Polymers

Question1

Match the following :

	List-I (Use)		List-II (Substance)
A.	Electrodes in batteries	I.	Polypropylene
B.	Welding of metals	II.	Polyacetylene
C.	Toys	III.	Oxyacetylene

The correct answer is

AP EAPCET 2025 - 26th May Morning Shift

Options:

A.

A-III, B-II, C-I

B.

A-II, B-III, C-I

C.

A-II, B-I, C-III

D.

A-I, B-II, C-III

Answer: B

Solution:

- **A. Electrodes in batteries:**
    - **Polyacetylene (II)** is a conductive polymer that, when doped, can achieve electrical conductivities similar to metals. This property makes it suitable for use as an electrode material in some types of batteries, particularly in the early development of conducting polymer batteries.
    - Polypropylene (I) is used for battery cases, not electrodes.
    - Oxyacetylene (III) is a gas mixture for welding.
    - Therefore, **A matches II**.
- **B. Welding of metals:**
    - **Oxyacetylene (III)** is a mixture of oxygen and acetylene gas, which when ignited, produces a very hot flame (up to 3200°C). This high-temperature flame is widely used for welding, cutting, and heating metals.
    - Polypropylene (I) and Polyacetylene (II) are polymers and not directly used for welding metals in this context.
    - Therefore, **B matches III**.
- **C. Toys:**
    - **Polypropylene (I)** is a versatile thermoplastic polymer known for its durability, flexibility, chemical resistance, and relatively low cost. It is widely used in the manufacturing of various plastic products, including many types of toys.
    - Polyacetylene (II) is a specialized conductive polymer, not typically used for common toys.
    - Oxyacetylene (III) is a gas mixture, not a material for toys.
    - Therefore, **C matches I**.

Combining these matches:

A - II

B - III

C - I

Question2

A polymer sample contains 10 molecules each with molecular mass 5,000 and 5 molecules each with molecular mass 50,000 . The number average molecular mass of the polymer sample is

AP EAPCET 2025 - 26th May Morning Shift

Options:

A.

2×10^4

B.

3×10^4

C.

2×10^5

D.

3×10^5

Answer: A

Solution:

Step 1: Find the total mass for each type of molecule

There are 10 molecules, each with a mass of 5,000. So, the total mass for these is:

$10 \times 5000 = 50000$

There are 5 molecules, each with a mass of 50,000. So, the total mass for these is:

$5 \times 50000 = 250000$

Step 2: Add total masses and total number of molecules

Add the total masses together:

$50000 + 250000 = 300000$

Add the total numbers of molecules:

$10 + 5 = 15$

Step 3: Calculate the number average molecular mass

Use the formula:

$\mathrm{M}_n = \frac{\sum n_i M_i}{\sum n_i} = \frac{300000}{15} = 20000$

Question3

Which one of the statements, regarding X is not correct?

3-Hydroxybutanoic acid +3 -Hydroxypentanoic acid $\rightarrow X$

AP EAPCET 2025 - 26th May Evening Shift

Options:

A.

It is a condensation polymer

B.

It is non-biodegradable

C.

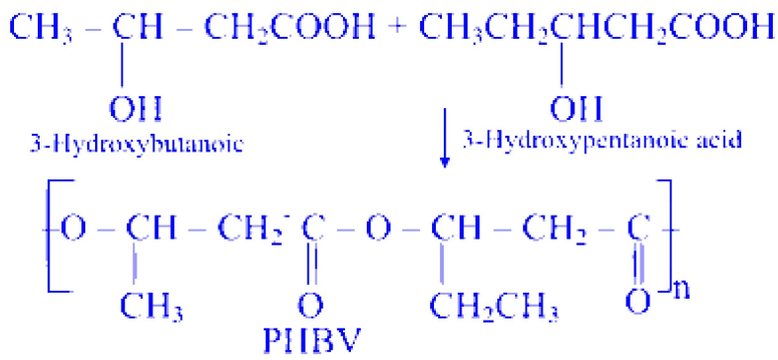
It is used in orthopaedic devices

D.

It is known as PHBV

Answer: B

Solution:



It is a biodegradable polymer.

Question4

Consider the following

Statement I Nylon 6 is a condensation copolymer.

Statement II Nylon 6, 6 is a condensation polymer of adipic acid and tetra-methylene diamine.

The correct answer is

AP EAPCET 2025 - 24th May Morning Shift

Options:

A.

Both statement-I and Statement-II are correct.

B.

Statement-I is correct, but Statement-II is not correct.

C.

Statement-I is not correct, but Statement-II is correct.

D.

Both statement-I and Statement-II are not correct.

Answer: D

Solution:

Both statement I and statement II are incorrect. This correct forms are Nylon 6 is a condensation homopolymer, Nylon 6,6 is made from adipic acid and hexamethylene diamine.

Question5

What are X and Y in the following reaction?

$$n\mathrm{ClCH}=\mathrm{CH}_2 \xrightarrow{x} Y$$

AP EAPCET 2025 - 23rd May Evening Shift

Options:

A.

$Na/NH_3(I)$ - Thermosetting polymer

B.

$(C_6H_5COO)_2$ - Thermoplastic polymer

C.

$Na/NH_3(l)$ - Condensation polymer

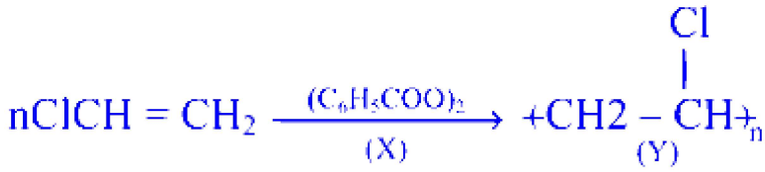
D.

$(C_6H_5COO)_2$ - Network polymer

Answer: B

Solution:

The complete polymerisation reaction is,



Thermoplastic polymer (Product Y).

Question6

Which of the following properties is not correct for silicones?

AP EAPCET 2025 - 23rd May Morning Shift

Options:

A.

Bio compatible

B.

High thermal stability

C.

Low dielectric strength

D.

Water repelling in nature

Answer: C

Solution:

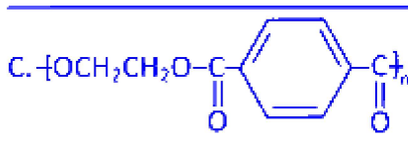
The incorrect statement about silicon is

It has low dielectric strength.

The correct form is, it has high dielectric strength and due to this it is good insulator.

Question7

Match the following.

List-I (Polymer)	List-II (Used in making)
A. $[-CF_2-CH_2-]_N$	I. Safety helmets
B. $\left\{CH_2-\underset{\displaystyle CN}{\underset{\vert}{CH}}\right\}_N$	II. Gaskets
C. 	III. Laminated sheets
D. $\{NHCONHCH_2\}_n$	IV. Commercial fibres
	V. Paints

Correct answer is

AP EAPCET 2025 - 23rd May Morning Shift

Options:

A.

A-III, B-V, C-I, D-II

B.

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

C.

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

D.

A-II, B-IV, C-V, D-I

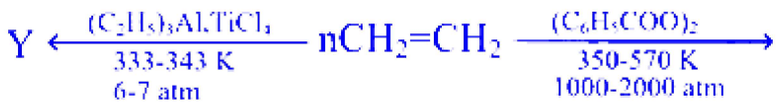
Answer: C

Solution:

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

Question8

The correct statement regarding X and Y in the following set of reactions is



AP EAPCET 2025 - 22nd May Evening Shift

Options:

A.

X is HDP and Y is LDP.

B.

X is LDP and Y is HDP.

C.

X is used in the preparation of flexible pipes and Y is used in manufacturing squeeze bottles.

D.

X is used in insulation of electricity carrying wires, Y is used in manufacturing of bottles.

Answer: B

Solution:

Complete reaction is,

$$nCH_2 = CH_2 \xrightarrow[T.p\ High]{(C_6H_5COO)_2} \underset{LDP\ (Product\ X)}{\left[CH_2 - CH_2\right]_n}$$

Free radical polymerisation

$$nCH_2 = CH_2 \xrightarrow[T.p\ Low]{(C_2H_5)_3Al_2TiCl_4} \underset{HDP\ (Product\ Y)}{\left[CH_2 - CH_2\right]_n}$$

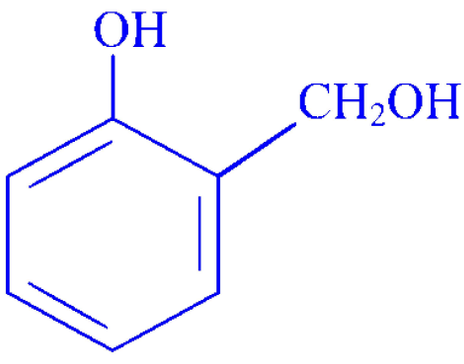
(Ziegler - Natta polymerisation)

Question9

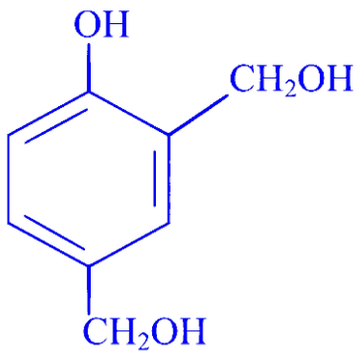
Novolac is formed by the polymerisation of monomer ' x ' in the presence of OH^- ions. What is ' x '?

AP EAPCET 2025 - 22nd May Morning Shift

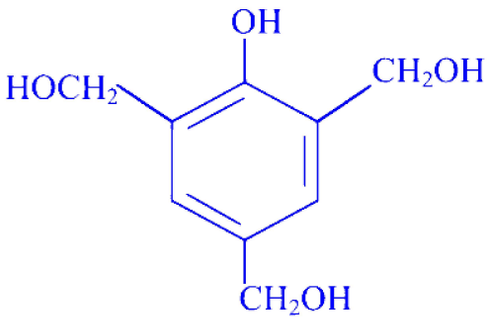
Options:

A. 

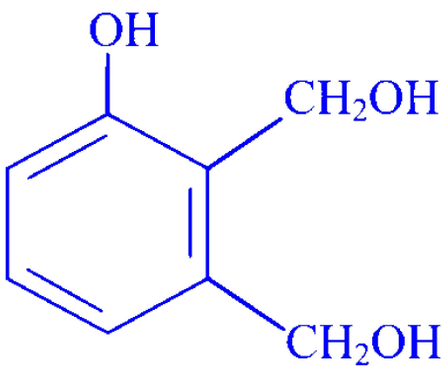
B.



C.



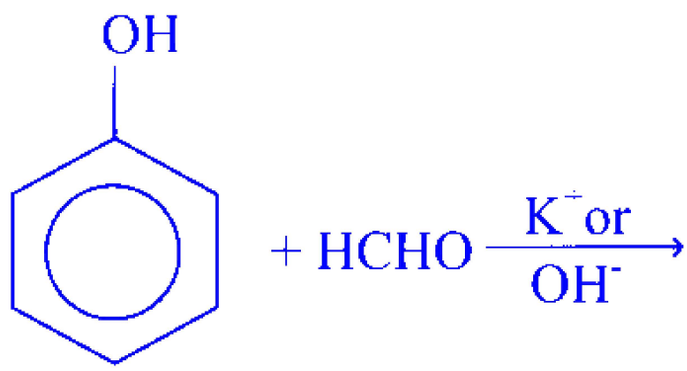
D.

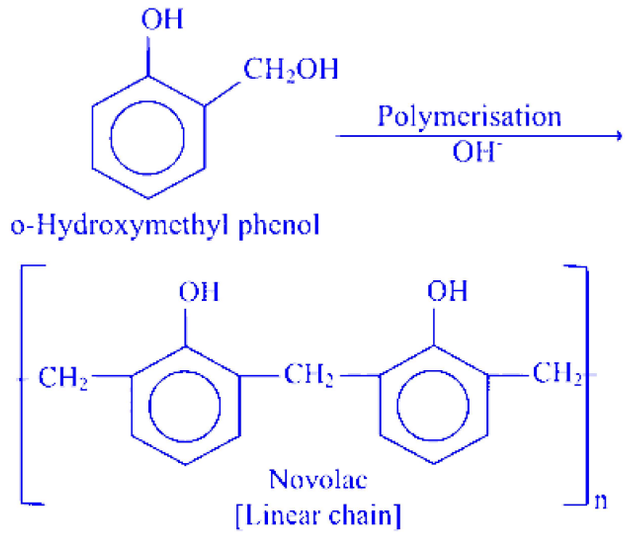


Answer: A

Solution:

The complete polymerisation is,



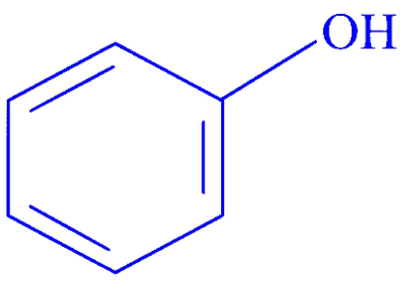


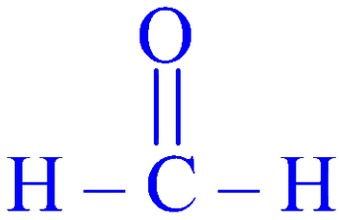
Question10

Which of the following is the common monomer for the polymers bakelite and melamine?

AP EAPCET 2025 - 21st May Evening Shift

Options:

A. 

B. 

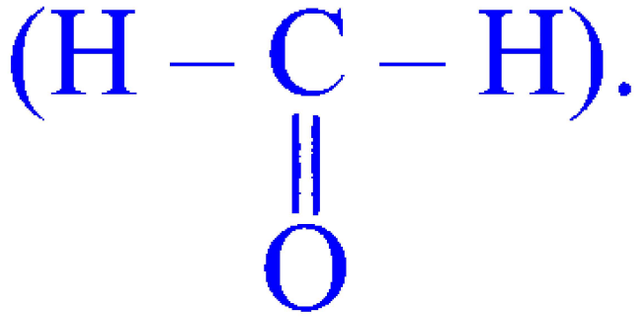
C. $HO - CH_2 - CH_2 - OH$

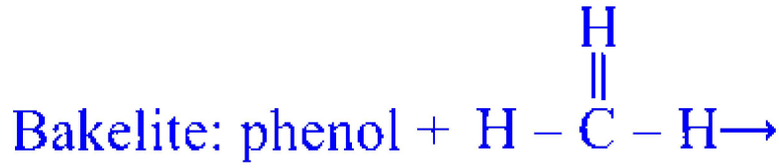
D. $CH_3 - OH$

Answer: B

Solution:

The common monomer for bakelite and melamine is formaldehyde





Phenol-formaldehyde resin

Melamine-formaldehyde resin.

Question11

In which polymer preparation, Ziegler- Natta catalyst is used?

AP EAPCET 2025 - 21st May Morning Shift

Options:

A.

Low density polythene

B.

Telfon

C.

Polyacrylonitrile

D.

High density polythene

Answer: D

Solution:

High density polythene is prepared using Ziegler-Natta catalyst. Ziegler - Natta catalyst: A transition metal halides + Organoaluminium compound e.g. $TiCl_4 + Al(C_2H_5)_3$

Question12

Polymers that can be softened on heating and hardened on cooling are called

AP EAPCET 2024 - 22th May Evening Shift

Options:

A. thermosetting polymers

B. bakelite

C. fibres

D. thermoplastic polymers

Answer: D

Solution:

The correct answer is Option D: thermoplastic polymers.

Here's why:

Thermoplastic polymers soften when heated and harden again upon cooling. This property allows them to be remolded repeatedly.

In contrast, thermosetting polymers (such as bakelite) undergo a curing process that permanently locks their structure, so they do not soften upon reheating.

Fibres refer to materials with long, flexible strands and are not classified based on heat-softening properties.

Thus, polymers that can be softened on heating and hardened on cooling are called **thermoplastic polymers.**

Question13

Which of the following is correct statement?

AP EAPCET 2024 - 22th May Evening Shift

Options:

A. Starch is a polymer of β-D-glucose

B. Amylose is a components of starch

C. Proteins are biopolymers of only one type of amino acids

D. Lactose is a disaccharide of $\alpha - D$ - glucose and β-D galactose

Answer: B

Solution:

Statement given in option (b) is correct, while all other are incorrect.

The correct statements are:

(a) Starch is a polymer of $\alpha -$ D glucose.

(c) Proteins are made of up to 20 different amino acids, so protein is heteropolymers or copolymers.

(d) Lactose is a disaccharide of $\beta -$ D glucose and β-D-galactose.

Set given in option (a) is not

Question14

Match the following.

List-I (Polymers)		List-II (Type)	
A.	Buna- N -rubber	I	Fibre

List-I (Polymers)		List-II (Type)	
B	Terylene	II	Thermosetting polymer
C	Polystyrene	III	Elastomer
D	Urea-formaldehyde resin	IV	Thermosplastic polymer

AP EAPCET 2024 - 22th May Morning Shift

Options:

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

B. A - III, B - IV,C -1, D $-$ II

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

D. A - IV, B - III, C -11, D-I

Answer: A

Solution:

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

A. Elastomer are any rubber material composed of long chain like polymers that are capable of recovering to original shape after stretching $\longrightarrow$ Buna-N Rubber is elastomer. (Inter-particle force is weakest : van der Waals' force)

B. Fiber forming polymers are linear macromolecules that are suitable for synthetic fiber $\longrightarrow$ Terylene is synthetic fiber.

(Inter-particle force is strongest : H-bonding)

C. A thermoplastic polymer are those polymer that can softern on heating and then processed. Polystyrene is an example.

D. Thermosetting polymers are semifluid substance with low molecular mass, when heated in mould undergo a permanent change, in composition. Urea-formaldehyde resin is an example.

Question15

The correctly matched set of the following is

AP EAPCET 2024 - 21th May Evening Shift

Options:

A. polystyrene - copolymer - thermoplastic

B. Bakelite - addition polymer - thermosetting

C. Nylon 6 - homopolymer- fibre

D. Buna- N - homopolymer - elastomer

Answer: C

Solution:

Option A: Polystyrene is formed by the polymerization of styrene and is a homopolymer (made from a single type of monomer), not a copolymer. Although it is a thermoplastic, the first part of the match is incorrect.

Option B: Bakelite is a thermosetting resin, but it is produced via a condensation reaction (not addition), so calling it an "addition polymer" is incorrect.

Option C: Nylon 6 is produced from caprolactam by ring-opening polymerization, making it a homopolymer. It is widely used in the textile industry as a fiber.

Nylon 6 (a homopolymer of caprolactam) → Fiber

This option is correctly matched.

Option D: Buna-N, also known as nitrile rubber, is a copolymer (usually made from butadiene and acrylonitrile), not a homopolymer, although it is an elastomer.

Thus, the correctly matched set is:

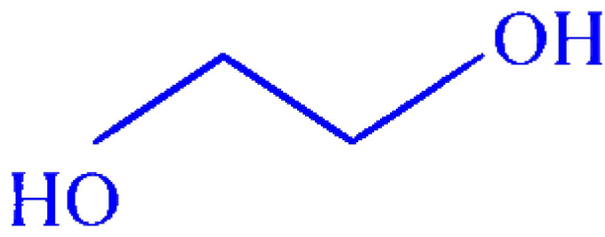
Option C: Nylon 6 – homopolymer – fiber.

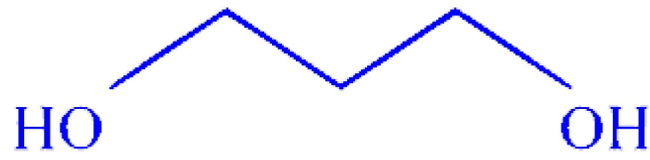
Question16

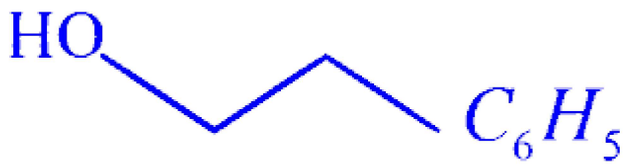
The common monomer for both terylene and glyptal is

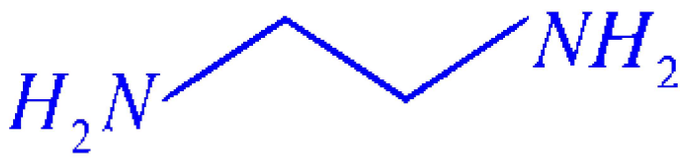
AP EAPCET 2024 - 21th May Morning Shift

Options:

A. 

B. 

C. 

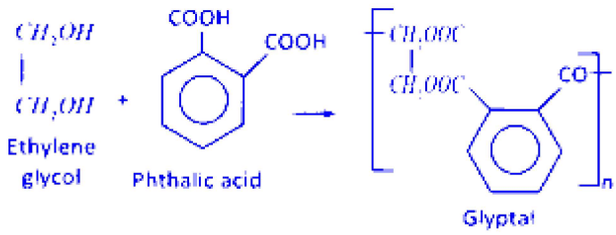
D. 

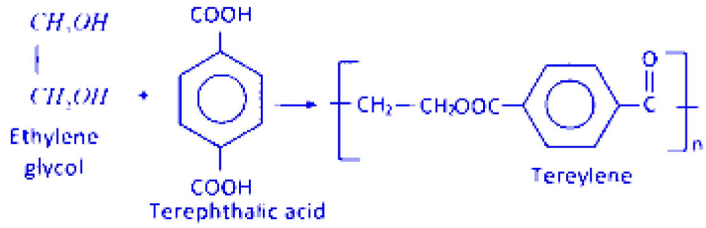
Answer: A

Solution:

Ethylene glycol is the common monomer for both terylene and glyptal.

Ethylene glycol



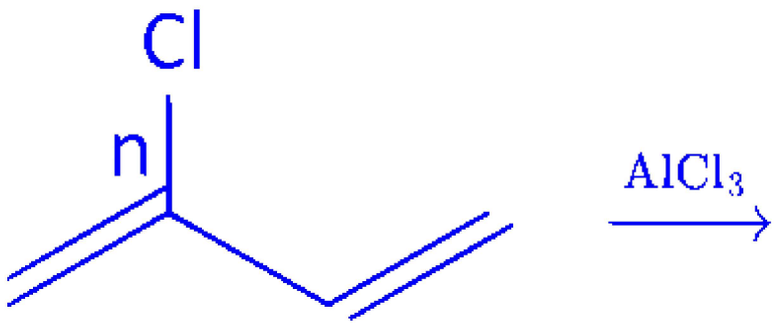


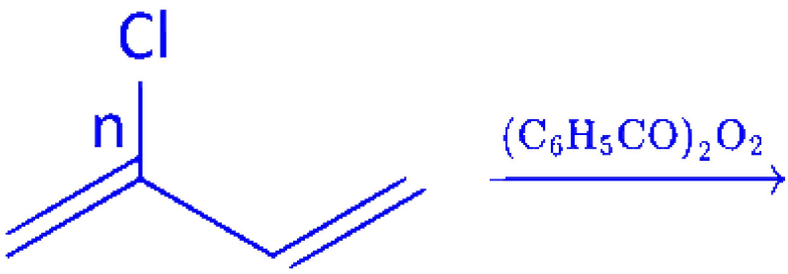
Question17

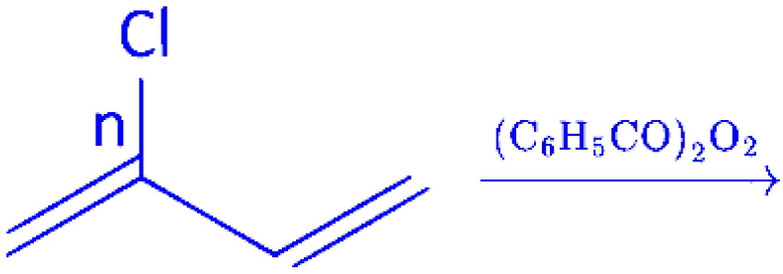
Which of the following polymerisation leads to the formation of neoprene ?

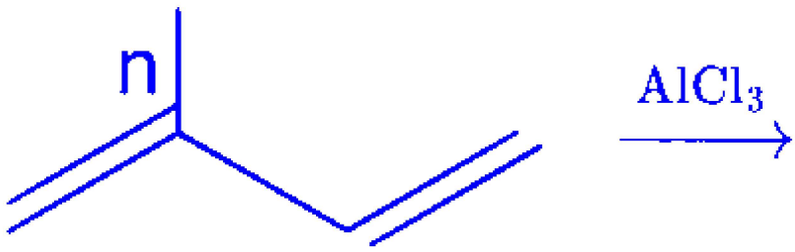
AP EAPCET 2024 - 20th May Evening Shift

Options:

A. 

B. 

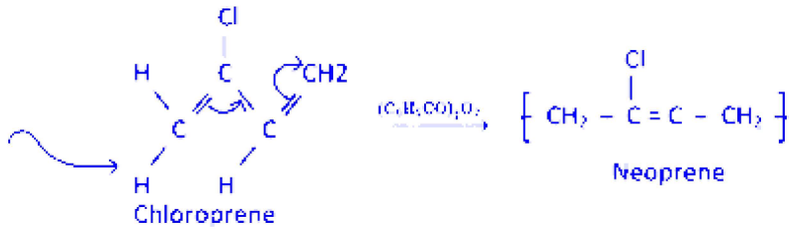
C. 

D. 

Answer: C

Solution:

Chloroprene is the monomer of neoprene. The complete reaction is as follow.

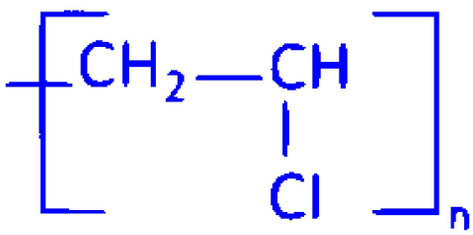


Question18

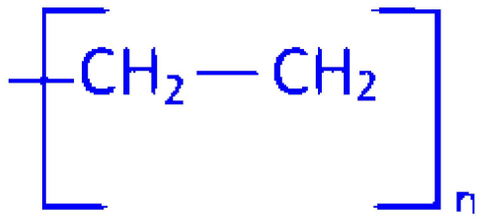
Which of the following is an example for fibre?

AP EAPCET 2024 - 20th May Morning Shift

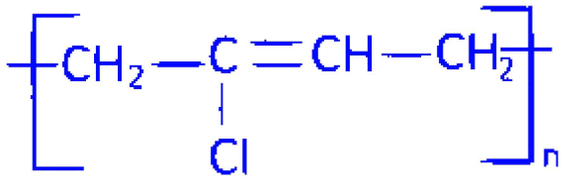
Options:

A. 

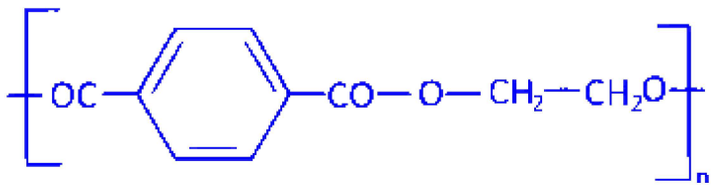
B.



C.



D.

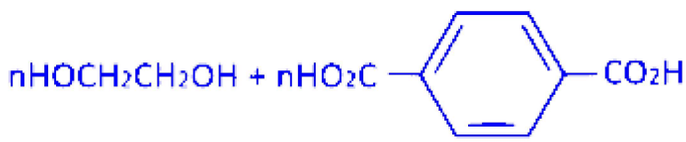


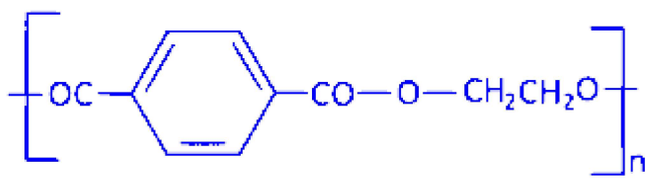
Answer: D

Solution:

Among the given, polyethylene terephthalate is a fibre polymer (a polyester).

Its monomers are ethylene glycol and terephthalic acid.





Question19

PHBV is a biodegradable polymer of two monomers X and Y. X and Y respectively are.

AP EAPCET 2024 - 19th May Evening Shift

Options:

A. $X = C_2H_5 - CH(OH) - CH_2CO_2H$

$Y = C_2H_5 - CH(OH) - CO_2H$

B. $X = CH_3 - CH(OH) - CH_2CO_2H$

$Y = C_2H_5 - CH(OH) - CH_2CO_2H$

C. $X = CH_3 - CH(OH) - CH_2OH$

$Y = C_2H_5 - CH(OH) - CH_2CO_2H$

D. $X = H_2N - (CH_2)_5 - CO_2H$

$Y = CH_3 - CH(OH) - CH_2CO_2H$

Answer: B

Solution:

PHBV (IUPAC name) 3-hydroxybutyrate-CO- 3 hydroxy valerate) is a polyhydroxy alkanoate type polymer. The monomers are

(i) 3 hydroxybutyrate (3 HB)

$X = CH_3 - CH(OH) - CH_2CO_2H$

(ii) 3 hydroxyvalerate (3 HV)

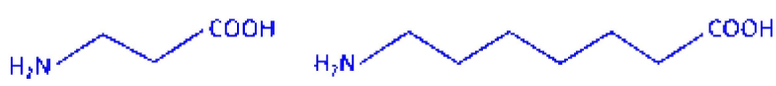
$Y = C_2H_5CH(OH)CH_2CO_2H$

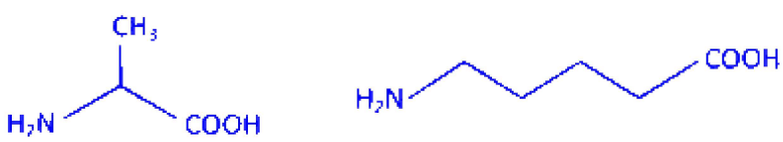
Question20

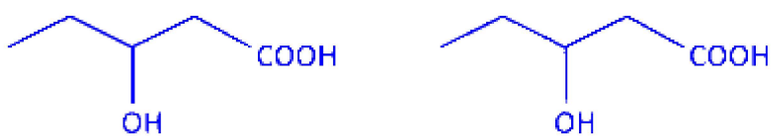
A polymer X is biodegradable and is obtained from the monomers Y, Z. What are Y and Z ?

AP EAPCET 2024 - 18th May Morning Shift

Options:

A. 

B. 

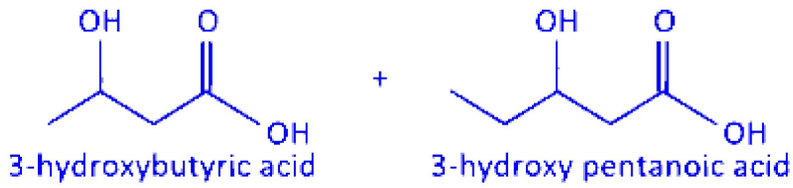
C. 

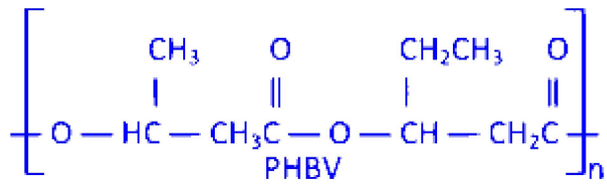
D. 

Answer: D

Solution:

Among the given options monomer given in option (d) will give biodegradable polymer i.e., PHBV.





Question21

The catalyst used in the manufacture of polyethylene is a mixture of

AP EAPCET 2022 - 4th July Morning Shift

Options:

A. $Ti, Al(CH_3)_3$

B. Ti, CH_3MgBr

C. $TiCl_3, Si(CH_3)_4$

D. $TiCl_4, Al(CH_3)_3$

Answer: D

Solution:

Preparation of polyethylene is done in the presence of the "Zeigler-Natta catalyst" which is a mixture of trimethylaluminium $[Al(CH_3)_3]$ and titanium tetrachloride $(TiCl_4)$.