite is:

- A. 3
- B. 2
- C. 1
- D. 0

Ans. (B)

Q4. Which of the following is used for manufacture of paints?

- A. PVC
- B. Polystyrene
- C. Urea-formaldehyde resin
- D. Glyptal

Ans. (D)

Q5. Which of the following is used for manufacture of unbreakable cups and laminated sheets?

- A. Urea-formaldehyde resin
- B. Bakelite
- C. Polythene
- D. polystyrene

Ans. (A)

Q6. Which of the following is a homopolymer?

- A. Urea-formaldehyde resin
- B. Bakelite
- C. Glyptal
- D. PVC

Ans. (D)

Q7. Which of the following is an example of addition polymerisation?

- A. Urea-formaldehyde resin
- B. Bakelite



- C. Glyptal
- D. polystyrene

Ans. (D)

Q8. Which of the following is an example of condensation polymerisation?

- A. polystyrene
- B. Bakelite
- C. Polythene
- D. Polypropene

Ans. (B)

Q9. Which of the following is not an example of chain growth polymerisation?

- A. Polythene
- B. Urea-formaldehyde resin
- C. Polypropene
- D. PVC

Ans. (B)

Q10. Which of the following is not an example of step growth polymerisation?

- A. Glyptal
- B. Bakelite
- C. PVC
- D. dacron

Ans. (C)

Q11. Polymer made up of ethylene glycol and terephthalic acid is also known as:

- A. Teflon
- B. Acrilan
- C. Dacron
- D. Caprolactam

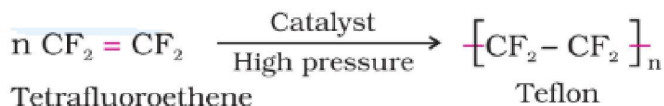
Ans. (C)



Set – 2

(b) Polytetrafluoroethene (Teflon)

Teflon is manufactured by heating tetrafluoroethene with a free radical or persulphate catalyst at high pressures. It is chemically inert and resistant to attack by corrosive reagents. It is used in making oil seals and gaskets and also used for non-stick surface coated utensils.



Q1. Which type of Polymer is teflon?

- A. Addition Polymer
- B. Condensation Polymer
- C. Copolymer
- D. Biodegradable Polymer

Ans. (A)

Q2. Which of the following properties is not of teflon?

- A. Resistant to attack of reagent
- B. Reactive
- C. Solid
- D. Chemically Inert

Ans. (B)

Q3. Which of the following is a use of teflon?

- A. Non-stick utensils
- B. Rope
- C. Textiles
- D. Brushes

Ans. (A)



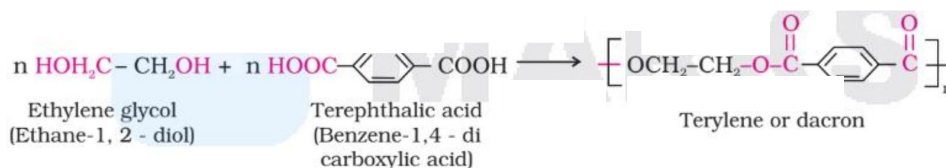
Q4. Which of the following is the monomer of teflon?

- A. Acrylonitrile
- B. Styrene
- C. Ethene
- D. Tetrafluoroethene

Ans. (D)

Set – 3

The formation of terylene or dacron by the interaction of ethylene glycol and terephthalic acid is an example of this type of polymerisation.



Q1. Which type of Polymer is Dacron?

- A. Addition
- B. Copolymer
- C. Condensation
- D. Biodegradable

Ans. (C)

Q2. Which of the following compounds is used in the manufacture of dacron?

- A. Styrene
- B. Glycol
- C. adipic acid
- D. Caprolactam

Ans. (B)

Q3. How many acid groups are in terephthalic acid?

- A. four
- B. two



- C. one
- D. three

Ans. (B)

Q4. IUPAC name of terephthalic acid?

- A. Benzene -2,4-dicarboxylic acid
- B. Benzene -1,4-dicarboxylic acid
- C. Benzoic acid
- D. Benzene -1,4,6-tricarboxylic acid

Ans. (B)

Q5. Terylene is most commonly used for?

- A. blending with fibers
- B. Rope
- C. utensils
- D. Coverings

Q6. Terylene is most commonly used for?

- A. blending with fibers
- B. Rope
- C. utensils
- D. Coverings

Ans. (A)

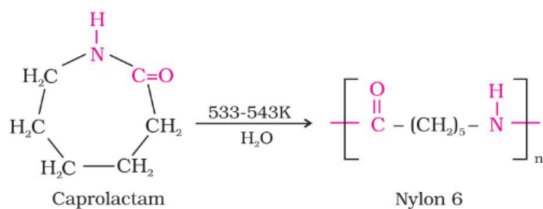


Set – 4

- (ii) **Nylon 6:** It is obtained by heating caprolactam with water at a high temperature.

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Nylon 6 is used for the manufacture of tyre cords, fabrics and ropes.

Q1. Which type of Polymer is Nylon 6?

- A. Addition
- B. Copolymer
- C. Biodegradable
- D. Condensation

Ans. (D)

Q2. Which of the following compounds is used in the manufacture of Nylon 6?

- A. Styrene
- B. Caprolactam
- C. Butadiene
- D. Glycol

Ans. (B)

Q3. Which of the following is the use of Nylon 6?



- A. Cords, Ropes
- B. Glass
- C. Coverings
- D. Safety equipments

Ans. (A)

Q4. Which group is present in Caprolactam?

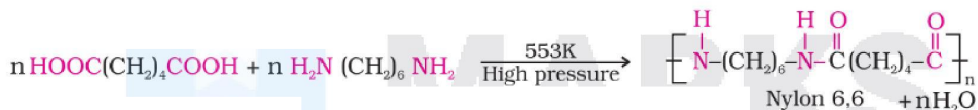
- A. acid
- B. amide
- C. alcohol
- D. ketone

Ans. (B)

Set – 5

Nylons

(i) **Nylon 6,6:** It is prepared by the condensation polymerisation of hexamethylenediamine with adipic acid under high pressure and at high temperature.



Nylon 6, 6 is fibre forming solid. It possess high tensile strength. This characteristic can be attributed to the strong intermolecular forces like hydrogen bonding. These strong forces also lead to close packing of chains and thus impart crystalline nature.

Nylon 6, 6 is used in making sheets, bristles for brushes and in textile industry.

Q1. Which type of Polymer is Nylon 6,6?

- A. Condensation
- B. Copolymer
- C. Addition
- D. Biodegradable

Ans. (A)



Q2. Which of the following compounds is used in the manufacture of dacron?

- A. Styrene
- B. Glycol
- C. hexamethylenediamine
- D. Caprolactam

Ans. (C)

Q3. How many acid groups are in adipic acid?

- A. three
- B. four
- C. one
- D. two

Ans. (D)

Q4. Which of the following properties are not of Nylon 6,6?

- A. High Tensile Strength
- B. Crystalline
- C. Resistant to Heat
- D. Strong intermolecular force

Ans. (C)

Q5. Which of the following are not the use of Nylon 6,6?

- A. Brush bristles
- B. Sheets
- C. Textile Industry
- D. None of the above

Ans. (D)

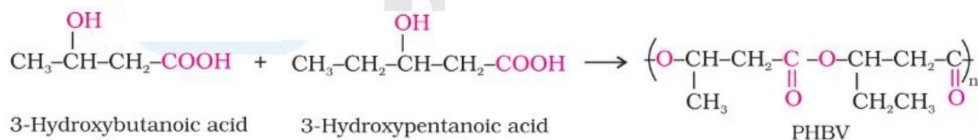


Set – 6

Aliphatic polyesters are one of the important classes of biodegradable polymers. Some important examples are given below:

1. Poly β -hydroxybutyrate – co- β -hydroxy valerate (PHBV)

It is obtained by the copolymerisation of 3-hydroxybutanoic acid and 3-hydroxypentanoic acid. PHBV is used in speciality packaging, orthopaedic devices and in controlled release of drugs. PHBV undergoes bacterial degradation in the environment.



Q1. What is the full form of PHBV?

- A. Poly -hydroxy – co- -hydroxybutyrate valerate
- B. Poly -hydroxybutyrate – co- -1,2-hydroxy valerate.
- C. Poly -hydroxybutyrate – co- -hydroxy valerate.
- D. Poly -hydroxy valerate – co- -hydroxybutyrate.

Ans. (C)

Q2. Which type of Polymer is PHBV?

- A. Condensation
- B. Biodegradable
- C. Addition
- D. Copolymer

Ans. (B)

Q3. Which of the following compounds is used in the manufacture of PHBV?

- A. 3-Hydroxybutanoic acid
- B. Terephthalic acid
- C. adipic acid
- D. Caprolactam

Ans. (A)



Q4. Which of the following are not the use of PHBV?

- A. Ropes
- B. Speciality packaging
- C. controlled release of drug
- D. orthopedic devices

Ans. (A)