

CHEMISTRY

BOOKS - CHETANA PUBLICATION

Introduction of Polymer Chemistry

Example

1. Classify the following materials as bio degradable and non-bio-degradable :

Thermocol, glass, wood, cotton clothes, paper bags, polythene bags, nylon ropes, fruit peels.



2. State and explain the principle of conservation of angular momentum. Use a suitable illustration. Do we use it in our daily life? When?



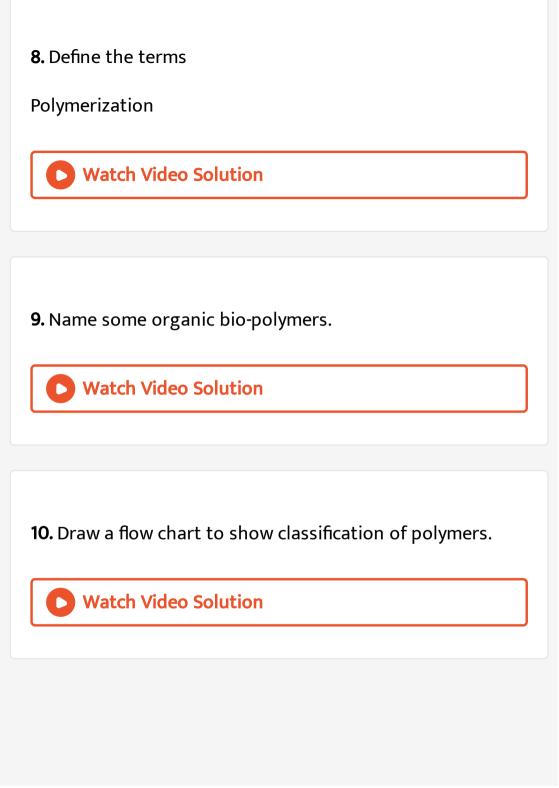
3. Which material is used in manufacture of toys, combs?



4. Write examples of thermosetting plastic articles.



5. List various properties of plastic.
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6. Define the following terms :
Polymers
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7. Define the terms
Monomers
Watch Video Solution



11. What are the different ways in which the polymers can be classified?



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12. Explain the classification of polymers on the basis of structure.



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13. Explain the classification of polymers on the basis of structure.



14. Explain classification of polymer on the basis of mode of polymerization.



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15. Differentiate between Natural polymers and Synthetic polymers.



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16. Explain the process of Addition polymerization OR * Explain in detail free-radical mechanism involved during preparation of addition polymer.



17. Explain condensation polymerization.



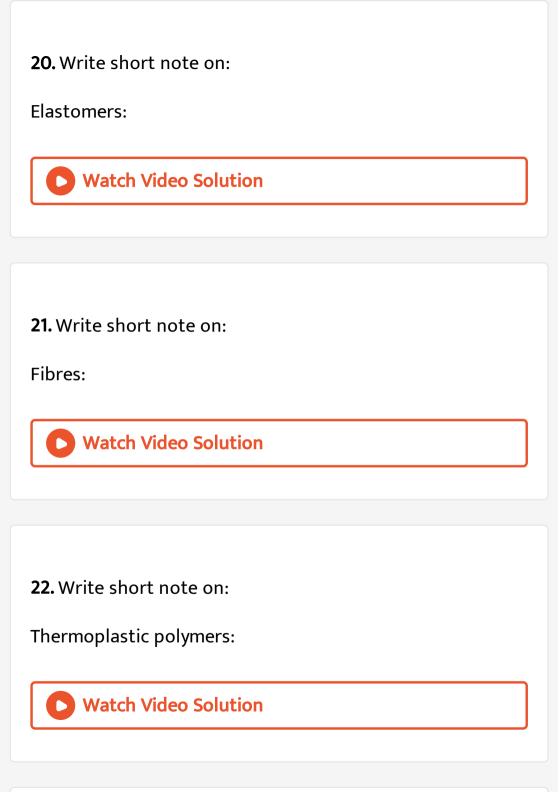
18. Explain Ring-opening polymerization.



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19. Explain the classification of polymers on the basis of inter-molecular forces.





23. Write short note on:

Thermosetting polyerms:



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24. Explain the classification of polymers on the basis of types of monomers.



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25. Explain the classification of polymers on the basis of biodegradability.



26. Write uses of Rubber
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27. Name the monomer of natural rubber.
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28. What is natural rubber? Draw its structure.
Watch Video Solution
29. What type of polymer is rubber?
Watch Video Solution

30. Write the reaction involved in the formation of natural rubber



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31. Write properties of natural rubber.



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32. What is Vulcanization of rubber?



33. Explain the process of vulcanization of natural rubber. **Watch Video Solution** 34. Explain, how vulcanization of natural rubber improves its elasticity? **Watch Video Solution 35.** Write structure of polythene. What are the types of

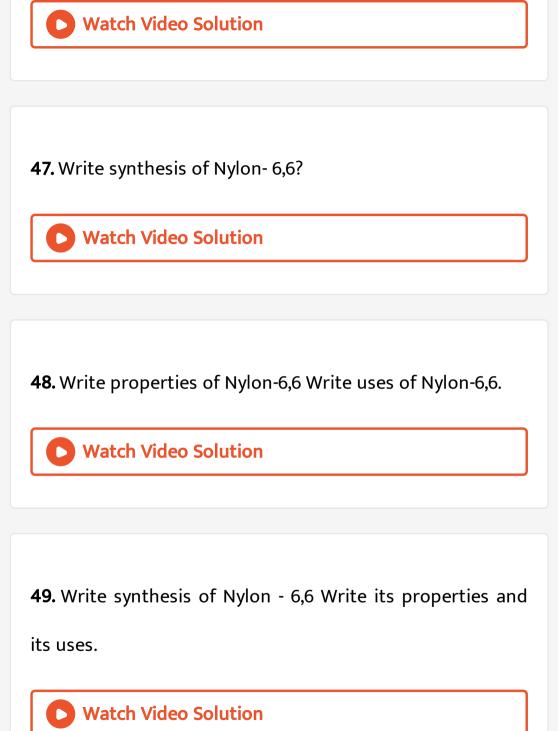
polythene?

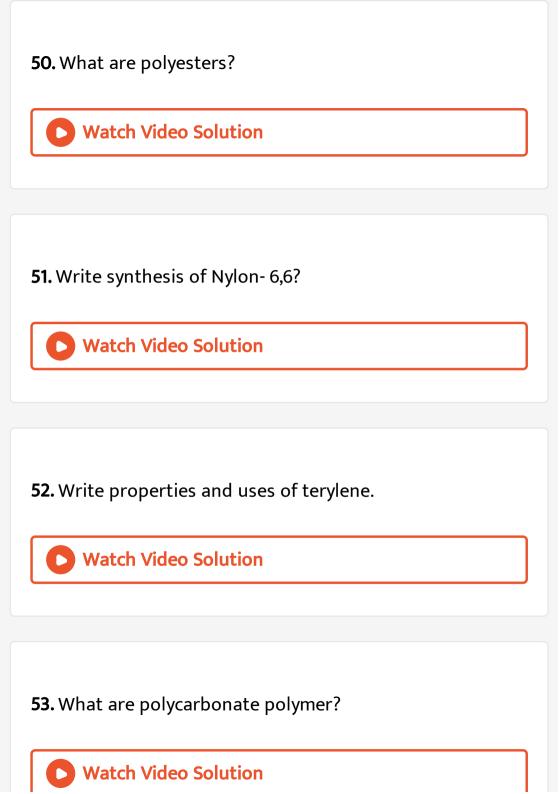
36. How is low density polyethylene (LDP) manufactured? Give its properties. **Watch Video Solution** 37. Write uses of LDP? **Watch Video Solution 38.** How is ethylene prepared? **Watch Video Solution** 39. Explain the mechanism of preparation of L.D.P.?

Watch Video Solution
40. How is high density polyethylene (HDP) manufactured?
Give its properties:
Watch Video Solution
41. Write used of HDP?
Watch Video Solution

42. What is Teflon? Which is its monomer?

43. How is Teflon prepared? Write its properties. **Watch Video Solution** 44. Writes uses of Teflon? **Watch Video Solution 45.** How is poly-acrylonitrile manufactured? Write the uses of it. **Watch Video Solution** 46. What are Nylons?





54. Write a note on: Bakelite. **Watch Video Solution 55.** Write synthesis of Melamine-formaldehyde polymer? What are its uses? **Watch Video Solution 56.** Write a note on: Buna-S rubber?

57. Write note on: Neoprene. **Watch Video Solution 58.** Write a note on: Viscose rayon? **Watch Video Solution** 59. Write structural formulae of styrene and poly butadiene? **Watch Video Solution** 60. Classify the following polymers as addition or condensation.



Watch Video Solution

61. Classify the following polymers as addition or condensation.

Polyamides



Watch Video Solution

62. Classify the following polymers as addition or condensation.

Polystyrene



63. Classify the following polymers as addition or condensation.

Polycarbonates



Watch Video Solution

64. Classify the following polymers as addition or condensation.

Navolac



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65. Name the polymer type in which following linkage is C = C



66. Classify the following polymers as natural and synthetic polymers.

Cellulose



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67. Classify the following polymers as natural and synthetic polymers.

Poly-styrene



68. Classify the following polymers as natural and synthetic polymers.

Terylene



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69. Classify the following polymers as natural and synthetic polymers.

Starch



Watch Video Solution

70. Classify the following polymers as natural and synthetic polymers.

protein **Watch Video Solution** 71. Classify the following polymers as natural and synthetic polymers. **Silicones Watch Video Solution** 72. Classify the following polymers as natural and synthetic

polymers.

Orlon (poly-acrylo-nitrile)



73. Classify the following polymers as natural and synthetic polymers.

Phenol



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74. Name and draw structure of the repeating unit in natural rubber.



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75. Write name and formula of raw material from which bakelite is made.



76. Which are the vulcanizing agents used in the following synthetic rubber:

Neoprene



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77. Which are the vulcanizing agents used in the following synthetic rubber:

BuNa-N



78. Write examples of Addition polymers and condensation polymers. [Chain growth polymers][Step-growth polymers]



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79. What type of intermolecular force leads to high density polymer?



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80. Give one example each of copolymer and homopolymer.



81. Identify Thermoplastic and Thermosetting Plastics from the following-

PET



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82. Identify Thermoplastic and Thermosetting Plastics from the following-

Urea formaldehyde resin



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83. Identify Thermoplastic and Thermosetting Plastics from the following-

Polythene



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84. Identify Thermoplastic and Thermosetting Plastics from the following-

Phenol formaldehyde



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85. Draw the structures of polymers formed from the following monomers

$$nHOOC - R - COOH + nHO - R' - OH$$



86. Draw the structures of polymers formed from the following monomers

$$H_2N - (CH_2)_5 - COOH$$



87. What Me synthetic resins? Name some natural and synthetic resins.



88. Distinguish between thermosetting and thermoplastic resins. Write example of both the classes.



89. Identify condensation polymers and addition polymers from the following,

$$\left[egin{array}{c} -CH_2-CH- \ \ \ \ \ \ \ \ \ \ \ \ \end{array}
ight]_{r}$$



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90. Identify condensation polymers and addition polymers from the following,

$$[-CH_2 - CH = CH - CH_2 -]_n$$



91. Identify condensation polymers and addition polymers from the following,

$$\Big[-ig(CO-(CH_2)_4-CO-NH(CH_2)_6NH-ig]_n$$



92. Identify condensation polymers and addition polymers from the following,



93. Classify the following polymers as straight chain, branched chain and cross linked polymers.

$$-\left(CH_2-CH-igg|_{CN}
ight)_n$$



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94. Classify the following polymers as straight chain, branched chain and cross linked polymers.

$$\left(egin{array}{c} -CH_2-CH_2-CH_2-CH_2-CH_2-CH_2-CH_2 \\ CH_2 \\ CH_2 \end{array}
ight)_{T_2}$$



95. Is synthetic rubber better than natural rubber? If so, in what respect?



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96. Complete the following statements.

Caprolactam is used to prepare



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97. Complete the following statements.

Navolac is a copolymer ofand



98. Complete the following statements.

Terylene is......polymer of terephthalic acid and ethylene glycol.



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99. Complete the following statements.

Benzol peroxide used in addition polymerization acts as

•••••

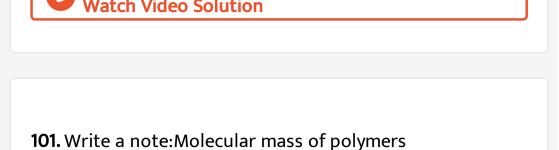


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100. Complete the following statements.

Polyethene consists of polymerized





102. Name some materials which undergo degradation

103. List the materials which do not decay even after a long

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after use.

time.

104. How is the environment affected by non decaying substances ?



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105. Which bonds are broken during digestion of proteins and-carbohydrates?



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106. What are the structural formulae of glycine and e-amino caproic acid?



107. What are biodegradable polymers? Write examples. **Watch Video Solution 108.** What are non biodegradable polymers? Write examples. **Watch Video Solution 109.** Give synthesis of PHBV. **Watch Video Solution**

110. Give synthesis of Nylon2-nylon 6.

Exercise

- 1. Nylon fibres are......
 - A. Semisynthetic fibres
 - B. Polyamide fibres
 - C. Polyester fibres
 - D. Cellulose fibres

Answer:



2. Which of the following is naturally occurring polymer?
A. Teflon
B. Polyethylene
C. PVC
D. Protein
Answer:
Watch Video Solution
3. Silk is a kind offibre.
A. Semisynthetic
B. Synthetic

C. Animal
D. Vegetable
Answer:
Watch Video Solution
4. Dacron is another name of
A. Nylon 6
B. Orion
C. Novolac
D. Terylene
Answer:

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A. Dacron

B. Rayon

C. Nylon

D. Jute

Answer:



6. The number of carbon atoms present in the ring of E-
caprolactam is
A. Five
B. Two
C. Seven
D. Six
Answer:
Watch Video Solution
7. Terylene is
A. Polyamide fibre

B. Polyester fibre C. Vegetable fibre D. Protein fibre **Answer: Watch Video Solution** 8. PET is formed by A. Addition B. Condensation C. Alkylation D. Hydration



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- **9.** Chemically pure cotton is.......
 - A. Acetate rayon
 - B. Viscose rayon
 - C. Cellulose nitrate
 - D. Cellulose

Answer:



10. Teflon is chemically inert, due to presence of
A. C-H bond
B. C - F bond
C. H- bond
D. C=C
Answer:
Watch Video Solution
11. Which one of the following is a condensation Polymer?
A. Nylon
B. Polythene
·

C. PVC D. Teflon **Answer: Watch Video Solution** 12. Which one of the following is an addition polymer? A. Bakelite B. Nylon-6,6 C. Polystyrene D. Terylene **Answer:**

13 .	Which	of the	folloy	wing	is a	conol	vmer?
10.	VVIIICII	OI LIIC	101101	ville	13 a	COPOI	yiiici :

A. Orlon

B. Teflon

C. PVC

D. PHBV

Answer:



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14. The monomer used to prepare superglue is

A. Vinyl chloride B. methyl a-alpha cyanoacrylate C. p-phenylene diamine D. diethyl carbonate **Answer: Watch Video Solution** 15. A polymer of butadiene and acrylonitrile is called. A. Buna-S B. Buna-N C. Buna-B

D. Buna-A

Answer:



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16. Natural rubber is a polymer of

A. styrene

B. butadiene

C. vinyl chloride

D. isoprene

Answer:



A. PHBV, Bakelite
B. Polythene,terylene
C. Polyacrylonitrile, nylon-6,6
D. Polystyrene,melamine
Answer:
Watch Video Solution
18. The polymer used in paints is
A. Nylon

17. In which of the following paris both are copolymers?

- B. Glyptal
- C. Neoprene
- D. Terylene



- **19.** Which of the following contains biodegradable polymers only?
 - A. Cellulose,dextron,PHBV
 - B. Starch,PHBV,PVC
 - C. Bakelite, nylon-2-nylon-6,nylon6,6
 - D. Cellulose, starch, terylene



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20. Thermosetting polymer is

- A. Nylon-6
- B. Nylon-6,6
- C. Bakelite
- D. SBR

Answer:



21. Nylon thread contains the polymer
A. polyamide
B. polyvinyl
C. polyester
D. polyethylene
Answer:
Watch Video Solution
Watch Video Solution
Watch Video Solution
Watch Video Solution 22. Polythene, PVC, teflon and neoprene are all
22. Polythene, PVC, teflon and neoprene are all

- C. copolymers
- D. condensation polymers



- **23.** Which one of the following is NOT a biodegradable polymer?
 - A. Starch
 - B. Cellulose
 - C. Dextron
 - D. Decron

Answer: Watch Video Solution 24. The polymer used in making blankets (artificial wool) is A. polyester B. polyacrylonitrile C. polythene

D. polystyrene

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Answer:

25. Trans-poly-isoprene is called
A. Glyptal
B. Gutta-Percha
C. Melamine
D. Bun-S
Answer:
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Watch Video Solution
Watch Video Solution 26. Polythene is
26. Polythene is

- C. thermoplastic polymer
- D. copolymer



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27. Elastromers have

- A. Weak intermolecular force
- B. Strong intermolecular force
- C. Strongest intermolecular force
- D. Weakest intermolecular force

Answer:

28. The	polymer	has
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- A. low molecular weight
- B. high molecular weight
- C. high density
- D. high volume



A. Polyamide fibre B. Polyester fibre C. Vegetable fibre D. Protein fibre **Answer: Watch Video Solution** 30. The monomer of natural rubber is A. Ethene B. Styrene C. Chloroethene

D. isoprene

Answer:



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31. Silk is......

A. an artificial fibre

B. a vegetable fibre

C. a regenerated fibre

D. an animal fibre

Answer:



32. Which of the following is a natural fibre?
A. Rayon
B. Jute
C. Terylene
D. Nylon
Answer:
Watch Video Solution
33. Which of the following is a polyester fibre?
A. Nylon-6

B. Nylon-6,6
C. Terylene
D. Rayon
Answer:
Watch Video Solution
34. Cellulose is the main constituent of
A. Nylon-6
B. Cotton
C. Terylene
D. wool



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35. Give the method of preparation of Nylon-6

A.

$$\left[-NH-\left(CH_{2}
ight)_{6}-NH-\overset{O}{C}-\left(CH_{2}
ight)_{6}-\overset{O}{C}-
ight]_{n}$$

Β.

$$ig[-CO - \left(CH_2
ight)_6 -CO -NH - \left(CH_2
ight)_6 -NH -ig]_n$$

 \mathbf{C}

$$\left[-NH-\left(CH_{2}
ight)_{6}-NH-\overset{O}{C}-\left(CH_{2}
ight)_{6}-C-
ight]_{n}$$

D.

$$ig[-CO - \left(CH_2
ight)_4 - CO - NH - \left(CH_2
ight)_4 - NH - ig]_n$$

Answer:



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36. Nylon - 6, 6 polymer is correctly represented as.....

A.
$$_{-}nigl[-NH-(CH_{2})_{5}-CO-igr]$$

$$\mathsf{B.} - NH - (CH_2)_5 - CO -$$



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37. Dihydroxy diethyl terephthalate is..........

B.
$$\begin{array}{c} \text{Ho-CH}_2\text{-CH}_2\text{-OOC-}\bigcirc\text{-}\\ \text{COO-CH}_2\text{-CH}_2\text{-OH} \end{array}$$

C.

Answer:



A. Nylon-6
B. Dacron
C. Polyester
D. PVC
Answer: Watch Video Solution
39. Complete the following statements.
Terylene ispolymer of terephthalic acid and ethylene
glycol.

38. Reaction of DMT & ethylene glycol produces

- A. Glycerol
- B. ethylene glycol
- C. Prolylene glycol
- D. ehtyl alcohol



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40. The monomer used to prepare orlon is......

A.
$$CH_2 = CH - CN$$

$$\operatorname{B.}CH_2=CHCl$$

$$\mathsf{C.}\,CH_2=CH-F$$

D.
$$CH_2=CF_2$$



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41. The polymer used in human hair wigs is.......

A. Dynel

B. Thiokl

C. kevlar

D. Nomex

Answer:



A. Terephthalic acid chloride

B. Ethylene chloride

C. Aerylonitrile

D. Methyl lpha-cyanoacrylate

Answer:



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43. The Ziegler - Natta catalyst is used in the preparation of

A. LDPE

B. PHBV
C. PAN
D. HDPE
Answer:
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44. A high molecular weight molecule built from a large
numbers of simple molecules is called -a
A. Monomer
B. Isomer
C. Polymer



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- **45.** A high molecular weight molecule which does not contain repeating structural units is called a.....
 - A. Polymer
 - B. Macromolecule
 - C. Both a and b
 - D. None of the above

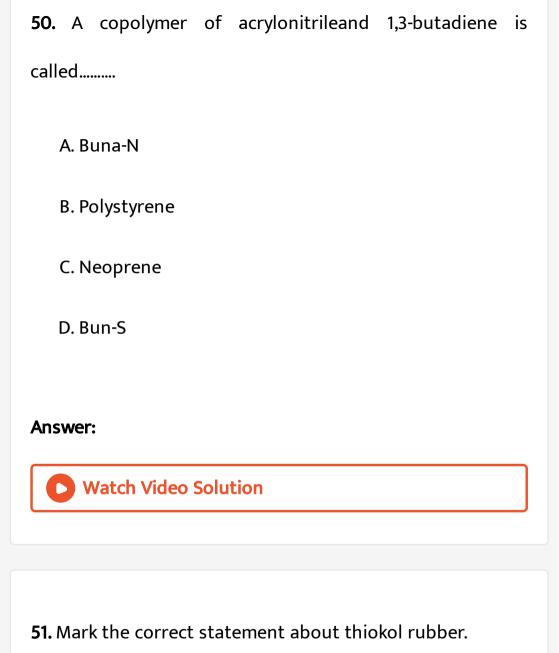
Answer:



46. The simple molecules from which a polymer is made are
called
A. Monomers
B. Metamers
C. Rotamers
D. Enantiomers
Answer:
Watch Video Solution
47. Which of the following is not a biopolymer?
A. Proteins

B. Nucleic acids
C. Cellulose
D. Neoprene
Answer:
Watch Video Solution
48. Amongst the following, a homopolymer is
A. PMMA
B. Bakelite
C. Glyptal
D. Dacron

Answer: Watch Video Solution 49. Which of the following is copolymer? A. Bune-S B. PAN C. Polythene D. PTFE **Answer: Watch Video Solution**



A. It is a synthetic polysulphide rubber.

B. t is obtained by condensation chloride with sodium tetrasulphide

C. It is resistant to oils and abrasion.

D. All are correct.

Answer:



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52. Sucrose is formed by condensation of

A. Low density polythene

B. High density polythene

C. Nylon-6

D. Dacron

Answer:



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53. Gutta percha is

- A. trans-polyisoprene
- B. A synthetic polymer
- C. A very hard material
- D. All statements are correct

Answer:



54. Thermoplastics are.....

A. Linear polymers

B. Soften or melt heating

C. Molten polymer can be moulded in desired shape

D. All are correct

Answer:



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55. The tensile strength, elasticity and resistance to abrasion can be increased by a process called

A. Diazotization B. Vulcanization C. Isomerization D. Polymerization **Answer: Watch Video Solution** 56. The process of vulcanization was introduced by A. Charles Goodyear B. Kolbe C. Wohler

D. Zeigler

Answer:



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57. The linear chains in nylon are held together by

A. H-bonds

B. Covalent bonds

C. Ionic bonds

D. Van Der Waals forces

Answer:



A. Acetylene
B. Vinlacetylene
C. Divinylacetylene
D. Phenylacetylene
Answer:
Watch Video Solution
59. A polymer of prop-2-enenitrile is called
A. Saran

58. Chloroprene is obtained by addition of HCl to......

B. Orlon
C. Dacron
D. Taflon
Answer:
Watch Video Solution
60. Starch is the condensation polymer of
A. a-glucose
B. b-glucose
C. a-Fructose
D. b-Fructose



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- 61. Which one of the following is true about polymers?
 - A. Molecular weight is specific.
 - B. Formed by covalent bonds.
 - C. All chains in a sample have fixed length.
 - D. Bakelite is an addition polymer.

Answer:



62. Which of the following is not a chain reaction polymer?
A. polystyrene
B. bakelite
C. Dacron
D. nylon-6
Answer:
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63. A polymide is formed by condensation of n moles of
diamine and n moles of dicarboxylic acid. Number of moles
of water formed on completion of reactions is
A. n

- B. n-1
- C. 2n-1
- D. 2n



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64. The polymer -A-A-A-B-B-B-B-A-A-A- is formed by the addition of two monomers A and B. The polymer is

- A. homopolymer
- B. condensation polymer
- C. graft copolymer
- D. block copolymer



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65. The linkage present in proteins and peptides is.......

$$\mathsf{A.}-C-O-C-$$

$$B.-C-O-$$

C.
$$-\overset{\scriptscriptstyle{\sqcap}}{C}-NH-$$

$$D.-C-C$$

Answer:



66. Which of the following is polyamide?		
A. Teflon		
B. Nylon-6,6		
C. Terylene		
D. Bakelite		
Answer:		
Watch Video Solution		
67. Bakelite is a polymer of		
A. Formaldehyde and phenol		
B. Benzaldehyde and phenol		

C. Formaldehyde and benzyl alcohol D. Acetaldehyde and phenol **Answer: Watch Video Solution** 68. The Ziegler - Natta catalyst is used in the preparation of A. LDPE B. PHBV C. PAN D. HDPE Answer:

69. Natural rubber is a polymer of	69.	Natural	rubber	is a	pol	ymer	of
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- A. styrene
- B. butadiene
- C. vinyl chloride
- D. isoprene



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70. Nylon thread contains the polymer

A. polyamide
B. polyvinyl
C. polyester
D. polyethylene
Answer:
Watch Video Solution
71. Teflon is chemically inert, due to presence of
A. C-H bond
B. C-F bond
C. H- bond

D. C = C bond

Answer:



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72. Caprolactum is used to prepared

A. Terylene

B. Nylon-6,6

C. Novolac

D. Nylon-6

Answer:



73. What is the function of benzyl peroxide in the addition polymerization?



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74. Name any one biodegradable synthetic polymer.

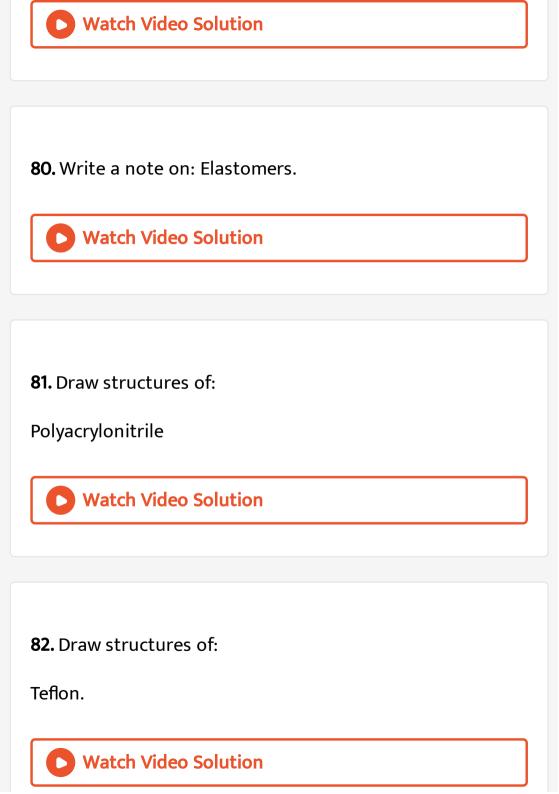


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75. Name the vulcanizing agent in the Neoprene.



76. Write the preparation of nylon-2-nylon- 6 polymers. **Watch Video Solution** 77. Give method of preparation of Nylon- 6, 6. **Watch Video Solution 78.** Give one example each of thermosetting thermoplastic polymers. **Watch Video Solution** 79. Write two properties of natural rubber.



83. Write a note on: Viscose rayon?



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84. How are polymers classified on the basis of their source?



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85. Explain classification of polymer on the basis of mode of polymerization.



86. Name the monomers used in the synthesis of following polymers -

Nylon 6,6



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87. Name the monomers used in the synthesis of following polymers -

Thermocol



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88. Give synthesis of PHBV.



89. Match the Columns:

	Column'A		Column 'B'
(1)	Polyester	(a)	CH ₂ =CH ₂
(2)	PVC	(b)	C ₆ H ₅ OH +HCHO
(3)	Polythene	(c)	CH ₂ =CH-Cl
(4)	Bakelite	(d)	HOOC -R-COOH and HO-R'-OH



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90. Give the method of preparation of Nylon-6

