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Q-1 - 19124168

Natural rubber is:

- (A) Polyisoprene
- (B) Polyvinyl chloride
- (C) Polychloroprene
- (D) Polyfluoroethylene

CORRECT ANSWER: A

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Q-2 - 19124157

Melmac is a polymer of melamine and

- (A) glycerol
- (B) formaldehyde
- (C) cyclohexane
- (D) caprolactum

CORRECT ANSWER: B

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Q-3 - 19038294

Natural rubber and gutta-percha respectively are

- (A) cis-polyisoprene and trans-polyisoprene
- (B) both are cis-polyisoprene
- (C) both are trans-polyisoprene

(D) trans-polychloroprene and cis polychloroprene and
cis-polychloroprene

CORRECT ANSWER: A

SOLUTION:

Natural rubber is cis-polyisoprene while gutta-parcha is
trans-polyisoprene.

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Q-4 - 12979885

Which of the following is not a natural polymer?

(A) Neoprene

(B) Gun-cotton

(C) Silk

(D) Both (1) and (2)

CORRECT ANSWER: D

SOLUTION:

Neoprene is a synthetic derived from the monomer chloroprene. Gun-cotton (cellulose nitrate, used in making explosives) is a semi synthetic polymer. Silk is a typical example of a natural polymer.

Natural polymers include proteins, nucleic acid.

Cellulose (polysaccharide), and rubber (polyisoprene).

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Q-5 - 12580781

Which of the following is a synthetic polymer?

(A) Rubber

(B) Perspex

(C) Protein

(D) Cellulose

CORRECT ANSWER: B

SOLUTION:

Perspex is a synthesized polymer.

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Q-6 - 14535271

Starch is polymer of

(A) α - D - Glucose

(B) β - D - Glucose

(C) α - D - Glucose and β - D - Glucose

(D) $\alpha - D$ - Fructose

CORRECT ANSWER: A

SOLUTION:

Starch is polymer of $\alpha - D$ -glucose.

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Q-7 - 12581062

Which of the following polymer is an example of fibre ?

(A) Silk

(B) Dacron

(C) Nylon— 66

(D) All of these

CORRECT ANSWER: D

SOLUTION:

Silk is protein fibre. Dacron is polyester fibre and Nylon — 66 is polyamide fibre.

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Q-8 - 11486567

Which of the following statements are correct about Nylon-6, 6?

- (A) Nylon fibers have higher tensile strength than terylene fibers.
- (B) Nylon fibers have lower tensile strength than terylene fibers.
- (C) In nylon, there is strong intermolecular H -bonding, while in terylene there is weak dipole-dipole interaction
- (D) In nylon, there is weak intermolecular H -bonding,

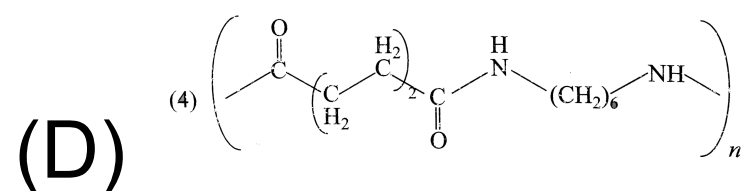
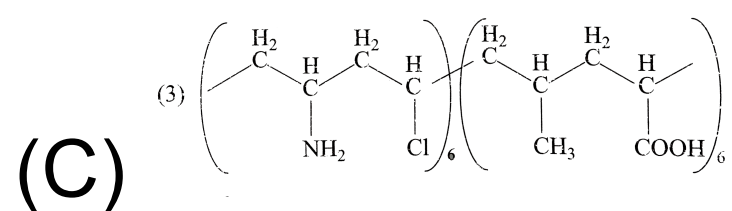
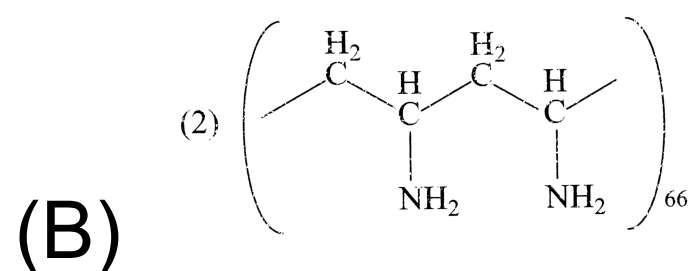
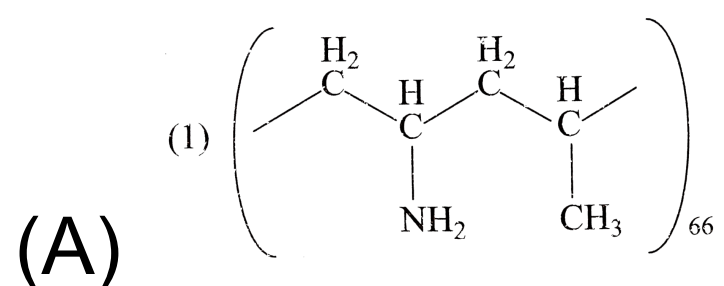
while in trylene there is strong dipole-dipole interaction

CORRECT ANSWER: A::C

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Q-9 - 12979932

Which one of the following represent nylon 6,6 polymer?

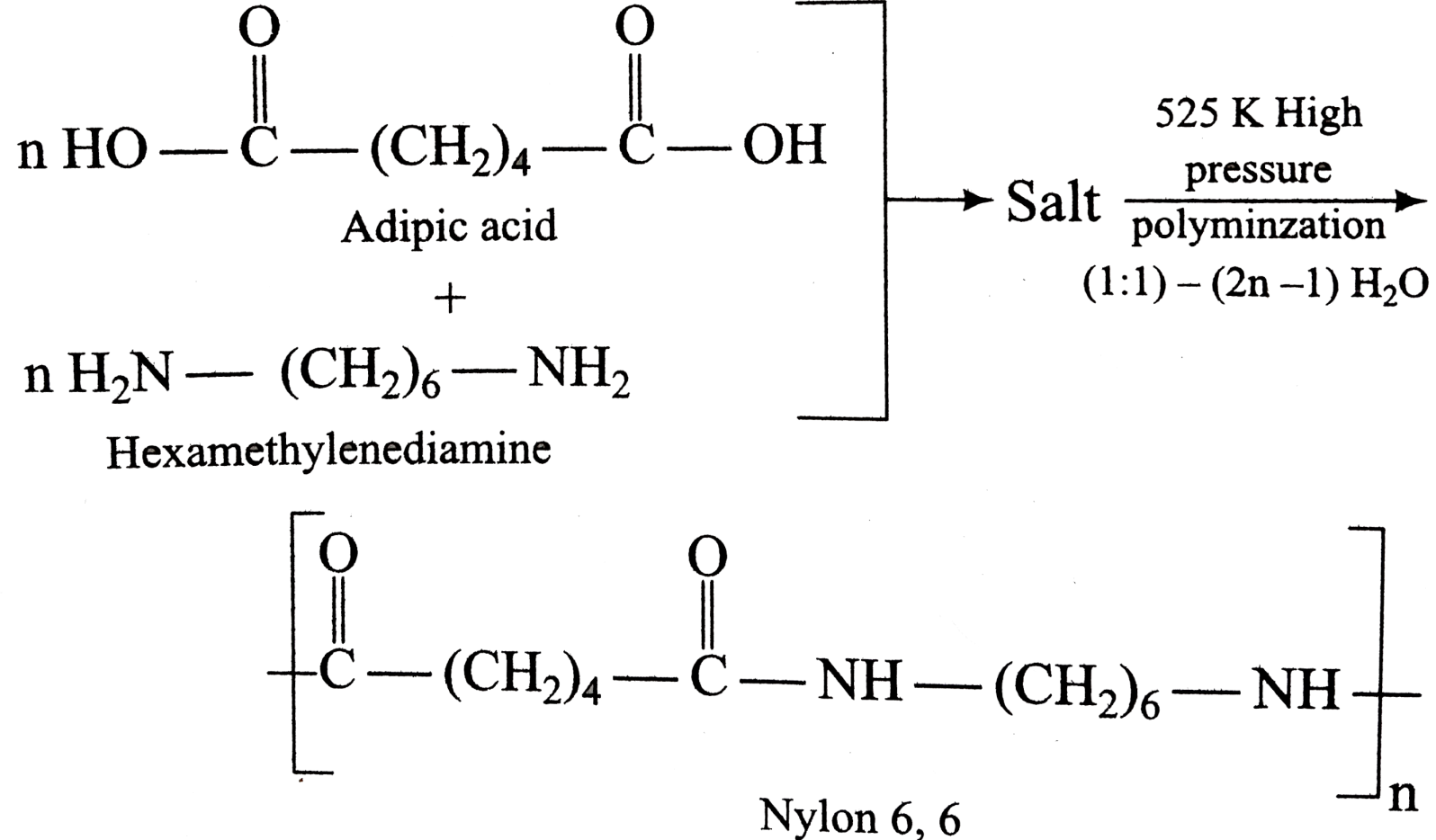


CORRECT ANSWER: B

SOLUTION:

Nylon 6,6 (a polyamide) is manufactured by the condensation polymerization of adipic and hexamethylenediamine. The acid and the amine first react to form a salt which when heated to $535K$ under pressure undergoes polymerization with elimination of water as steam and the nylon is produced in the molten state.

It can then be cast into a sheet of fibres by passing through a spinneret (some spinnign device). It is called nylon 6,6 (read as six, six) since both adipic and hexamethyllenediamin contains six carbon atoms each.



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Q-10 - 12581066

Teflon is a polymer of the monomer or Teflon is obtained by the polymerisation of

- (A) monofluoroethene
- (B) difluoroenthene
- (C) trifluoroethene
- (D) tetrafluorethene

CORRECT ANSWER: D

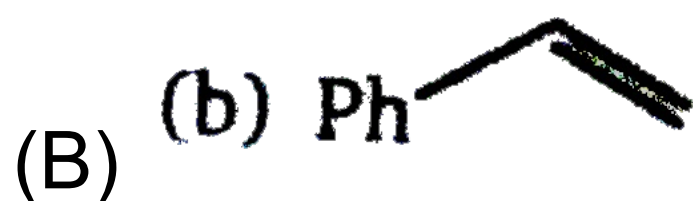
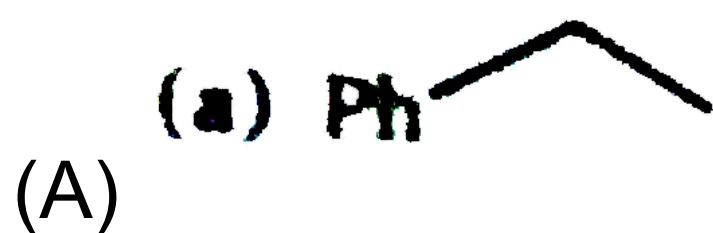
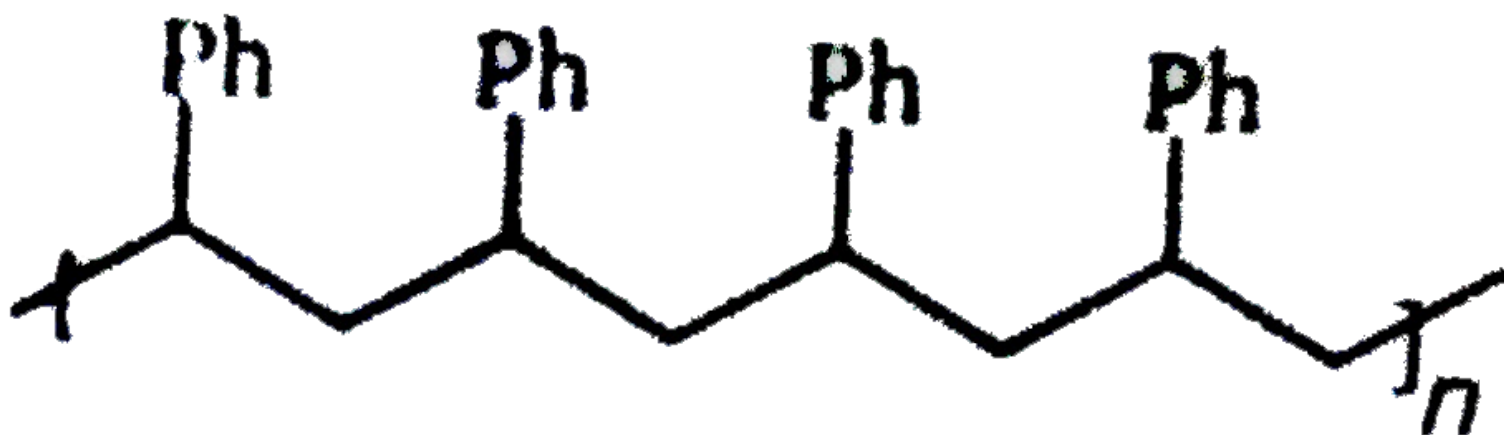
SOLUTION:

Tetrafluoroethene ($CF_2 = CF_2$).

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Q-11 - 19103364

What is the structure of the monomer from which the following polymer was made ?



(C)

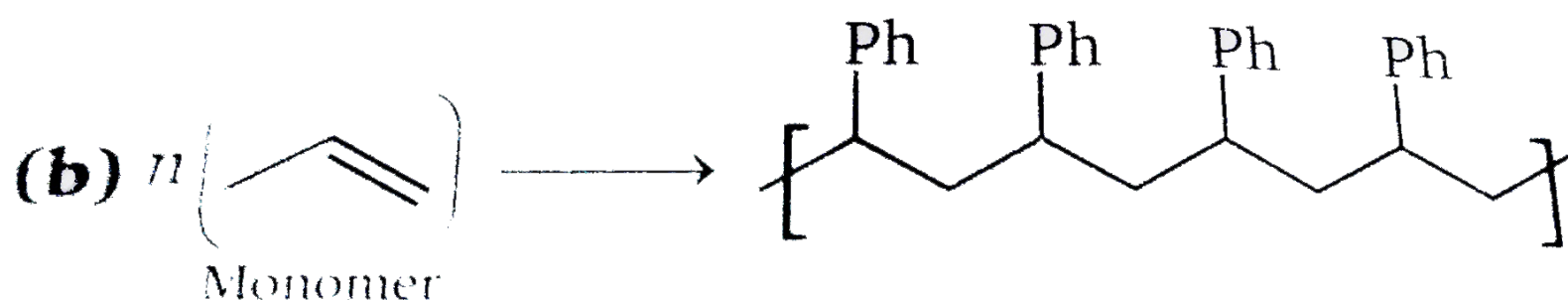


(D)



CORRECT ANSWER: B

SOLUTION:



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Q-12 - 15603122

Among cellulose, poly (vinyl chloride), nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest is

(A) nylon

(B) poly (vinyl chloride)

(C) cellulose

(D) natural rubber

CORRECT ANSWER: D

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Q-13 - 12580824

Which of the following is a copolymer formed by condensation polymerization?

(A) Buna-*S*rubber

(B) Buna-N

(C) Neoprene

(D) Terylene

CORRECT ANSWER: D

SOLUTION:

Terylene is prepared by condensing ethylene glycol and terephthalic acid.

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Q-14 - 12979899

Among the polymers, which one is generally prepared by cationic polymerization?

(A) Polymerization

(B) Teflon

(C) Orlon

(D) Polypropylene

CORRECT ANSWER: A

SOLUTION:

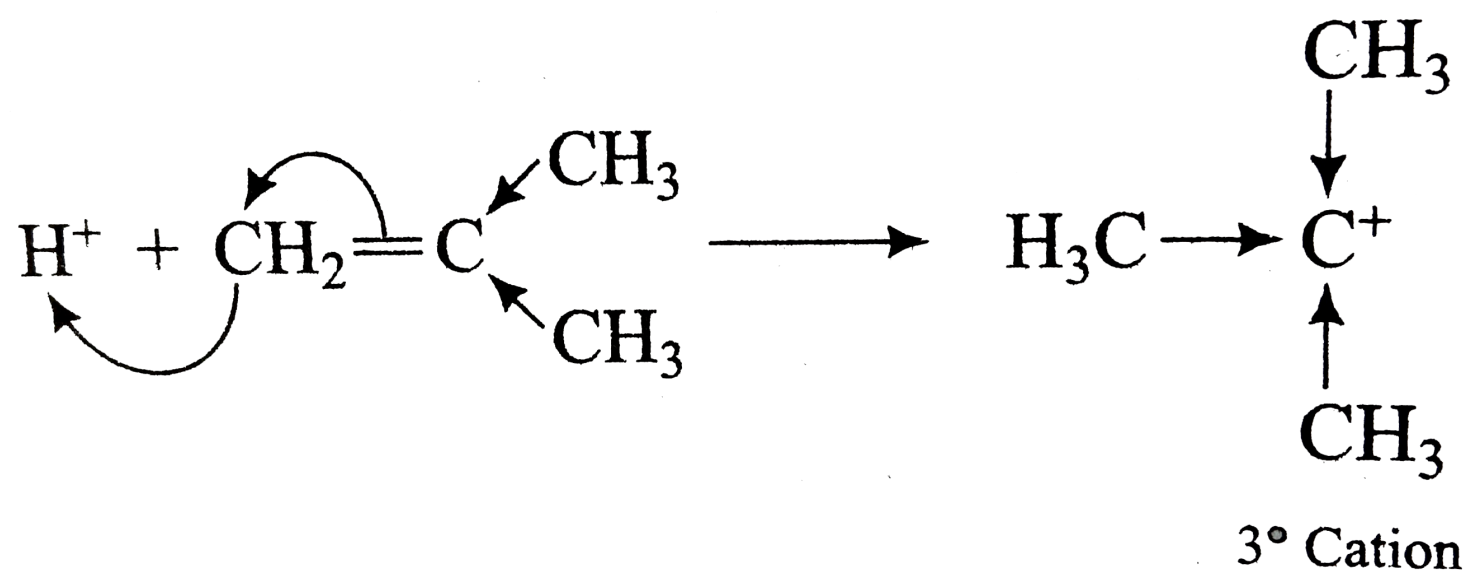
When the initiator is cationic in nature (such as H^+ from an acid), on addition to the double bond, it would generate a cationic intermediate for propagating the addition chain process which is called cationic intermediate for propagating the addition chain process which is called cationic addition polymerization.

Cationic polymerization is facilitated in monomers containing electron-releasing groups. Thus isobutylene undergoes cationic polymerization easily as it has two electron-releasing $-CH_3$ groups that will stabilize the intermediate tertiary carbocation:

Orlon or acrilan is derived from acrylonitrile,

$CH_2CH - CN$ which has an electron-withdrawing CN group. Teflon is derived from tetrafluoroethene

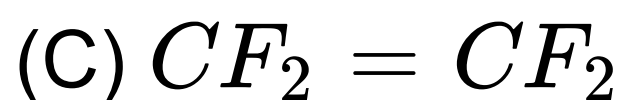
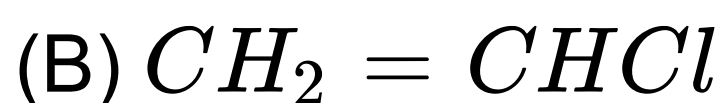
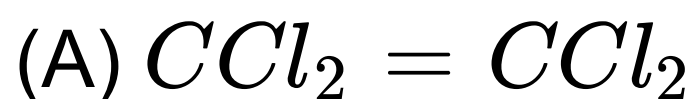
which has electron withdrawing F atoms. Polypropylene is derived from propylene $CH_3 = CH_2$ which has just one electron releasing methyl group.



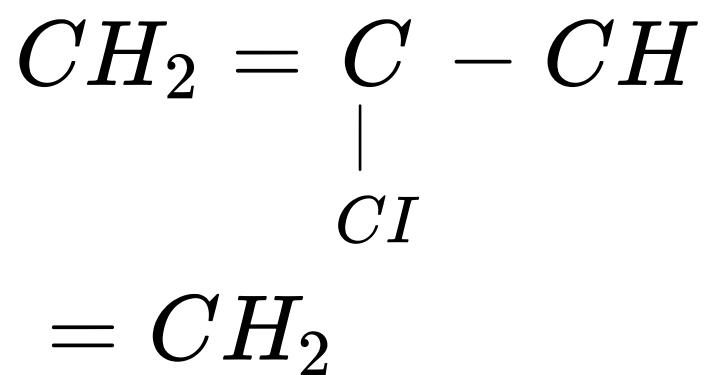
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Q-15 - 12979955

Which one of the following monomers gives the polymer neoprene on polymerization?



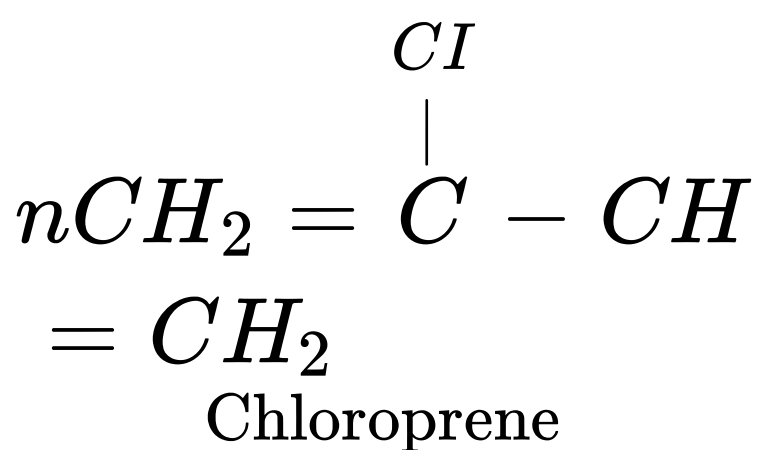
(D)



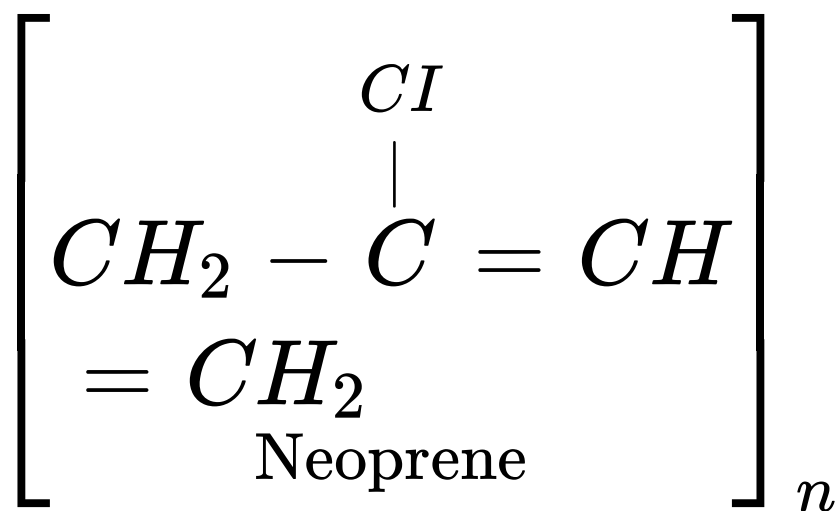
CORRECT ANSWER: D

SOLUTION:

Neoprene (or polychloroprene) is formed by the free radical of chloroprene:

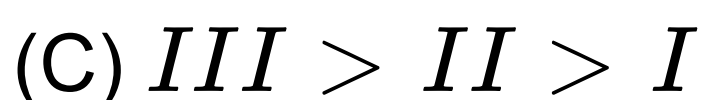
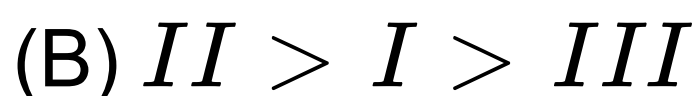
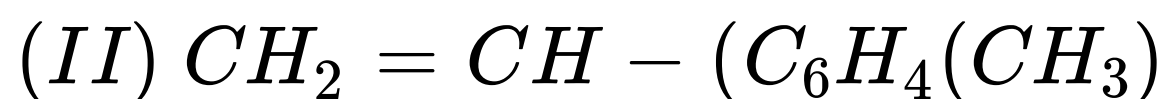
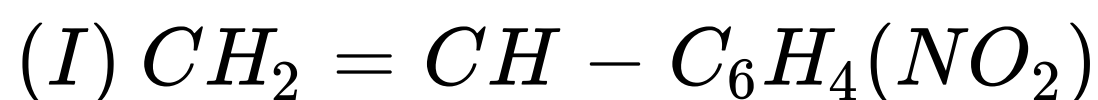


Polymerization
 $\xrightarrow{\hspace{1cm}}$



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Arrange the following monomers in order of decreasing ability of undergo cationic polymerisation.



CORRECT ANSWER: C

SOLUTION:

More stable is carbocation more is ability to undergo

cationic polymerisation.

+ *I* and + *R* nature of $-OCR_3$ stabilizes carbocation.

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Q-17 - 24342324

Which of the following monomers form biodegradable polymers?

- (A) 3-hydroxybutanoic acid + 3-hydroxypentanoic acid
- (B) Glycine+amino caproic acid
- (C) Ethylene glycol + phthalic acid
- (D) Caprolactum

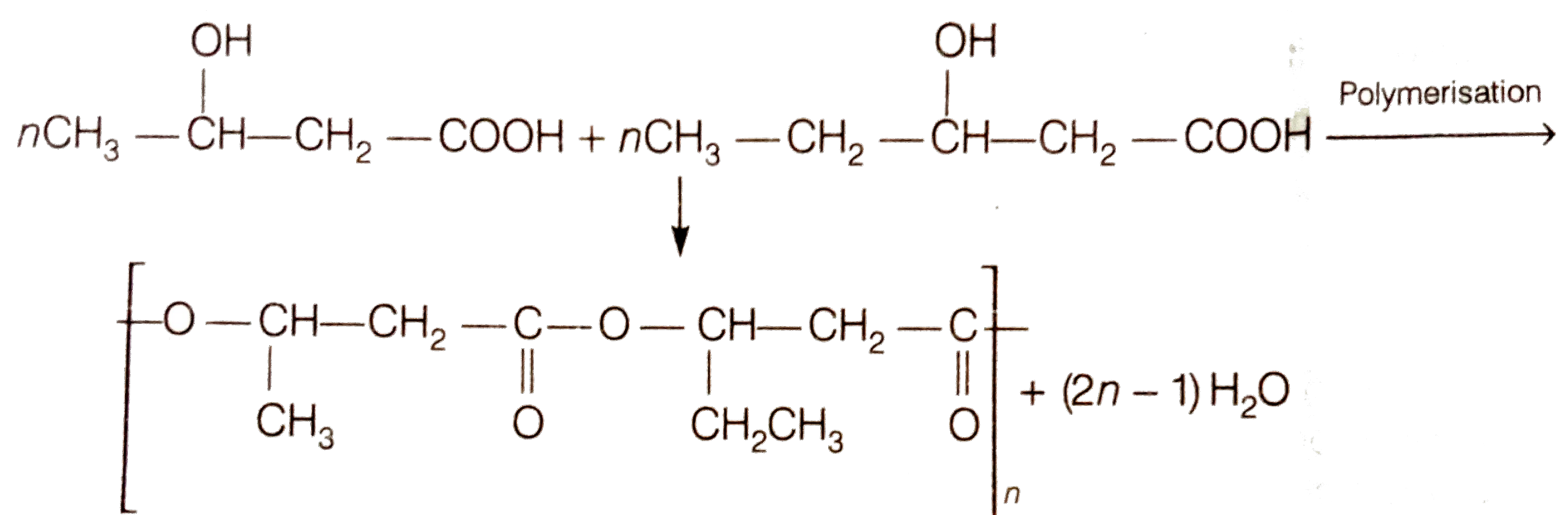
CORRECT ANSWER: A::B

SOLUTION:

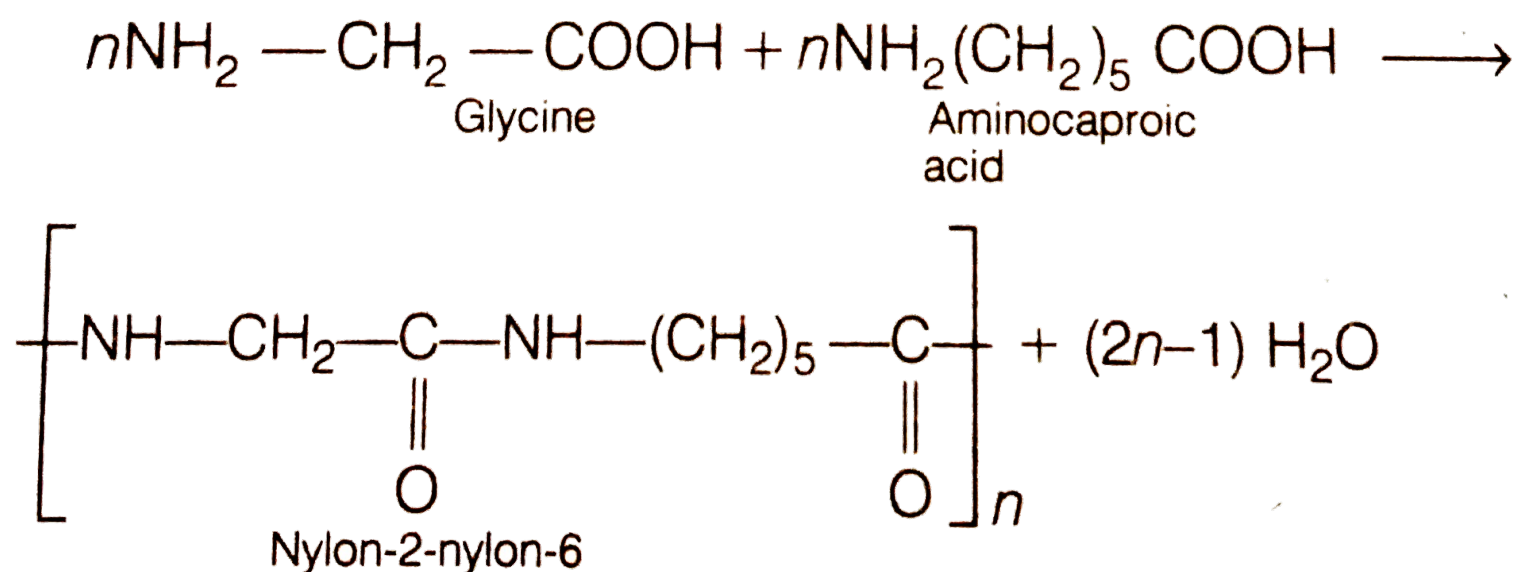
Biodegradable polymer The polymers which are easily

decomposed and not harmful for the environment are known as biodegradable polymer e.g

(i) PHBV is obtained by condensation polymerisation of 3 hydroxybutanoic acid and 3 hydroxypentanoic acid



(ii) Glycine and aminocaproic acid produces nylon-2
nylon -6 polymer



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The polymerization process in which two or more chemically different monomers take part to form a polymer is called

(A) addition polymerization

(B) copolymerization

(C) chain polymerizationn

(D) homopolymerization

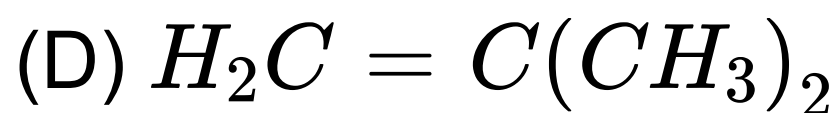
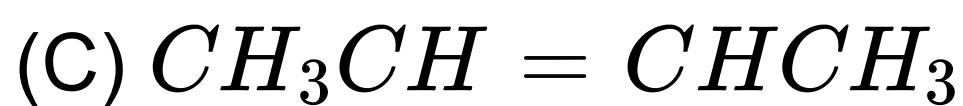
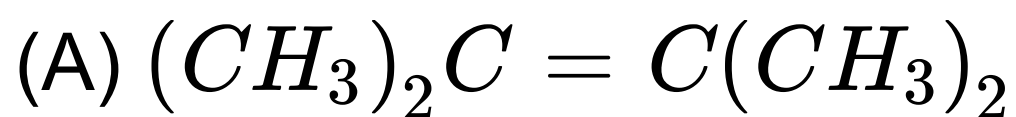
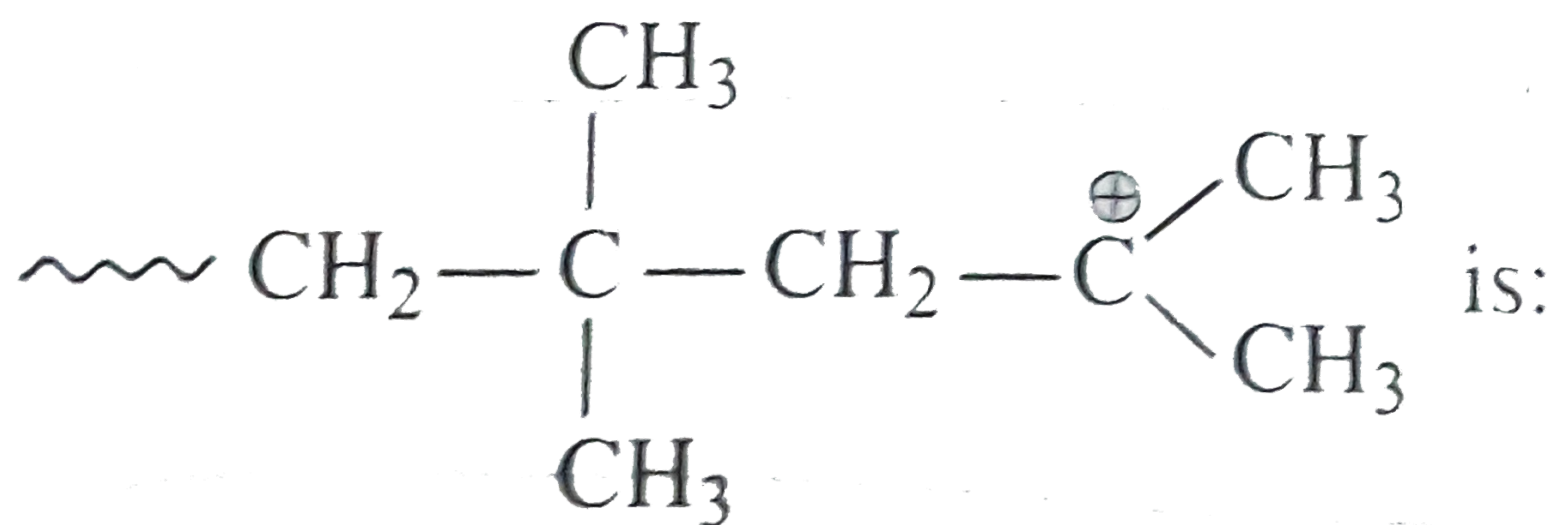
CORRECT ANSWER: B

SOLUTION:

Copolymerisation is a polymerization reaction in which a mixture of more than one monomeric species is allowed to polymerise and form copolymer

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The monomer of the polymer



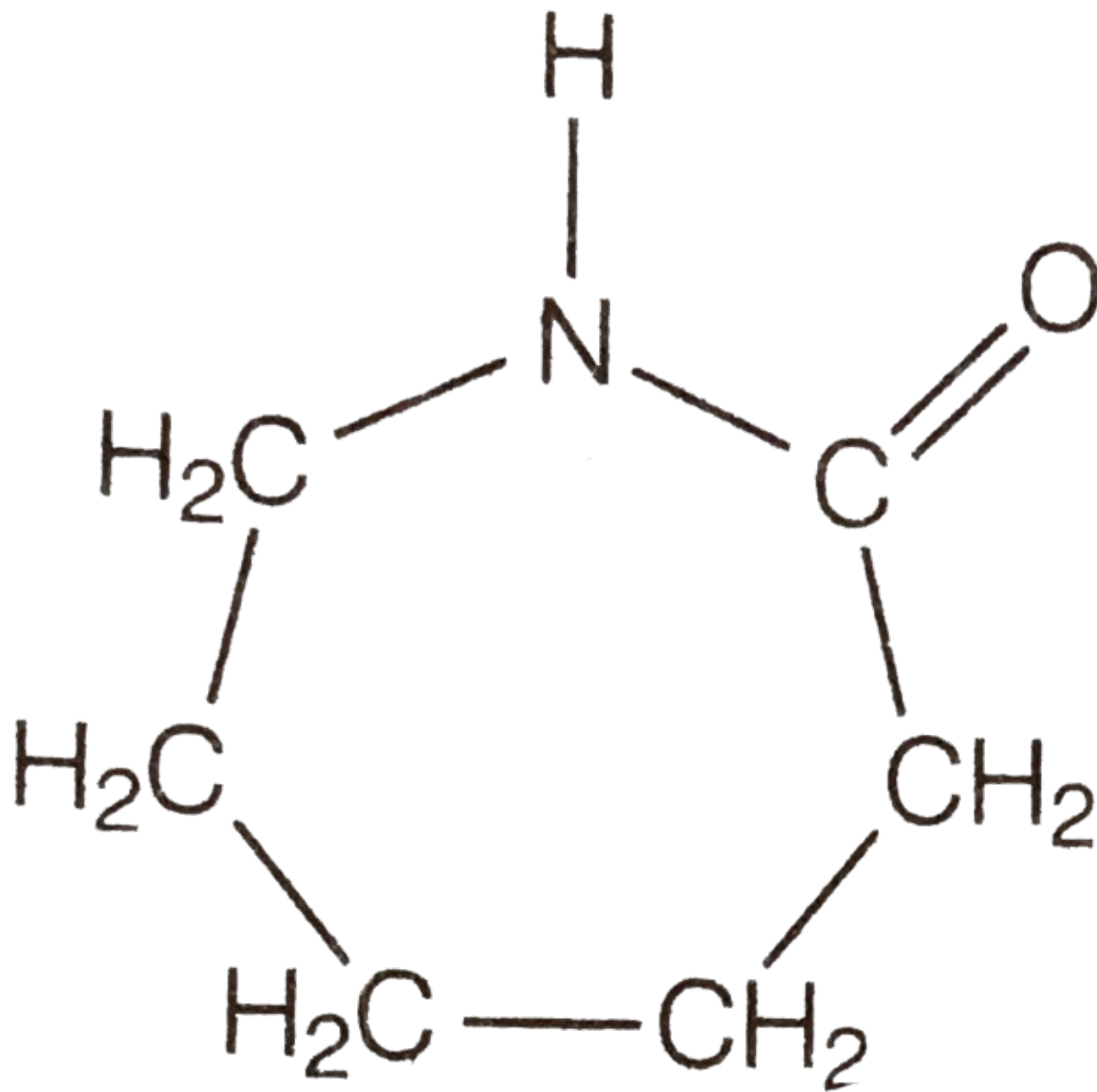
CORRECT ANSWER: D

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Q-20 - 24342315

Which of the following polymer can be formed by using the

following monomer units



(A) Nylon-6,6

(B) Nylon-2-nylon-6

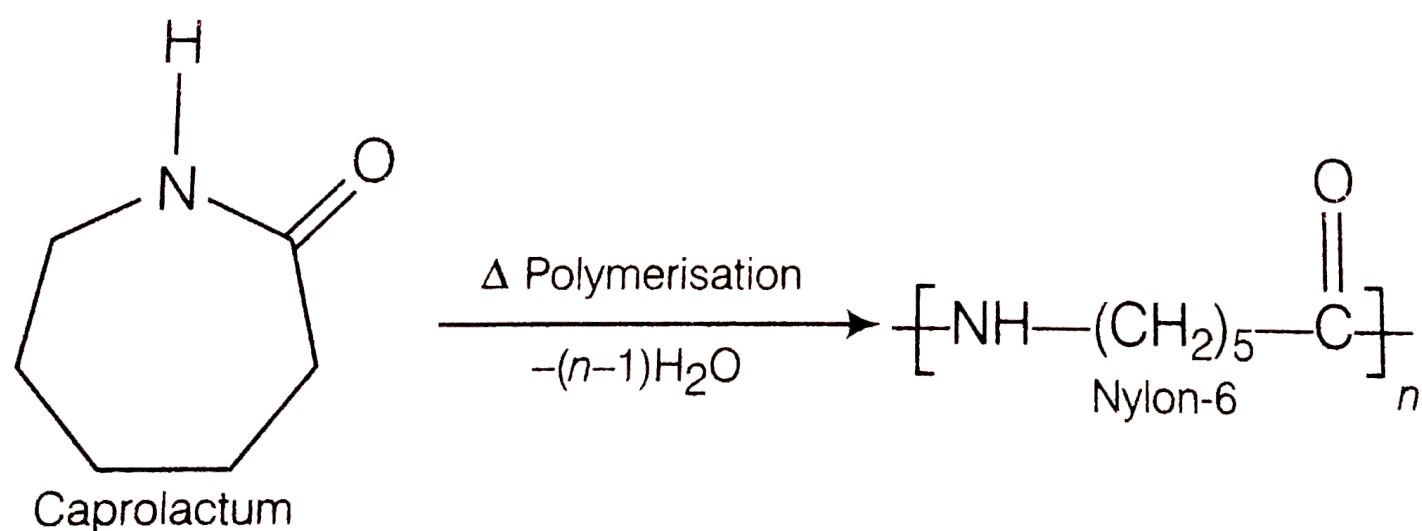
(C) Melamine polymeer

(D) Nylon-6

CORRECT ANSWER: D

SOLUTION:

Given monomer is the structure of caprolactum which on polymerisation produces Nylon-6



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Q-21 - 12580766

Orlon is a polymer of

- (A) Styrene
- (B) Tetrafluoro ethylene
- (C) Vinyl chloride
- (D) Acrylonitrile

CORRECT ANSWER: D

SOLUTION:

Acrylonitrile is a hard, horny and high melting material. It is used in the manufacture of orlon and Acrilan fibres which are used for making clothes, carpet and blankets.

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Q-22 - 12580811

Which of the following is not a polymer?

(A) Silk

(B) *DNA*

(C) *DDT*

(D) Starch

CORRECT ANSWER: C

SOLUTION:

DDT is an organic compound used as insecticide not is a polymer

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Q-23 - 11486580

Which of the following are additional homopolymers?

(A) Teflon

(B) *SBR*

(C) *PVC*

(D) Natural rubber

CORRECT ANSWER: A::C::D

SOLUTION:

SBR is copolymer .

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Q-24 - 19038280

In vulcanisation of rubber,

- (A) sulphur reacts to form a new compound
- (B) sulphur cross-links are introduced
- (C) sulphur forms very thin protective layer on rubber
- (D) All of the above

CORRECT ANSWER: B

SOLUTION:

In vulcanisation of rubber sulphur cross-links are

introduced at the reactive sites of double bonds.

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Q-25 - 12580774

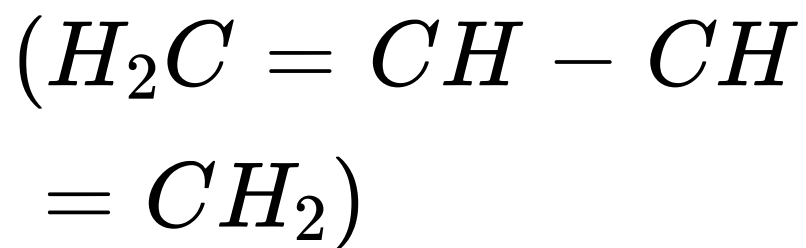
In Buna-*S* symbol 'Bu' stands for:

- (A) 1-butene
- (B) 2-butene
- (C) n-butene
- (D) butadiene

CORRECT ANSWER: D

SOLUTION:

In Buna-*S* (*SBR*, styrene butadiene rubber), the symbol '*Bu*' stands for 1,3-butadiene



.

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Q-26 - 12580792

'Rayon' is

- (A) Natural silk
- (B) Artificial silk
- (C) Natural plastic or rubber
- (D) Synthetic plastic

CORRECT ANSWER: B

SOLUTION:

Rayon is man-made fibre which consists of purified

cellulose in the form of long threads. Rayon resembles silk in appearance. Hence called as artificial silk.

Cellulose
(From woodpulp)

$\xrightarrow[\text{CS}_2]{\text{NaOH}}$ **Viscose**
(Syrum like liquid)

$\xrightarrow[\text{Spinneret into dil. H}_2\text{SO}_4]{\text{Pass through}}$ **Rayon**
(Fine silken thread)

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Q-27 - 12580777

Which of the following is a semisynthetic polymer?

(A) Silk

(B) Wood

(C) Rayon

(D) Natural rubber

CORRECT ANSWER: C

SOLUTION:

Rayon is an artificial fiber made of regenerated cellulose formerly known as viscos, artificial silk, fibre silk etc.

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Q-28 - 11486673

Which of the following is not correct regarding terylene?

- (A) Condensation polymer
- (B) Synthetic fibre
- (C) Step growth polymer
- (D) Thermosetting plastic

CORRECT ANSWER: D

Q-29 - 12580783

Which of the following is fully fluorinated polymer?

- (A) Teflon
- (B) Neoprene
- (C) Thiokol
- (D) *PVC*

CORRECT ANSWER: A

SOLUTION:

Teflon is polytetrafluoroethylene $(-CF_2 - CF_2 -)_n$.

Q-30 - 12580801

Isoprene is a valuable

- (A) propene
- (B) Liquid fuel
- (C) Synthetic rubber
- (D) Petrol

CORRECT ANSWER: C

SOLUTION:

Rubber is a polymer of isoprene. Its chemical formula is $(C_5H_8)_n$.

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Q-31 - 12580817

Styrene at room temperature is

(A) Solid

(B) Liquid

(C) Gas

(D) Colloidal solution

CORRECT ANSWER: B

SOLUTION:

Styrene at room temperature is liquid

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Q-32 - 12580819

The Ziegler-Natta catalysts are

(A) Stereospecific

(B) Non-metallic complexes

(C) Gaseous catalysts

(D) Universal in all polymerisation reactions

CORRECT ANSWER: A

SOLUTION:

Ziegler-Natta catalyst is a mixture of $TiCl_4$ and $(C_2H_5)_5Al$ used in the synthesis of stereoregular polymers.

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Q-33 - 12580827

What is not true about Polymers?

(A) Polymers do not carry any charge

(B) Polymers have high viscosity

(C) Polymers scatter light

(D) Polymers have low molecular weight

CORRECT ANSWER: D

SOLUTION:

Polymers have high molecular weight.

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Q-34 - 12581074

In elastomer, intermolecular forces are

(A) nil

(B) weak

(C) strong

(D) very strong

CORRECT ANSWER: B

SOLUTION:

Polymer chains in elastomer are held together by weak intermolecular forces *e. g.* Vulcanised rubber.

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Q-35 - 19124161

The monomer unit of PVC is:

- (A) vinyl chloride
 - (B) ethylene
 - (C) chloroprene
 - (D) acrylonitrile
-

CORRECT ANSWER: A

Q-36 - 19124162

Glyptal is a polymer of

- (A) ethylene glycol
 - (B) ethylene glycol and phthalic acid
 - (C) ethylene glycol and adipic acid
 - (D) caprolactum
-

CORRECT ANSWER: B

Q-37 - 19124179

Artificial silk is:

(A) nylon-6

(B) rayon

(C) nylon-66

(D) none of these

CORRECT ANSWER: C

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Q-38 - 14535424

Bakelite is obtained from phenol by reacting with.

(A) CH_3CHO

(B) CH_3COCH_3

(C) $HCHO$

(D) $(CH_2OH)_2$

CORRECT ANSWER: C

SOLUTION:

Bakelite is polymer of phenol and formaldehyde.

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Q-39 - 19038214

On the basis of strcture of polymers, they can be classified as

- (A) ilnear, synthetic and network polymers
 - (B) natural, synthetic and polymers
 - (C) natural, synthetic and semi synthetic polymers
 - (D) natural, synthtic and linear polymers
-

CORRECT ANSWER: A

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Terylene is a condensation polymer of ethylene glycol and

(A) benzoic acid

(B) phthalic acid

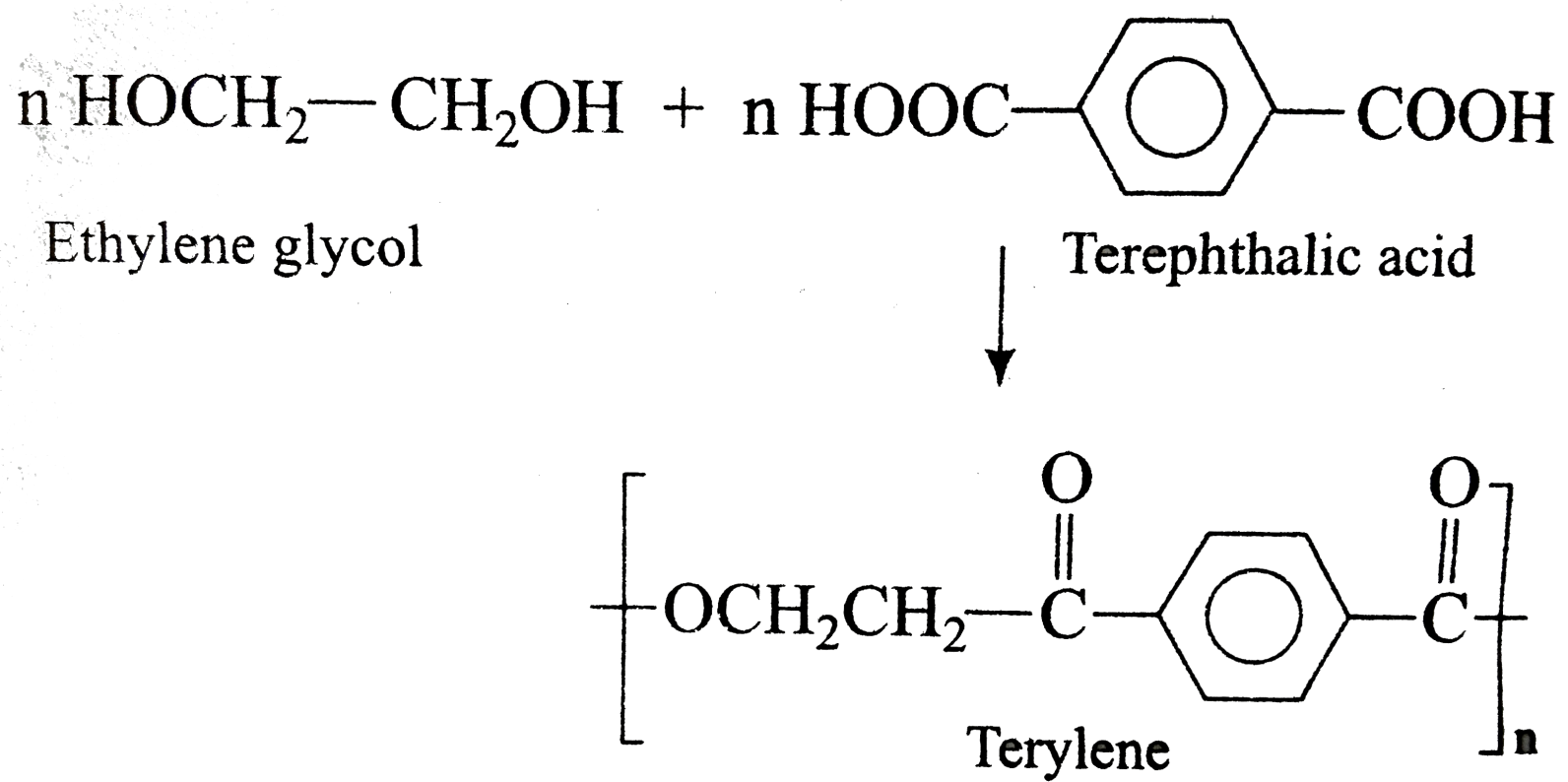
(C) terephthalic acid

(D) salicylic acid

CORRECT ANSWER: C

SOLUTION:

The formation of terylene or dacron involves the interaction of ethylene glycol and terephthalic acid:



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Q-41 - 14535274

Ziegler-Natta catalyst is

- (A) $K[\text{PtCl}_3(\text{C}_2\text{H}_4)]$
- (B) $(\text{Ph}_3\text{P})_3\text{RhCl}$
- (C) $\text{Al}_2(\text{C}_2\text{H}_5)_6 + \text{TiCl}_4$
- (D) $\text{Fe}(\text{C}_5\text{H}_5)_2$

CORRECT ANSWER: C

SOLUTION:

Ziegler Natta Catalyst is $Al_2(C_2H_5)_6 + TiCl_4$.

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Q-42 - 11486687

Teflon ,styron,and neoprene are all:

- (A) Copolymers
- (B) Monomers
- (C) Homopolymers
- (D) Condensation polymer

CORRECT ANSWER: C

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Q-43 - 11486689

Which of the following sets contains only copolymers?

- (A) *SBR*, Glyptal, Nylon-6, 6
 - (B) Poluthene, Polyester, *PVC*
 - (C) Nylon-6, Butyl rubber, Neoprene
 - (D) Melmac, Bakelite, Teflon
-

CORRECT ANSWER: A

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Q-44 - 12979929

Which one is not classified as a condensation polymer?

- (i) teflon
- (ii) Orlon
- (iii) Dacron
- (iv) Neoprene

(A) (i), (ii), (iv)

(B) (i), (ii), (iii) (iv)

(C) (i),(ii)

(D) (ii), (iv)

CORRECT ANSWER: A

SOLUTION:

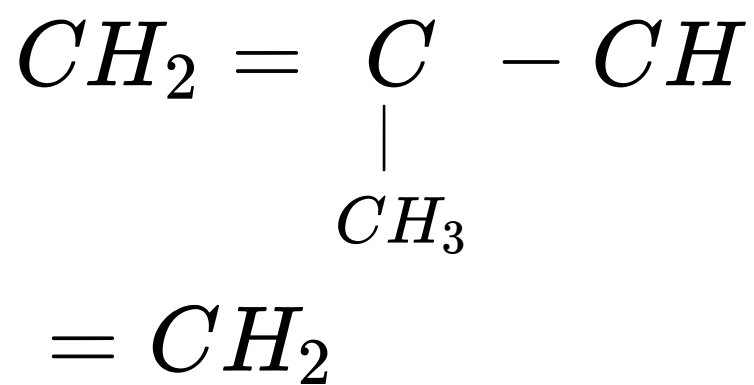
Only Dacron is a condensation polymer while the rest are addition polymers.

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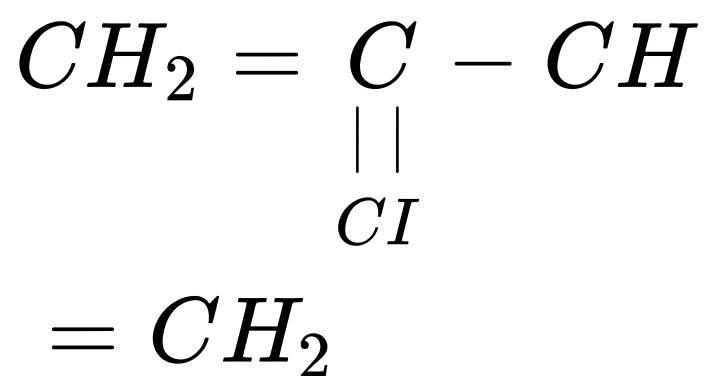
Q-45 - 12979940

Which is the monomer of neoprene in the following?

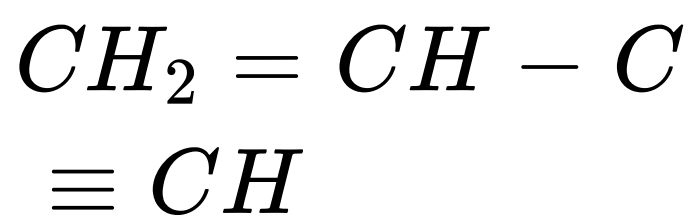
(A)



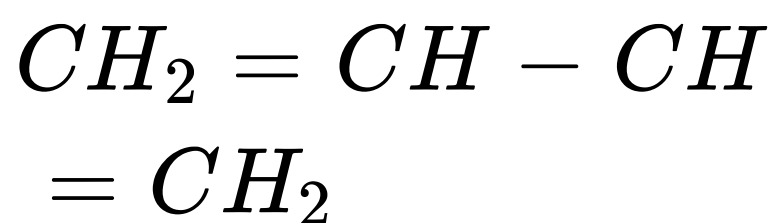
(B)



(C)



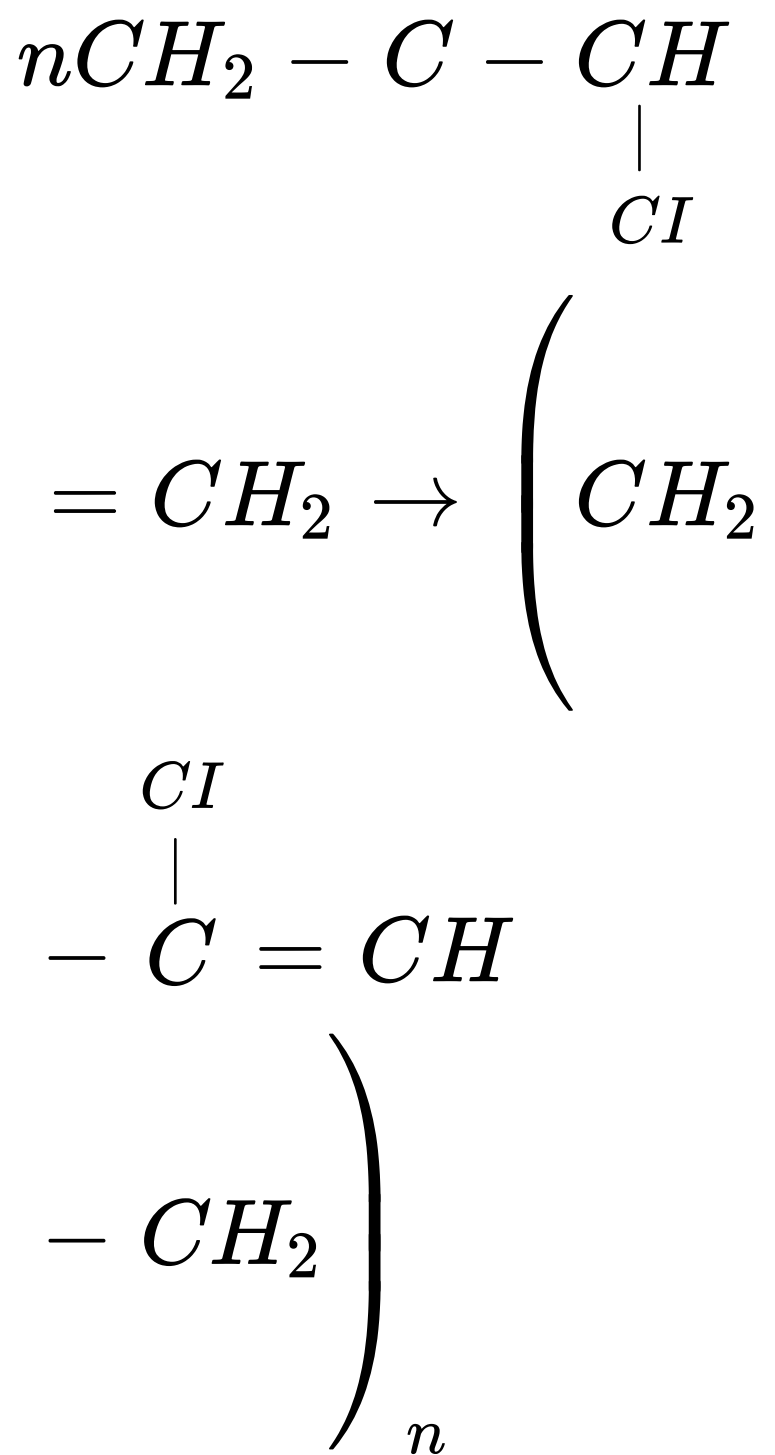
(D)



CORRECT ANSWER: B

SOLUTION:

Neoprene is formed by the radical polymerization of chloroprene:



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Q-46 - 12580995

Polymer obtained by condensation polymerization is :

(A) Polythene

(B) tefloon

(C) PVC

(D) nylon— 6, 6

CORRECT ANSWER: D

SOLUTION:

Nylon— 6, 6 is obtained by condensation polymerization which involves hexamethylene diamine and adipic acid.

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Q-47 - 12979711

Cellulose is a linear polymer of

(A) β — D — glucose

(B) α — D — glucose

(C) α — D — fructose

(D) β — D -fructose

CORRECT ANSWER: A

SOLUTION:

Cellulose, the chief constituent of the cell walls of plants, is a straight chain polysaccharide composed of only D-glucose units, which are joined by β -glycosidic linkage between $C - 1$ of one glucose unit and $C - 4$ of the next glucose unit. The molecular mass of cellulose is in the range of 50,000 - 500,000 (300 -2500 D-glucose units). It is used in the manufacture of paper, rayon and gun cotton.

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Q-48 - 12979935

Caprolactam, is used for the manufacture of

(A) Terylon

(B) Nylon-6,6

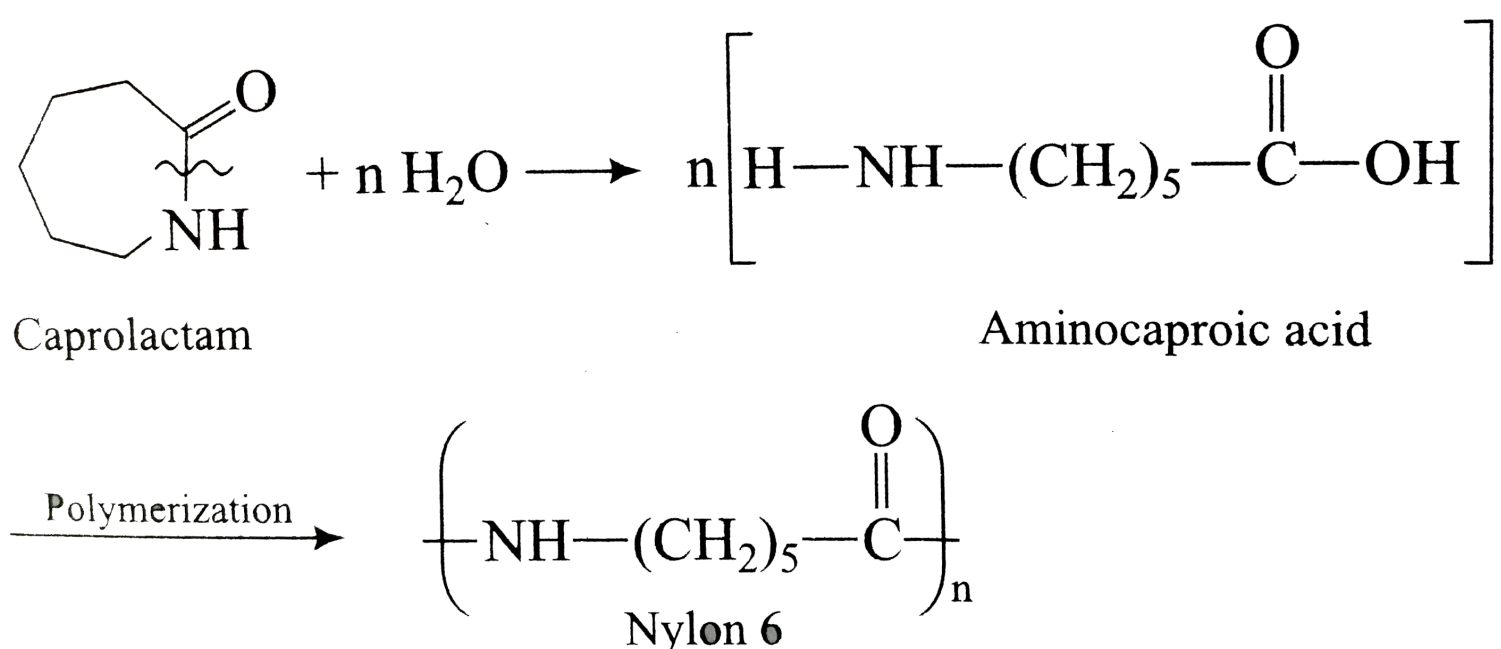
(C) Nylon-6

(D) Teflon

CORRECT ANSWER: C

SOLUTION:

Nylon 6 is formed by self condensation of a large number of molecules of aminocaproic acid. Since caprolactam is more easily available, it is used for polymerization which is carried out in the presence of water the first hydrolyses the lactam to amino acid



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Relation between number of average molecular mass (\overline{M}_n) and weight of average molecular mass (\overline{M}_w) of synthetic polymers is

(A) $\overline{M}_n < \overline{M}_w$

(B) $\overline{M}_n > \overline{M}_w$

(C) $\overline{M}_n \overline{M}_w$

(D) $\overline{M}_n > M_w$

CORRECT ANSWER: A

SOLUTION:

Polydispersity index (PDI) of polymer = $\frac{\overline{M}_w}{\overline{M}_n}$

For natural polymers, PDI = 1, i.e. $\overline{M}_w = \overline{M}_n$

For synthetic polymers PDI = 1, i.e. $\overline{M}_w > \overline{M}_n$

Polymer used in bullet proof glass is:

(A) *PMMA*

(B) Lexan

(C) Normex

(D) Kevlar

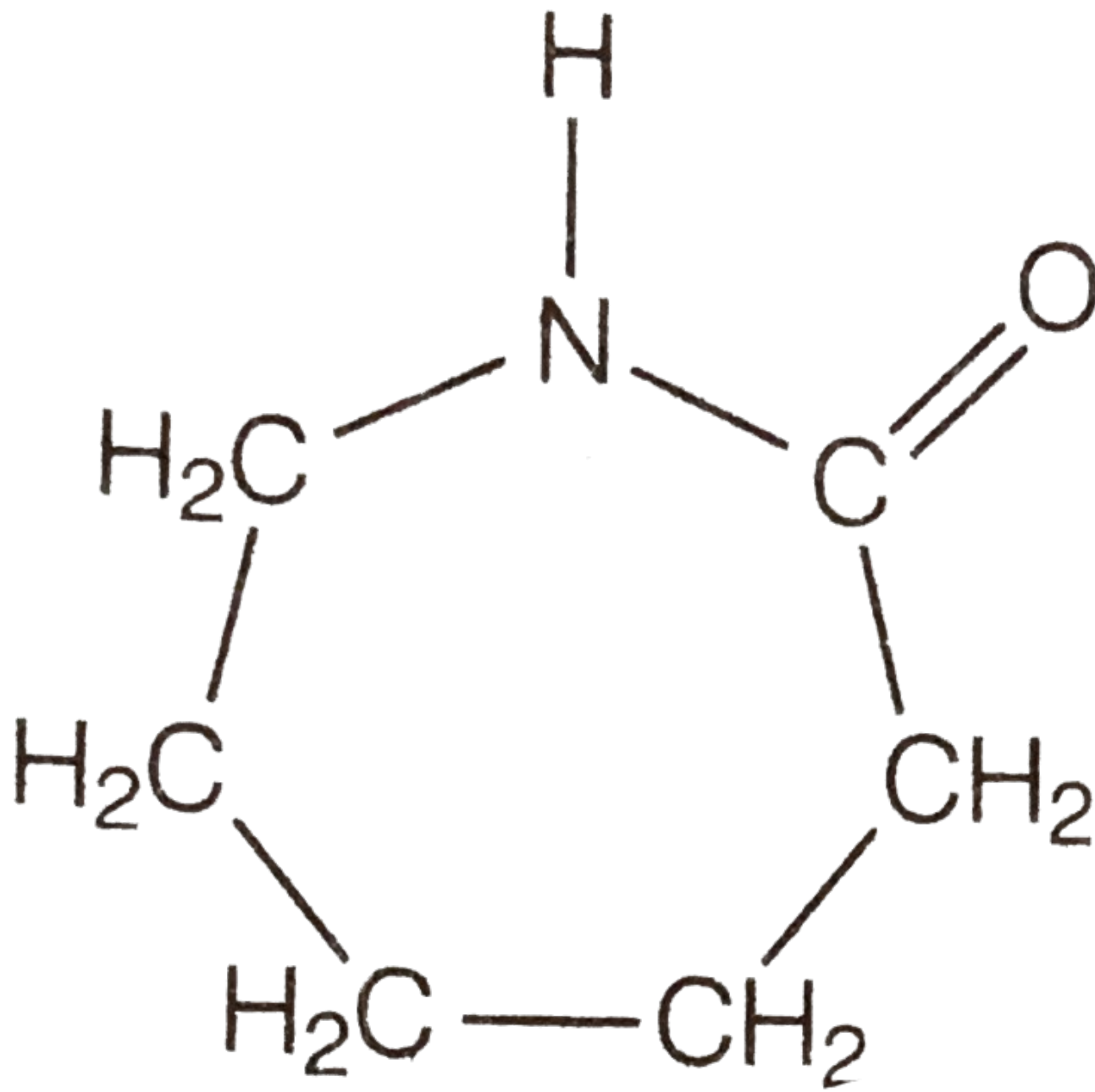
CORRECT ANSWER: B

SOLUTION:

Lexan (a polycarbonate or a polyester) is used for bullet proof windows and safety or crash helmets.

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Which of the following polymer can be formed by using the following monomer units

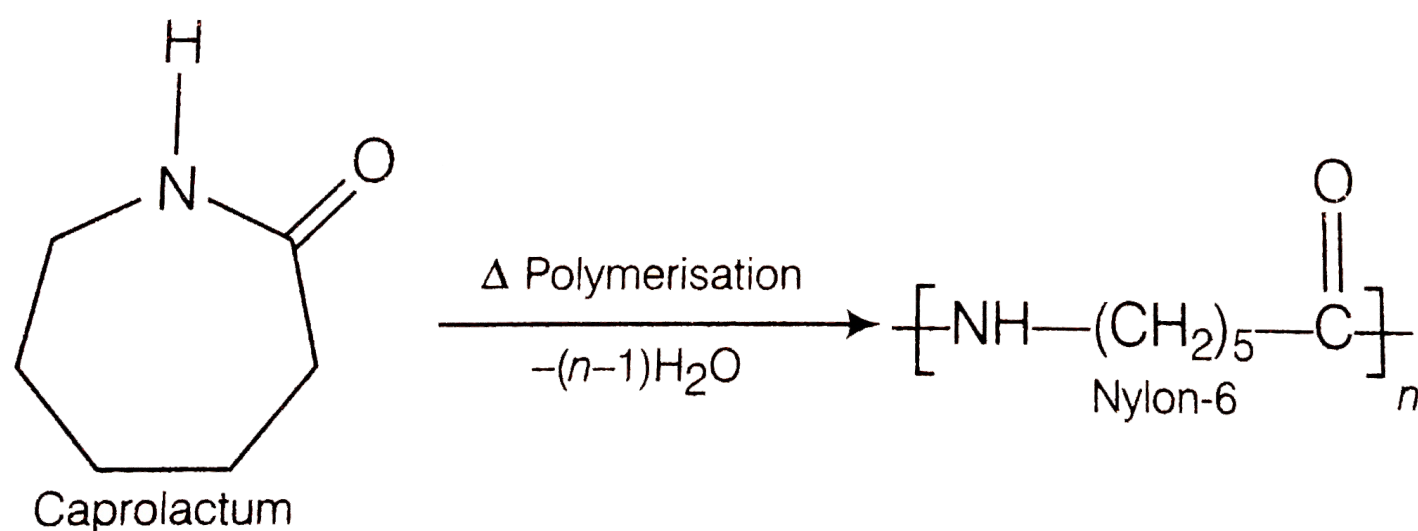


- (A) Nylon-6,6
- (B) Nylon-2-nylon-6
- (C) Melamine polymeer
- (D) Nylon-6

CORRECT ANSWER: D

SOLUTION:

Given monomer is the structure of caprolactum which on polymerisation produces Nylon-6



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Q-52 - 12662766

In vulcanization of rubber:

- (A) Sulphur reacts to form new compound
- (B) Sulphur cross-links are introduced which resists wear and tear due to friction
- (C) sulphur forms a very thin protective layer over rubber

(D) all of the statement are correct

CORRECT ANSWER: B

SOLUTION:

Vulcanisation is a process of treating natural rubber under heat and sulphur to develop sulphur cross-links and provide strength and resists wear and tear due to friction.

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Q-53 - 12979927

Which polymer is used in the manufacture of paints and lacquers?

(A) Glyptal

(B) Polypropen

(C) Ployvinylchloride

(D) Bakelite

CORRECT ANSWER: A

SOLUTION:

Glyptal, a copolymer of ethylene glycol and phthalic acid, is used to manufacture paints and lacquers.

Polypropene → Manufacture of ropes, toys

Polyvinyl chloride → Manufacture of rain coats, handbags

Bakelite → Making combs and electrical switches

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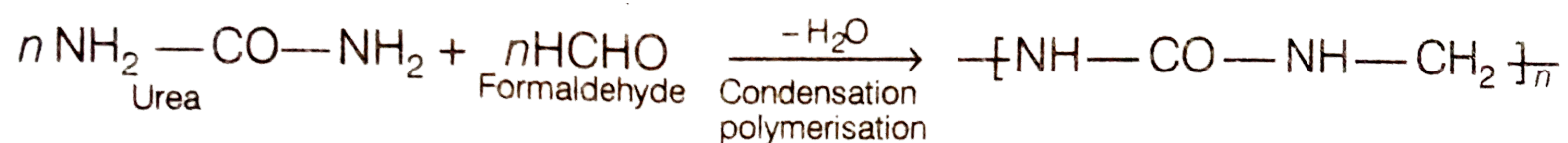
Q-54 - 24342348

Name the polymer used in laminating sheets and give the name of monomeric units involved in its formation

SOLUTION:

Urea formaldehyde resin is used for laminated sheets.

The monomer of this resin is urea ($NH_2CO NH_2$) and formaldehyde (HCHO)



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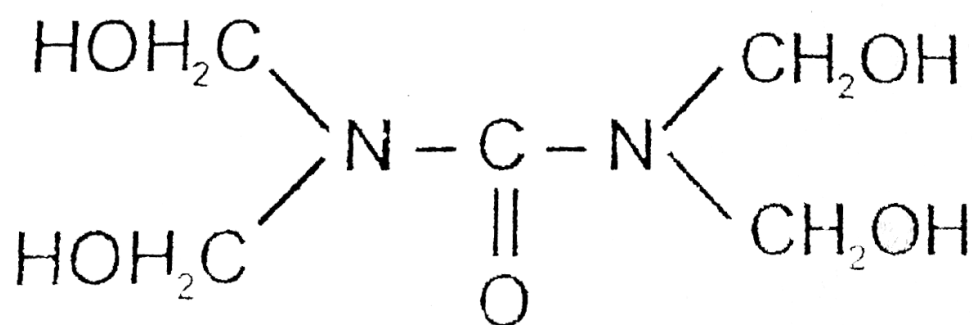
Q-55 - 19124188

Which polymer is generally used in carry bags?

- (A) Polyester
- (B) Bakelite
- (C) Polyethylene
- (D) Alkyd resin

CORRECT ANSWER: D

Q-56 - 14535365



The polymer obtained by the above compound is

- (A) Bakelite
- (B) Urea formaldehyde resin
- (C) Melamine formaldehyde resin
- (D) Teflon

CORRECT ANSWER: B

SOLUTION:

Given polymer is formed by Urea and formaldehyde,

hence is called Urea formaldehyde resine.

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Q-57 - 15603126

Match the chemical substances in Column *I* with type of polymers/type of bond in Column *II*

Column I

Column II

- | | |
|--------------|----------------------|
| A. Cellulose | p. Natural polymer |
| B. Nylon-66 | q. Synthetic polymer |
| C. Protein | r. Amide linkage |
| D. Sucrose | s. Glycoside linkage |

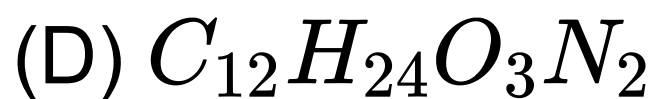
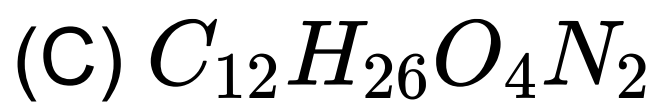
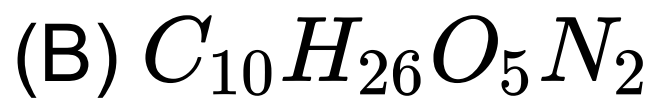
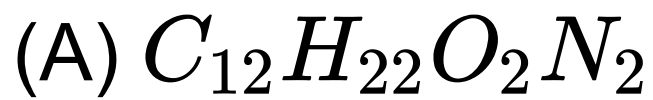
CORRECT ANSWER:

ARARP, S; BRARQ,
R; CRARP, R; DRA
RS

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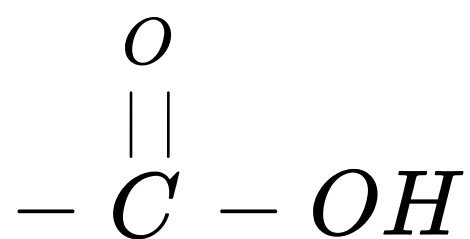
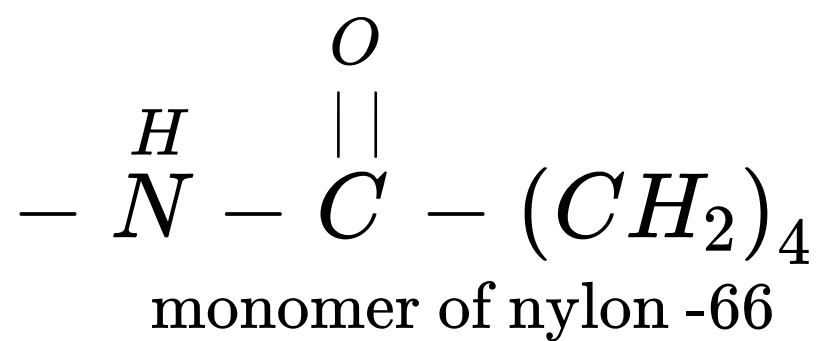
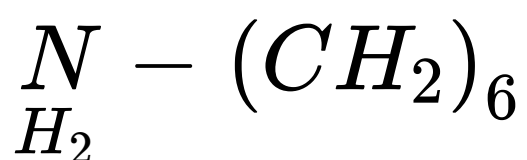
Q-58 - 12580778

The molecular formula of hexamethylene diamine adipate
(monomer of nylon-66) is



CORRECT ANSWER: D

SOLUTION:



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Assertion : Cellulose acetate is a semisynthetic polymer.

Reason : Chemical name of cellulose acetate polymer is rayon.

(A) If both the assertion and reason are true and the reason is the correct explanation of the assertion

(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(C) If assertion is true but reason is false.

(D) If assertion is false but reason is true.

CORRECT ANSWER: B

SOLUTION:

Assertion and reason both are correct, but reason cannot explain the assertion.

Q-60 - 11486641

*GR*A is a copolymer of:

- (A) Butadiene and acrylonitrile
 - (B) Butadiene and adipic acid
 - (C) Chloroprene and acrylonitrile
 - (D) Chloroprene and adipic acid
-

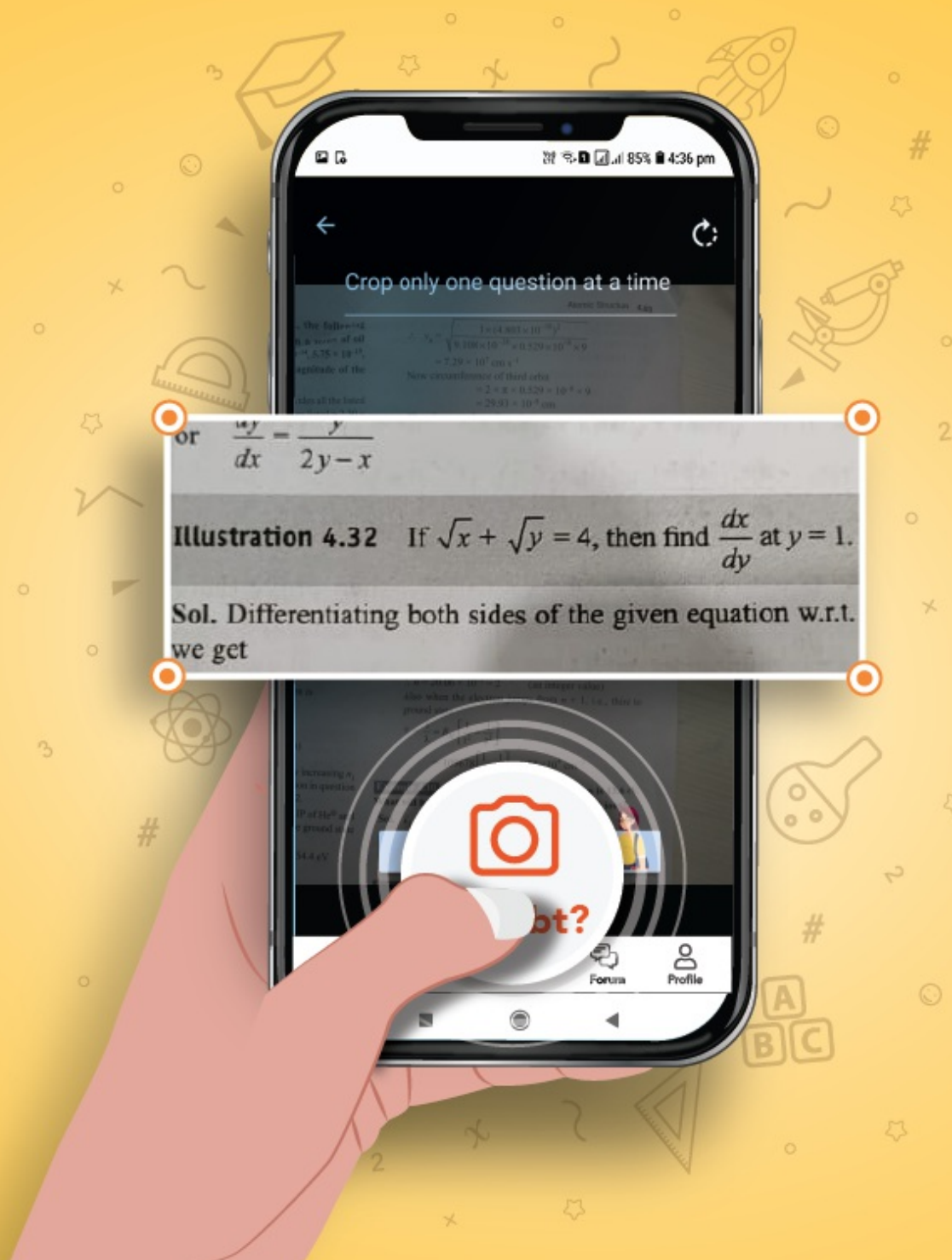
CORRECT ANSWER: A

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