CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

POLYMERS

Warm Up Exercise

1. Define monomer and polymer. Give examples.

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2. What do you mean by structural and repeating units of a polymer?

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3. What type of polymers have the same structural and repeating units?

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4. Write the formulae of the monomers of the following chain polymers:

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5. What are natural polymers? Give two examples.

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6. What are biopolymers? Give two examples

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7. Give two examples each of homopolymers and copolymers.

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8. Define the following terms with an example each: (i) synthetic polymer (ii) semi-synthetic polymer.

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9. Among the following polymers, which are chain polymers and which are condensation polymers: (i) Teflon (ii) Nylon (iii) Polyethylene terephthalate (iv) Nylon 6,6.

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10. What are network polymers? Give two examples.

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11. Define thermoplastic and thermosetting polymers. Give an example of each.

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12. Why do polymers not have a specific molecular mass?

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13. Why do solutions of polymers have high viscosity?

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14. How polymers are classified on the basis of their structures?

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15. Is enzyme a polymer?

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16. Can polymers like nucleic acids, proteins and starch be regarded as step-growth polymers?

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17. How polymers are classified on the basis of intermolecular forces?

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18. Is the following polymer a homopolymers or a copolymer? Identify the monomer(s).

$[--CH_2-CH(C_6H_{35})--]_n$

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19. Which of the following polymers are homopolymers and which are copolymers? In each case, identify the monomer(s).

$$\left[- \ - O - R_1 - O - \overset{O}{\overset{||}{C}} - R_2 - \overset{O}{\overset{||}{C}} - \ - \right]_n$$

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20. Which of the following polymers are homopolymers and which are copolymers? In each case, identify the monomer(s).

$$\left[- \ - NH - CH_2 - \overset{O}{\overset{||}{C}} - O - \ - \right]_n$$

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21. Which of the following polymers are homopolymers and which are copolymers? In each case, identify the monomer(s).

$$\left[- \ - NH - R_1 - NH - \overset{O}{\overset{||}{C}} - R_2 - \overset{O}{\overset{||}{C}} - \ - \right]_n$$

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22. What is polymerisation or polymerisation reaction?

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23. What is addition or chain polymerisation? Why is it called vinyl polymerisation?

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24. What do you mean by the chain growth polymerisation? Give two examples of monomers which can take part in this type of polymerisation.

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25. What are the different ways in which addition polymerisation can take place?

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26. Write the names and chemical formulae of two initiators used in free radical polymerisation.

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27. Write one method of the chain termination in a free radical polymerisation.

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28. Among the following monomers which one takes part in cationic polymerisation and which orie is anionic polymerisation? Give reason.

(i)$H_2C = C(CH_3)CH_3$ (ii)$H_2C = CH - CN$

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29. What type of initiators are used in the cationic and anionic addition polymerisations?

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30. Which polymerisation is referred to as living polymerisation? Why?

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31. Define condensation polymerisation. Why is it called step polymerisation? Give two examples of polymers produced by this method.

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32. Define copolymerisation. Give two examples of polymers produced by this method.

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33. Write the purpose of copolymerisation.

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34. Write the monomeric units of the following copolymers:

(i)SAN , (ii)SBR , (iii)ABS , (iv)saran

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35. Mention the difference between Buna-S and Buna-N.

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36. What is Ziegler-Natta catalyst? Which among the two, LDPE and HDPE, uses this catalyst in its preparation?

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37. What is LDPE?

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38. Name the monomer used in the preparation of PVC. Give two uses of PVC.

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39. Write the name and structural formula of the polymer used in making of non-stick cookwares.

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40. Which polymer is popularly known as terylene? Write the names and formulae of the monomers used in the production of this polymer. Write the structural formula of the polymer.

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41. Write the name and structural formula of the polyester used to make water bottles.

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42. What do you understand by alkyd resin? What is 'the chemical name of glyptal?

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43. What is bakelite? Distinguish between novolac and resole.

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44. What do 6 and 10 of nylon 6,6 and nylon 6,10 respectively, indicate?

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45. Write the names and structural formulae of the monomers used in the preparation of nylon 6,6. Write the structural formula of nylon 6,6.

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46. Between LDPE and HDPE, which one is used in manufacturing bucket, dustbin, etc? Give reasons.

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47. What is the reason of crystalline structure of nylon?

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48. What is the difference between the structures of LDPE and HDPE?

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49. Which polymer is used in making laminated sheet? What is the name of monomer of this polymer?

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50. Write chemical name and structural formula of natural rubber.

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51. What are Gutta-percha and ebonite?

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52. What do you mean by vulcanisation of rubber? Name an element used in vulcanisation.

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53. Why is the vulcanisation of pure rubber necessary?

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54. Name the monomers used in the manufacturing of Buna-S and Buna-N. Give one use of each.

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55. What is the monomer of neoprene rubber? Mention one use of this rubber.

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56. What are biodegradable and non-biodegradable polymers? Give an example of each.

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57. Identify the following as biodegradable and nonbiodegradable polymers:

polyvinyl chloride (PVC) , (ii) poly hydroxybutyrate (PHB) , (iii) polystyrene (PS) , (iv)polypropylene (PP) , (v)polylactic acid (PLA) , (vi) polyethylene (PE) ,(vii)protein ,(viii) polyglutamic acid

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58. Classify the biodegradable polymers on the basis of their origin and give example of each type.

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59. Give an example of a polymer that is prepared from a monomer which is prone to attack by microorganism.

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60. Biodegradable polymers are attacked by microorganisms, while non-biodegradable polymers are not. Explain.

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61. Give an example of an additive that is blended with a nonbiodegradable polymer to produce a biodegradable polymer.

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62. Name two biodegradable polymers. Give their structural formulae and uses.

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63. Nylon 2 - nylon 6 is a biodegradable polymer. Write the names of its monomers and their chemical formulae.

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Question Answer Zone For Board Examination

1. Write the names and chemical formulae of the monomers for the following polymers.

$$\left[- \ - CH_2 - \underset{Cl}{\overset{|}{C}} = CH - CH_2 - \ - \right]_n$$

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2. Write the names and chemical formulae of the monomers for the following polymers.

nylon 6,10

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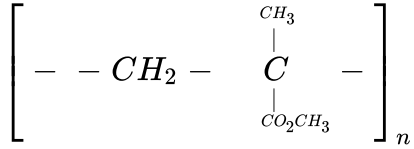
3. Write the names and chemical formulae of the monomers for the following polymers.



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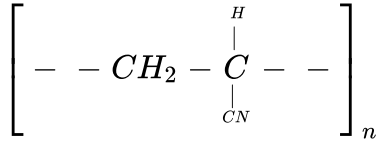
4. Write the names and chemical formulae of the monomers for the following polymers.



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5. Write the names and chemical formulae of the monomers for the following polymers.

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6. Which kind of polymers has the same chemical structure for its repeating unit and monomer ?

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7. Give examples of monomers that take part in free radical, cationic and anionic addition polymerisation.

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8. Is $[--CH_2-CH(C_6H_5)--]_n$ a homopolymer or copolymer?

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9. Is $\left[- - NH - CH(R) - \overset{\overset{O}{||}}{C} - O - - \right]_n$ a homopolymer or copolymer?

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10. Between PVC and dacron, which one is homopolymer and which one is copolymer?

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11. What is the name of the monomer of the following polymer?

$$\left[- - \overset{\overset{O}{||}}{C} - (CH_2)_5 - NH - - \right]_n$$

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12. Name a compound that is used as an initiator in the free radical polymerisation.

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13. What do the terms 'Bu' and 'S' in Buna-S indicate?

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14. Which polymer is called mylar?

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15. What type of polymer does bakelite belong to, thermoplastic or thermosetting?

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16. Name a rubber widely used in the manufacturing of car tyre.

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17. Give examples of monomers that take part in free radical, cationic and anionic addition polymerisation.

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18. Name a compound that is used as an initiator in anionic polymerisation.

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19. What type of polymerisation is known as living polymerisation?

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20. Name the monomer of teflon

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21. What is PMMA? Name its monomer.

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22. Name the monomor of PAN

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23. Which of the following polymers are synthetic, semisynthetic and natural polymers?

Cellulose acetate, terylene, starch

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24. Which of the following are addition and condensation polymers: polypropylene, PET, nylon, PAN.

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25. Give an example of a polyamide and a polyester.

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26. Give an example each of thermoplastic and thermosetting polymers.

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27. Name a copolymer obtained by copolymerisation of three different monomers.

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28. Why are substances made of polymers lighter than metallic substance?

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29. Which of the following forms self-polycondensation polymer?

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30. Give two examples of copolymers.

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31. Name two biodegradable polymers used in medicine.

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32. Name the monomers used in the preparation of glyptal

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33. Name the monomer of natural rubber

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34. What is the trade name of trans-polyisoprene?

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35. Which polymer is also known as plexiglass?

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36. All polymers are macromolecules but all macromolecules are not polymers-explain.

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37. Why are solutions of polymers more viscous than normal solutions?

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38. What do you mean by Ziegler-Natta catalyst? What is it used for?

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39. What do 6 in nylon 6 and 6 and 10 in nylon 6, 10 indicate?

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40. What is addition polymerisation? Mention its types.

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41. Explain the chain initiation and chain propagation of free radical polymerisation.

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42. Explain the chain initiation and chain propagation of cationic polymerisation.

Watch Video Solution

43. Name any two monomers that talce part in anionic polymerisation. Why is anionic polymerisation also known as living polymerisation? Explain.

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44. Explain whether homopolymers an be prepared both addition and condensation polymerisation?

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45. What is copolymerisation? What is its purpose?

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46. How are high density and low density polyethylenes (LDPE and HDPE) prepared?

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47. Write the reaction for the preparation of polyethylene terephthalate (PET). Mention two of its uses.

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48. Write the reaction for the preparation of glyptal. Mention two of its uses.

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49. Why is it important to vulcanise natural rubber?

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50. Name the monomer of nylon-6. Mention its uses.

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51. Distinguish between addition and condensation polymerisation.

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52. What is degree of polymerisation ?

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53. Explain the ways ln which chain termination occurs in free radical polymerisation.

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54. Distinguish between natural and vulcanised rubber.

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55. Name the monomer of melamine formaldehyde polymer. Write its uses.

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56. Why is It important to have monomers In their purest form In free radical addition polymerisation?

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57. Why is bakelite known as a thermosetting polymer ?

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58. Identify the following polymers according to their classes.

-A-A-A-A-A-A-

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59. Identify the following polymers according to their classes.

-A-B-B-A-A-A-B-

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60. Identify the following polymers according to their classes.

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61. A natural polymer of 2-methyl-1,3-butadiene when treated with sulphur at 373K to 415 K, it gets hardened . In the reaction , chains of polymers become connected by -S-S- linkages. Write the structure of the substance formed in the reaction

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62. Arrange the polymers in order of their increasing intermolecular forces: (1). Nylon 6, 6, Buna-S, polyethylene, (2). Nylon 6, neoprene, polyvinyl chloride

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63. What is the role of sulphur in vulcanisation of natural rubber?

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1. Which of the following is a polyamide polymer-

A. terylene

B. nylon

C. rubber

D. bakelite

Answer: B

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2. What is the difference between homopolymer and copolymer? Give one example of each type

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3. Which one of the following is a natural polymer-

A. polythene

B. nylon

C. protein

D. terylene

Answer: C

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4. Identify the two monomers in the following polymer:

a. $\left[- - NH - (CH_2)_6 - NH - \underset{\underset{O}{||}}{C} - (CH_2)_4 - \underset{\underset{O}{||}}{C} - - \right]_n$

b.What is condensation polymerisation reaction ?

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5. Which of the following is a biodegradable polymer-

A. nylon-2-nylon-6

B. nylon-6,6

C. nylon-6

D. bakelite

Answer: A

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6. What are the two monomer units of terylene? Write the repeating unit of terelyne.

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7. Which of the following can be considered as the monomer of natural rubber-

A. $H_2C = CH - CH = CH_2$

B. $H_2C = C(CH_3) - CH = CH_2$

C. $CH_3 - CH = CH - CH_3$ (trans)

D. $CH_3 - CH_2 - CH = CH_2$

Answer: B

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8. What is condensation polymerisation? Write with an example.

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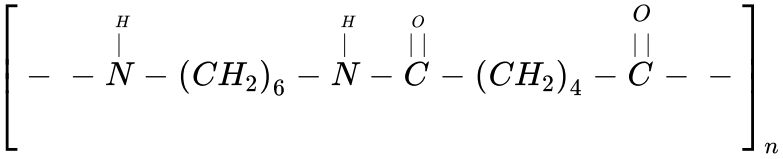
Solved Ncert Textbook Problems

1. Write the names of monomers of the following polymers:



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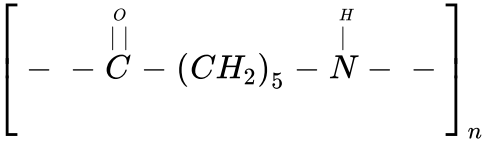
2. Write the names of monomers of the following polymers:



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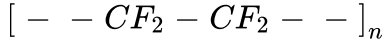
3. Write the names of monomers of the following polymers:



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4. Classify the following as addition and condensation polymers: Terylene, Bakelite, Polyvinyl chloride, Polythene.

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5. Explain the difference between Buna-N and Buna-S.

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6. Arrange the following polymers in increasing order of their intermolecular forces: (1) Nylon 6,6, Buna-S, Polythene. (2) Nylon 6, Neoprene, Polyvinyl chloride.

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7. Explain the terms polymer and monomer.

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8. What are natural and synthetic polymers? Give two examples of each type.

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9. Distinguish between the terms homopolymer and copolymer and give an example of each.

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10. How do you explain the functionality of a monomer?

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11. Define the term polymerisation.

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12. is $(NH-CHR-CO)_n$,a homopolymer ? a homopolymer or copolymer ?

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13. In which classes, the polymers are classified on the basis of molecular forces?

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14. How can you differentiate between addition and condensation polymerisation?

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15. Explain the term copolymerisation and give two example.

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16. Write the free radical mechanism for the polymerisation of ethene.

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17. Define thermoplastics and thermosetting polymers with two examples of each.

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18. Write the monomers used for getting the following polymers. (1) Polyvinyl chloride (2) Teflon (3) Bakelite.

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19. Write the name and structure of one of the common initiators used in free radical addition polymerisation .

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20. How does the presence of double bonds in rubber molecules influence their structure and reactivity ?

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21. Discuss the main purpose of vulcanisation of rubber

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22. What are the monomeric repeating units of Nylon-6, and Nylon-6,6 ?

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23. Write the names of structures of the monomers of the following polymers : Buna-S

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24. Write the names of structures of the monomers of the following polymers : Buna-N

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25. Write the names of structures of the monomers of the following polymers : Decron

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26. Write the names of structures of the monomers of the following polymers : Neoprene

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27. Identify the monomers in the following polymers :

$$\left[- - \overset{O}{\overset{||}{C}} - (CH_2)_8 - \overset{O}{\overset{||}{C}} - NH - (CH_2)_6 - NH - - \right]_n$$

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28. Identify the monomers in the following polymers :

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29. How is dacron obtained from ethylene glycol and terephthalic acid?

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30. What is a biodegradable polymer? Give an example of a biodegradable aliphatic polyester.

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Higher Order Thinking Skill Questions

1. Explain whether cationic or anlonic poiymerisation takes place in the preparation of acrylonitrile.

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2. Compounds like ice, NaCl etc., have a sharp melting point. However polymers do not have a sharp melting point. Give reasons.

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3. Which of the following polymers are long chain and which of them are cross-linked condensation polymers? Explain.

(1) Ethylene glycol (2) Glycerol (3) Terephthalic acid

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4. What do you mean by polymer additive ?

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5. What do you mean by plasticizer ? Give an example.

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6. Why does cis-polyisoprene exhibit elasticity ?

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Entrance Question Bank

1. Silicone oil is obtained from the hydrolysis and polymerisation of

A. trimethylchlorosilane and dimethyldichlorosilane

B. trimethylchlorosilane and methyltrichlorosilane

C. methyltrichlorosilane and dimethyldichlorosilane

D. triethylchlorosilane and diethyldichlorosilane

Answer: A

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2. Which one of the following is a condensation polymer -

A. PVC

B. teflon

C. dacron

D. polystyrene

Answer: C

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3. Which one is classified as a condensation polymer

A. acrylonitrile

B. dacron

C. neoprene

D. teflon

Answer: B

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4. Which polymer is used in the manufacture of paints and lacquers -

A. bakelite

B. glyptal

C. polypropene

D. polyvinyl chloride

Answer: B

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5. Which of the following statements about low density polyethylene is false -

A. its synthesis requires high pressure

B. it is a poor conductor of electricity

C. its synthesis requires dioxygen or a peroxide initiator as a catalyst

D. It is used in the manufacture of buckers, dustbins etc.

Answer: D

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6. The fomation of which of the following polymer involves hydrolysis reaction -

A. nylon 6, 6

B. terylene

C. nylon 6

D. bakelite

Answer: C

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7. Of the following which one is classified as polyester polymer -

A. terylene

B. bakelite

C. melamine

D. nylon-6,6

Answer: A

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8. Which of the following statements is false -

A. the repeat unit in natural rubber is isoprene

B. both starch and cellulose are polymers of glucose

C. artificial silk is derived from cellulose

D. nylon-6,6 is an example of elastomer

Answer: D

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9. Which of the following is not a condensation polymer-

A. dacron

B. neoprene

C. melamine

D. glyptal

Answer: B

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10. Which one of the following sets from the biodegradable polymer -

A. $H_2N - CH_2 - COOH$ and $H_2N - (CH_2)_5 - COOH$

B. 

C. 

D. $CH_2 = CH - CN$ and $CH_2 = CH - CH = CH_2$

Answer: A

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11. What is monomer of neoprene in the following -

A. $CH_2 = CH - C \equiv CH$

B. $CH_2 = CH - CH = CH_2$

C. $CH_2 = \underset{\underset{CH_3}{|}}{C} - CH = CH_2$

D. $CH_2 = \underset{\underset{Cl}{|}}{C} - CH = CH_2$

Answer: D

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12. Nylon is an example of

A. polythene

B. polyester

C. polysaccharide

D. polyamide

Answer: D

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13. Which of the following organic compounds polymerises to form the polyester dacron -

A. propylene and para - HO-(C_6H_4) -OH

B. benzoic acid and ethanol

C. terephthalic acid and ethylene glycol

D. benzoic acid and para- HO-(C_6H_4) -OH

Answer: C

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14. Which one of the following is an example of a thermosetting polymer-

A. $\left(- - CH_2 - \underset{\underset{\text{Cl}}{|}}{C} = CH - CH_2 - - \right)_n$

B. $(- - CH_2 - CH_2 - -)_n$

C. $\left(- - \overset{\overset{H}{|}}{N} - (CH_2)_6 - \overset{\overset{H}{|}}{N} - \overset{\overset{O}{||}}{C} - (CH_2)_4 - \overset{\overset{O}{||}}{C} - - \right)_n$

D. 

Answer: D

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15. Caprolactam is used for the manufacture of

A. teflon

B. terylene

C. nylon 6, 6

D. nylon 6

Answer: D

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16. Which one of the following structures represents nylon 6, 6 polymer-

A. 

B. 

C. 

D. 

Answer: D

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17. Natural rubber has-

A. alternate cis- and trans-configuration

B. random cis-and trans-configuration

C. all cis-configuration

D. all trans-configuration

Answer: C

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18. Regarding cross-linked or network polymers, which of the following statements is incorrect-

A. they contain covalent bonds between various linear polymer chains

B. they are formed from bi- and tri-functional monomers

C. examples are bakelite and melamine

D. they contain strong covalent bonds in their polymer chains

Answer: C

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19. Isoprene is-

A. 3-methyl-1,2-butadiene

B. 2-methyl-1,3-butadiene

C. 3-chloro-1,2-butadiene

D. 2-chloro-1,3-butadiene

Answer: B

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20. Which of the following is correct examples of condensation polymers-

A. nylon, Buna-S

B. teflon, Buna-N

C. nylon 6,6, dacron

D. neoprene, Buna-S

Answer: C

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21. Non-stick cookwares generally have a coating of a polymer, whose monomer is-

A. $CH_2 = CH_2$

B. $CH_2 = CHCN$

C. $CH_2 = CHCl$

D. $CF_2 = CF_2$

Answer: D

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22. Monomers of nylon 2-nylon 6 are-

A. glycine and aminocaproic acid

B. glycine and caproic acid

C. hexamethylenediamine and adipic acid

D. alanine and aminocaproic acid

Answer: A

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23. The polymer obtained by the interaction of ethylene glycol and terephthalic acid is-

A. nylon

B. dacron

C. teflon

D. bakelite

Answer: B

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24. Which is not classified as thermoplastics-

A. polyethylene

B. polystyrene

C. bakelite

D. neoprene

Answer: C

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

(I)$CH_2 = CH - C_6H_4(NO_2)$

(II)$CH_2 = CH - C_6H_4(CH_3)$

(III)$CH_2 = CH - C_6H_4(OCH_3)$

A. I gt II gt III

B. II gt I gt III

C. III gt II gt I

D. I gt III gt II

Answer: C

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26. Match the following

A. IAA	i. Herring sperm DNA
B. ABA	ii. Bolting
C. Ethylene	iii. Stomatal closure
D. GA	iv. Weed free lawns
E. Cytokinins	v. Ripening of fruits

A. (i)-(p), (ii)-(q),(iii)-(r) , (iv)-(s)

B. (i)-(q), (ii)-(p),(iii)-(r) , (iv)-(s)

C. (i)-(p), (ii)-(q),(iii)-(s) , (iv)-(r)

D. (i)-(s), (ii)-(r),(iii)-(p) , (iv)-(q)

Answer: A

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Solved Ncert Exemplar Problems

1. Which of the following polymers of glucose is stored by animals-

A. cellulose

B. amylose

C. amylopectin

D. glycogen

Answer: D

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2. Which of the following is not a semisynthetic polymer-

A. cis-polyisoprene

B. cellulose nitrate

C. cellulose acetate

D. vulcanised rubber

Answer: A

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3. The commercial name of polyacrylonitrile is __.

A. dacron

B. orlon (acrilan)

C. PVC

D. bakelite

Answer: B

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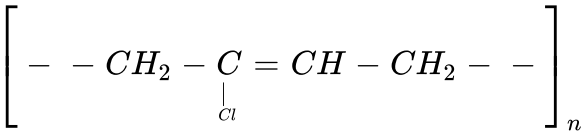
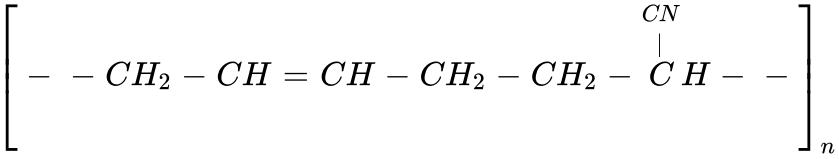
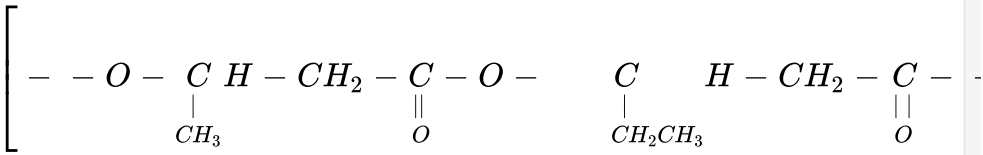
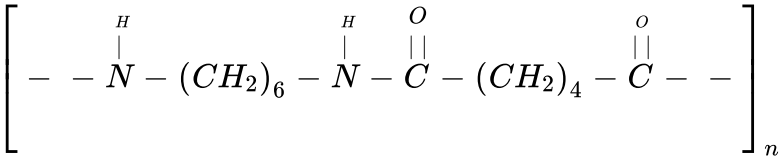
4. Which of the following polymer is biodegradable -

A. 

B. 

C.



D. 

Answer: D

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5. In which of the following polymers ethylene glycol is one of the monomer units-

A. 

B. $[- \ - CH_2 - CH_2 - \ -]_n$

C. 

D.

$$\left[- \ - O - \underset{CH_3}{\overset{|}{C}} H - CH_2 - \underset{O}{\overset{||}{C}} - O - \quad \underset{CH_2CH_3}{\overset{|}{C}} \quad H - CH_2 - \underset{O}{\overset{||}{C}} - \right.$$

Answer: A

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6. Which of the following statements is not true about low density polythene-

A. tough

B. hard

C. poor conductor of electricity

D. highly branched structure

Answer: C

Watch Video Solution

7. $\left(- - CH_2 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH_2 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - - \right)_n$ is a polymer having monomer units _____

A. 

B. 

C. 

D. 

Answer: A

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8. Which of the following polymers, need atleast one diene monomer for their preparation-

A. dacron

B. Buna-S

C. neoprene

D. novolac

Answer: B::C

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9. Which of the following are characteristics of thermosetting polymers-

A. heavily branched cross linked polymers

B. linear slightly branched long chain molecules

C. become infusible on moulding, so cannot be reused

D. soften on heating and harden on cooling, can be reused

Answer: A::C

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10. Which of the following polymers are thermoplastic

A. teflon

B. natural rubber

C. neoprene

D. polystyrene

Answer: A::D

Watch Video Solution

11. Which of the following polymers are used as fibre-

A. polytetrafluoroethane

B. polychloroprene

C. nylon

D. terylene

Answer: C::D

Watch Video Solution

12. Which of the following are addition polymers-

A. nylon

B. melamine formaldehyde resin

C. orion

D. polystyrene

Answer: C::D

Watch Video Solution

13. Which of the following are condensation polymers

A. bakelite

B. teflon

C. butyl rubber

D. melamine formaldehyde resin

Answer: A::D

Watch Video Solution

14. 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. caprolactam

Answer: A::B

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15. Which of the following are examples of synthetic rubber-

A. polychloroprene

B. polyacrylonitrile

C. Buna-N

D. cis-polyisoprene

Answer: A::C

Watch Video Solution

16. Which of the following polymers can have strong intermolecular forces -

A. nylon

B. polystyrene

C. rubber

D. polyesters

Answer: A::D

Watch Video Solution

17. Which of the following polymers have vinylic monomer units

A. acrilan

B. polystyrene

C. nylon

D. teflon

Answer: A::B::D

Watch Video Solution

18. Vulcanisation makes rubber-

A. more elastic

B. soluble in inorganic solvent

C. crystalline

D. more stiff

Answer: a,d

Watch Video Solution

19. A natural linear polymer of 2-methyl-1, 3-butadiene becomes hard on treatment with sulphur between 373 to 415 K and -S-S- bonds are formed between chains. Write structure of the product ofthis treatment.

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20. Identify the type of polymer. -A-A-A-A-A-

Watch Video Solution

21. Identify the type of polymer. -A-B-B-A-A-A-B-A-

Watch Video Solution

22. Out of chain growth polymerisation and step growth polymerisation, in which type will you place the following.

$(--A--)m+(--A--)n\rightarrow(--A--)_m(--A--$

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23. Identify the type of polymer in the following figure.

View Text Solution

24. Identify the polymer given below:

View Text Solution

25. Why are rubbers called elastomers?

Watch Video Solution

26. Can enzyme be called a polymer?

Watch Video Solution

27. Can nucleic acids, proteins and starch be considered as step growth polymers?

Watch Video Solution

28. How is the following resin intermediate prepared and which polymer is formed by this monomer unit?

View Text Solution

29. To have practical applications why are cross links required in rubber?

Watch Video Solution

30. Why does cis-polyisoprene possess elastic property?

Watch Video Solution

31. What is the structural difference between HOP and LDP? How does the structure account for different behaviour and nature, hence the use of a polymer?

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32. What is the role of benzoyl peroxide in addition polymerisation of alkenes? Explain its mode of action with the help of an example.

Watch Video Solution

33. Which factor imparts crystalline nature to a polymer like nylon?

Watch Video Solution

34. Name the polymers used in laminated sheets and give the name of monomeric units involved in its formation .

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35. Which type of biomolecules have some structural similarity with synthetic polyamides? What is this similarity?

Watch Video Solution

36. Why should the monomers used in addition polymerisation through free radical pathway be very pure?

Watch Video Solution

37. Assertion (A): Rayon is a semi synthetic polymer and is taken as a better choice than cotton fabric.

Reason (R) : Mechanical and aesthetic properties of cellulose can be improved by acetylation.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: B

Watch Video Solution

38. Assertion (A): Most of the synthetic polymers are not biodegradable.

Reason (R) : Polymerisation process induces toxic character in organic molecules.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: D

Watch Video Solution

39. Assertion (A): Olefinic monomers undergo addition polymerisation.

Reason (R) : Polymerisation of vinyl chloride is initiated by peroxides/persulphates.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: A

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40. Assertion (A): Polyamides are best used as fibres because of high tensile strength.

Reason (R) : Strong intermolecular forces (like hydrogen bonding within polyamides) lead to close packing of chains and increase the crystalline character, hence, provide high tensile strength to polymers.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: B

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41. Assertion (A): For making rubber synthetically, isoprene molecules are polymerised.

Reason (R) : Neoprene (a polymer of chloroprene) is a synthetic rubber.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is wrong statement and (R) is correct statement

Answer: D

Watch Video Solution

42. Assertion (A): Network polymers are thermosetting.

Reason (R) : Network polymers have high molar mass.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: A

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43. Assertion (A): Polytetrafluoroethylene is used in making non-stick cookwares.

Reason (R) : Fluorine has highest electronegativity.

A. (A) and (R) both are correct statement but reason does not explain (A)

B. (A) and (R) both are correct statements and (R) explains the (A)

C. Both (A) and (R) are wrong statement

D. (A) is correct statement and (R) is wrong statement

Answer: A

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44. Synthetic polymers do not degrade in the environment for a long time. How can biodegradable synthetic polymers be made? Differentiate between biopolymers and biodegradable polymers and give examples of each type.

Watch Video Solution

45. Differentiate between rubbers and plastics on the basis of intermolecular forces.

Watch Video Solution

46. Phenol and formaldehyde undergo condensation to give a polymer (A) which on heating with formaldehyde gives a thermosetting polymer (B). Name the polymers. Write the reactions involved in the formation of (A). What is the structural difference between two polymers?

Watch Video Solution

47. Low density polythene and high density polythene, both are polymers of ethene but there is marked difference in their properties. Explain.

Watch Video Solution

48. Which of the following polymers soften on heating and harden on cooling? What are the polymers with this property collectively called? What are the structural similarities between such polymers? Bakelite, urea-formaldehyde resin, polythene, polyvinyls, polystyrene.

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Mcq Hotspot

1. Which of the following is an example of thermosetting plastic-

A. nylon-6

B. terylene

C. bakelite

D. polyethelene

Answer: C

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2. The bond present in cellulose is

A. 1, 6' -β -glycosidic bond

B. 1 , 4' -β -glycosidic bond

C. 1 , 6' - α -glycosidic bond

D. 1 , 4' -α -glycosidic bond

Answer: B

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3. Which of the following polymers contains ester bond

A. nylon

B. bakelite

C. terylene

D. PVC

Answer: C

Watch Video Solution

4. Monomer of Teflon is-

A. FCIC = CCIF

B. $Cl_2C = CCl_2$

C. $F_2C = CF_2$

D. $FCIC = CF_2$

Answer: C

Watch Video Solution

5. Neoprene is the polymer of

A. vinyl chloride

B. chloroprene

C. butadiene

D. propene

Answer: B

Watch Video Solution

6. The biodegradable polymer belonging to polymamide group is-

A. dextron

B. nylon-2-nylon-6

C. nylon-6,6

D. PHBV

Answer: B

Watch Video Solution

7. Monomer-pair needed to prepare Dacron is -

A. acrylonitrile and vinyl acetate

B. terephthalic acid and ethylene glycol

C. phthalic acid and ethylene glycol

D. adipic acid and hexamethylene diamine

Answer: B

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8. Which of the following is used to prepare paints?

A. chloroprene

B. nylon

C. terylene

D. glyptal

Answer: D

Watch Video Solution

9. Which process helps in synthesis of polymer from monomer-

A. hydrolysis of monomer

B. condensation of monomer molecules

C. protonation of monomer

D. none of these

Answer: B

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10. Natural rubber is-

A. polysaccharide

B. polyamide

C. polyester

D. cis-polyisoprene

Answer: D

Watch Video Solution

11. Which one of the following statements is false-

A. size of polymer molecular is 100 or 1000 times larger than a compound molecule

B. polymer does not have a specific molecular weight

C. polymers posses a fixed melting point

D. viscosity of polymer solution are of high values

Answer: C

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12. Monomers of Buna-S are-

A. styrene and butadiene

B. butadiene

C. ioprene and butadiene

D. vinyl chloride and sulphur

Answer: A

Watch Video Solution

13. Which one of the following is not a homopolymer-

A. teflon

B. SBR

C. PVC

D. natural rubber

Answer: B

Watch Video Solution

14. Which one of the following is a completely fluorinated polymer-

A. neoprene

B. teflon

C. thiocol

D. PVC

Answer: B

Watch Video Solution

15. Repeating unit of PTTE is

A. $Cl_2CH - CH_3$

B. $F_2C = CF_2$

C. $F_3C - CF_3$

D. $FClC = CF_2$

Answer: B

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16. Caprolactam is the monomer of-

A. nylon-6

B. terylene

C. nylon-6,10

D. nylon-6,6

Answer: A

Watch Video Solution

17. Most reactive alkene in cationic polymerisation is

A. $H_2C = CHCH_3$

B. $H_2C = CF_2$

C. $H_2C = CHCN$

D. $H_2C = CHC_6H_5$

Answer: D

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18. Which one is used in the vulcanisation of rubber-

A. S_2Cl_2

B. CF_4

C. Cl_2F_2

D. C_2F_2

Answer: A

Watch Video Solution

19. The monomeric unit present in orlon is-

A. vinyl cyanide

B. acrolyne

C. glycol

D. isoprene

Answer: A

Watch Video Solution

20. Which one of the following is a natural fibre

A. starch

B. cellulose

C. rubber

D. nylon-6

Answer: B

Watch Video Solution

21. Which polymer is used as a lubricator and an insulator-

A. SBR

B. PVC

C. PTEE

D. PAN

Answer: C

Watch Video Solution

22. Which one is the initiator in a cationic polymerisation-

A. $LiAlH_4$

B. HNO_3

C. $AlCl_3$

D. BuLi

Answer: C

Watch Video Solution

23. The catalyst used in the polymerisation of olefin is

A. Zeigler-Natta catalyst

B. Wilkinson catalyst

C. Pd-catalyst

D. zeolite

Answer: A

Watch Video Solution

24. The compound used in increasing the rigidity of rubber in tyres is-

A. wax

B. 1,3-butadiene

C. CaC_2

D. carbon black

Answer: D

Watch Video Solution

25. Ebonite is-

A. natural rubber

B. synthetic rubber

C. high vulcanised rubber

D. polypropene

Answer: C

Watch Video Solution

26. Which one of the following not an intermediate in polymerisation-

A. carbocation

B. carbanion

C. free radical

D. carbene

Answer: D

Watch Video Solution

27. The full form of PLA is

A. polylevulonic acid

B. p-lactic acid

C. polylactic acid

D. polylactone acetic acid

Answer: C

Watch Video Solution

28. Monomer of polyethylene is-

A. ethylene

B. ethyl amine

C. ethanoic acid

D. ethylene glycol

Answer: A

Watch Video Solution

29. Commercial name of PTTE is-

A. styrene

B. glyptal

C. bakelite

D. teflon

Answer: D

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30. All polymers are macromolecules, but the reverse statement is not true. Which one of the following compound supports this comment-

A. polyethylene

B. polyvinyl chloride

C. chlorophyll

D. polystyrene

Answer: C

Watch Video Solution

31. Which one of the following form polyester network on reaction with terephthalic acid-

A. ethylene glycol

B. propylene glycol

C. glycerol

D. hydroquinone

Answer: C

Watch Video Solution

32. Which one of the following is used for lamination of wood

A. phenol-formaldehyde resin

B. urea-formaldehyde resin

C. melamine-formaldehyde resin

D. dacron

Answer: B

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33. Which one of the following is called neoprene rubber-

A. $\left[- - CH_2 - \underset{\text{Ph}}{\underset{|}{C}}H - - \right]$

B. $\left[- - CH_2 - \underset{Cl}{\underset{|}{C}}H - - \right]_n$

C. $\left[- - CH_2 - CH = CH - CH_2 - CH_2 - \underset{CN}{\underset{|}{C}}H - - \right]_n$

D. $\left[- - CH_2 - \underset{Cl}{\underset{|}{C}} = CH - CH_2 - - \right]_n$

Answer: D

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34. Order of intermolecular forces of attraction in the polymers: (1) nylon 6 (2) neoprene and (3) PVC is-

A. 1, 2, 3

B. 2, 1, 3

C. 2, 3, 1

D. 3, 1, 2

Answer: C

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35. Living polymerisation is

A. polycondensation polymerisation

B. free radical polymerisation

C. cationic polymerisation

D. anionic polymersation

Answer: D

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36. Which one of the following is elastomer-

A. polystyrene

B. neoprene

C. nylon 6, 6

D. bakelite

Answer: B

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37. Which one of the following is most inert polymer

A. terrylene

B. teflon

C. bakelite

D. cellulose

Answer: B

Watch Video Solution

38. Strong intermolecular force of attraction like H -bonding is present in the polymer-

A. natural rubber

B. teflon

C. nylon-6,6

D. polystyrene

Answer: C

Watch Video Solution

39. Which of the following polymer is stored in liver of animals-

A. amylase

B. cellulose

C. amylopectin

D. glycogen

Answer: D

Watch Video Solution

40. Which of the following is a polymer

A. carnuaba wax

B. carbowax

C. bees wax

D. paraffin wax

Answer: B

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41. Polymer used in bulllet proof glass is

A. PMMA

B. lexan

C. nomex

D. kevlar

Answer: A

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42. The condensation polymer/ s is/ are

A. teflon

B. PET

C. polystyrene

D. nylon

Answer: B and D

Watch Video Solution

43. The thermoplastic polymer/s is/are-

A. polyvinyl chloride

B. bakelite

C. polypropylene

D. polyethylene

Answer: A::C::D

Watch Video Solution

44. The two monomers of Buna-S are-

A. Isopropylene

B. Styrene

C. Alkylonitrile

D. Butadiene

Answer: B::D

Watch Video Solution

45. Choose the correct statements

A. polymers have sharp melting points

B. polymer solutions are more viscous

C. polymers have specific molecular weights

D. substances made of polymers generally have light weights

Answer: B::C::D

Watch Video Solution

46. The polymer obtained by the polycondensation of phenol and formaldehyde is-

A. novolac

B. polyester

C. resole

D. glyptal

Answer: A::C::D

Watch Video Solution

47. On vulcanisation, the natural rubber goes through changes in some of its properties like

A. decrease in elasticity

B. increase in resistance to abrasion

C. decrease in resistance to heat

D. increase in tensile strength

Answer: B::D

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48. $\left[- \ - NH - CH(R) - \overset{O}{\overset{||}{C}} - \ - \right]_n$ is a -

A. homopolymer

B. copolymer

C. condensation polymer

D. addition polymer

Answer: A::C

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49. Vinyl cyanide is used for the manufacture of-

A. Buna-S

B. ABS

C. Buna-N

D. neoprene

Answer: B::C

Watch Video Solution

50. Which of the following is a polyamide -

A. protein

B. dacron

C. nylon

D. melamine-formaldehyde resin

Answer: A::C

Watch Video Solution

51. Nylon 2 - nylon 6 is a biodegradable polymer. The monomers of these polymers are

A. glycine

B. caprolactam

C. aminocaproic acid

D. adipic acid

Answer: A::C

Watch Video Solution

52. Which of the following statements are not true regarding gutta-percha and natural rubber-

A. gutta-percha is an artificial polymer

B. both are natural

C. both have the same structure

D. they have different structure

Answer: B::D

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53. Which of the following are biodegradable polymer

A. dacron

B. polylactic acid

C. poly E-caprolactone

D. nylon 6, 10

Answer: B::C

Watch Video Solution

54. Which pairs of the following form biodegradable polymer -

A. $NH_2 - CH_2 - COOH$ and $NH_2 - (- - CH_2 - -)_5 COOH$

B. $H_2C = CH - CH = CH_2$ and $C_6H_5CH = CH_2$

C. $NH_2(- - CH_2 - -)_6 NH_2$ and

$HOOC(- - CH_2 - -)_4 COOH$

D. $CH_3CH(OH)CH_2COOH$ and $CH_3CH_2CH(OH)CH_2COOH$

Answer: A::D

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55. Which of the following are correctly designated-

A. polyvinyl chloride: branched polymer

B. bakelite: network polymer

C. polypropylene: thermoplastic polymer

D. terylene: thermoplastic polymer

Answer: B::C::D

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Exercise

1. What are polymers?

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2. Name the polymers that have the same empirical formulae as that of their monomers.

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3. Identify the addition and condensation polymers from the following: polyester, polyacrylonitrile, nylon, polypropylene.

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4. What is the other name of teflon?

Watch Video Solution

5. Name the polymer that is popularly known as terylene.

Watch Video Solution

6. Write the name and the formula of monomer of natural rubber.

Watch Video Solution

7. Name the repeating unit of polymethyl methacrylate (PMMA).

Watch Video Solution

8. Name the monomer and chemical formula of protein.

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9. Between long chain and cross-linked polymers, which one has the highest density and melting point?

Watch Video Solution

10. Why are substances made of polymers very light weight?

Watch Video Solution

11. What do you mean by living polymerisation?

Watch Video Solution

12. What is step polymerisation?

Watch Video Solution

13. Which is more branched among LOPE and HOPE?

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14. Write the monomer of PVC

Watch Video Solution

15. Name the monomers used in the preparation of glyptal

Watch Video Solution

16. Name the monomers of novolac

Watch Video Solution

17. Name a rubber that is used to make tyre tubes.

Watch Video Solution

18. Name a biodegradable and a non-biodegradable polymer.

Watch Video Solution

19. Give an example of biodegradable polymer and mention its use.

Watch Video Solution

20. ___ is the monomer of teflon

Watch Video Solution

21. Resole is prepared by the action of phenol and formaldehyde in the presence of ___ as a catalyst.

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22. The chemical name of natural rubber is ___

Watch Video Solution

23. The rubber prepared by the copolymerisation of butadiene and acrylonitrile is known as ___

Watch Video Solution

24. _____ polymerisation is also known as living polymerisation.

Watch Video Solution

25. Glyptal is a/an ___ resin.

Watch Video Solution

26. ___ and ___ are the monomers of nylon 6,6.

Watch Video Solution

27. ___ polymerisation is used in the preparation of polyvinyl chloride from vinyl chloride.

Watch Video Solution

28. Out of polyvinyl chloride and bakelite, thermoplastic polymer. ___ is a thermoplastic polymer

Watch Video Solution

29. Out of LDPE and HDPE, ___ has more number of side chains in its polymer chain.

Watch Video Solution

30. Biodegradable polymers are acted upon by ___

Watch Video Solution

31. Classify the following as addition and condensation polymers: nylon, styrene-butadiene, novolac, tetlon.

Watch Video Solution

32. Why don't polymers have a sharp melting point?

Watch Video Solution

33. Name two monomers that take part in addition polymerisation.

Watch Video Solution

34. Mention the various stages in addition polymerisation.

Watch Video Solution

35. Give an example each of free radical, cationic and anionic polymerisation reaction.

Watch Video Solution

36. How does chain initiation and chain propagation take place in free radical polymerisation?

Watch Video Solution

37. What do you mean by A-A and AA-BB polymerisation? Give an example of each type.

Watch Video Solution

38. What is copolymerisation? What is its purpose?

Watch Video Solution

39. Give an example of a copolymer prepared by each of the following methods: (i) addition polymerisation (ii) condensation polymerisation.

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40. What are LDPE and HDPE? Give two uses of polyethylene.

Watch Video Solution

41. Write the reaction for the preparation of polyethylene terephthalate. Give its use.

Watch Video Solution

42. Write the reaction for the preparation of glyptal. Give one of its applications.

Watch Video Solution

43. Write the reaction for the preparation of novolac. Give one use.

Watch Video Solution

44. Write the reaction for the preparation of resole. Give one use.

Watch Video Solution

45. What are Buna-S and Buna-N? Give their uses.

Watch Video Solution

46. What is biodegradable polymer? Give two examples.

Watch Video Solution

47. Write the reactions for preparation of nylon 6,6. Give two uses.

Watch Video Solution

48. What do you mean by vulcanisation of rubber? Why is it necessary?

Watch Video Solution

49. Why can't natural rubber be directly used?

Watch Video Solution

50. Classify the biodegradable polymers on the basis of their origin. Give an example of each.

Watch Video Solution

Practice Set 15

1. Which of the following polymers of glucose is stored by animals-

A. cellulose

B. amylase

C. amylopectin

D. glycogen

Answer: D

Watch Video Solution

2. The commercial name of polyacrylonitrile is -

A. dacron

B. orion

C. PVC

D. bakelite

Answer: B

Watch Video Solution

3. Biodegradable polymer which can be produced from glycine and aminocaproic acid ___

A. Buna-N

B. nylone 6,6

C. nylon 2-nylon 6

D. PHBV

Answer: C

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4. Which of the following is not a condensation polymer-

A. dacron

B. neoprene

C. melamine

D. glyptal

Answer: B

Watch Video Solution

5. Which one of the following is the initiator in a cationic polymerisation-

A. $LiAlH_4$

B. HNO_3

C. $AlCl_3$

D. BuLi

Answer: C

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6. (a)What do you mean by vulcanisation of rubber?

(b) Why is it necessary?

Watch Video Solution

7. What do you mean by A-A and AA-BB polymerisation? Give an example of each type.

Watch Video Solution

8. (a)What is copolymerisation?

(b) What is its purpose?

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9. (a) Define thermoplastic and thermosetting polymer.

(b) Give an example of each.

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10. Why are condensation polymers called as step growth polymers?

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1. Define the term, 'homopolymerisation' giving an example.

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2. Draw the structure of the monomer for each of the following polymers:

(i) Nylon 6 (ii) Polypropylene.

Watch Video Solution

3. Which of the following is a fibre? Nylon, Neoprene, PVC.

Watch Video Solution

4. Write the name of monomers used for getting the following polymers:

(i) Teflon (ii) Buna-N.

Watch Video Solution

5. Write the names and structures of the monomers of the following polymers: (i) Nylon 6, 6 (ii) PHBV (iii) Neoprene.

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6. Explain the term 'copolymerisation' and give an example of copolymerisation.

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7. What is the role of t- butyl peroxide in the polymerisation of ethene

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8. Idenity the monomers in the following polymer ?

$[--NH(CH_2)_6NHCO(CH_2)_4CO--]$

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9. Arrange the following polymers in the increasing order of their intermolecular forces : polystyrene, terylene, Buna-S

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10. Write the mechanism of free radical polymerisation of ethene

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11. What is the role of sulphur in the vulcanisation of rubber?

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12. Arrange the following polymers in the increasing order of their intermolecular forces : Terylene, Polythene , Neoprene

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13. Write the structures of the monomers used for getting the following polymers: (i) Dacron (ii) Melamine-formaldehyde polymer (iii) Buna-N (iv) Neoprene (v) Buna-S (vi) Nylon-6 (vii) Teflon

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14. Write the structures of the monomers used for getting the following polymrs: (i) Nylon-6,6 (ii) Melamine - formaldehyde polymer (iii) Buna-S (iv)Polyvinyl chloride (PVC) (v) Buna-N (vi) Neoprene (vii) Teflon

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15. Shyam went to grocery shop to purchase some food items. The shopkeeper packed all the item in polythene bags and gave them to Shyam. But, Shyam refused to accept the polythene bags and asked the shopkeeper to pack the items in paper bags. He informed the shopkeeper about the heavy penalty imposed by the government for using polythene bags. The shopkeeper promised that he would use paper bags in future in place of polythene bags.

Write the values (at least two) shown by the shyam

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16. Shyam went to grocery shop to purchase some food items. The shopkeeper packed all the item in polythene bags and gave them to Shyam. But, Shyam refused to accept the polythene bags and asked the shopkeeper to pack the items in paper bags. He informed the shopkeeper about the heavy penalty imposed by the government for using polythene bags. The shopkeeper promised that he would use paper bags in future in place of polythene bags.

Write one structural difference between low-density polythene and high-density polythene

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17. Shyam went to grocery shop to purchase some food items. The shopkeeper packed all the item in polythene bags and gave them to Shyam. But, Shyam refused to accept the polythene bags and asked the shopkeeper to pack the items in paper bags. He informed the shopkeeper about the heavy penalty imposed by the government for using polythene bags. The shopkeeper promised that he would use paper bags in future in

place of polythene bags.

Why did Shyam refused to accept the items in polythene bags ?

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18. Shyam went to grocery shop to purchase some food items. The shopkeeper packed all the item in polythene bags and gave them to Shyam. But, Shyam refused to accept the polythene bags and asked the shopkeeper to pack the items in paper bags. He informed the shopkeeper about the heavy penalty imposed by the government for using polythene bags. The shopkeeper promised that he would use paper bags in future in place of polythene bags.

What is a biodegradable polymer ? Give example

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