

Jimma Institute of Technology
B.Sc. Materials Science and Engineering
Tutorial - Multiple Choice Questions

08.05.2023

Name of the student	Register number

Answer the following questions.

1. What is a polymer?

- (a). A small molecule (b). A large molecule composed of repeating subunits called monomers (c). A type of metal
(d). A type of gas

Answer: (b)

Explanation: A polymer is a large molecule made up of repeating subunits called monomers.

2. What are monomers?

- (a). Large molecules (b). Small molecules that can be chemically bonded together to form a polymer (c). Elements
(d). Compounds

Answer: (b)

Explanation: Monomers are small molecules that can chemically bond together to form a polymer.

3. What is polymerization?

- (a). A type of metal (b). A chemical reaction in which monomers are linked together to form a polymer (c). A type of gas (d). A type of salt

Answer: (b)

Explanation: Polymerization is the chemical reaction in which monomers are linked together to form a polymer.

4. What are the two types of polymerization reactions?

- (a). Addition and subtraction (b). Condensation and substitution
- (c). Addition and condensation (d). Polymerization and depolymerization

Answer: (c)

Explanation: The two types of polymerization reactions are addition and condensation.

5. What is addition polymerization?

- (a). A type of polymerization reaction in which monomers react to form a polymer with the elimination of a small molecule
- (b). A type of polymerization reaction in which monomers add onto a growing polymer chain without the elimination of any byproducts
- (c). A type of polymerization reaction in which monomers break apart to form smaller molecules
- (d). A type of polymerization reaction in which monomers exchange functional groups

Answer: (b)

Explanation: Addition polymerization is a type of polymerization reaction in which monomers add onto a growing polymer chain without the elimination of any byproducts.

6. What is condensation polymerization?

- (a). A type of polymerization reaction in which monomers react to form a polymer with the elimination of a small molecule
- (b). A type of polymerization reaction in which monomers add onto a growing polymer chain without the elimination of any byproducts
- (c). A type of polymerization reaction in which monomers break apart to form smaller molecules
- (d). A type of polymerization reaction in which monomers exchange functional groups

Answer: (a)

Explanation: Condensation polymerization is a type of polymerization reaction in which monomers react to form a polymer with the elimination of a small molecule.

7. What are homopolymers?
- (a). Polymers that are composed of a single type of monomer
 - (b). Polymers that are composed of two or more different types of monomers
 - (c). Polymers that are crosslinked
 - (d). Polymers that are blends of different polymers

Answer: (a)

Explanation: Homopolymers are polymers that are composed of a single type of monomer.

8. What are copolymers?
- (a). Polymers that are composed of a single type of monomer
 - (b). Polymers that are composed of two or more different types of monomers
 - (c). Polymers that are crosslinked
 - (d). Polymers that are blends of different polymers

Answer: (b)

Explanation: Copolymers are polymers that are composed of two or more different types of monomers.

9. What is a thermoplastic polymer?
- (a). A polymer that can be melted and re-molded multiple times without significant degradation of its properties
 - (b). A polymer that undergoes a permanent chemical change upon curing.

Answer: a.

10. What is the definition of polymerization?
- (a). The process by which a polymer is broken down into its monomers
 - (b). The process by which a polymer is crosslinked
 - (c). A process by which monomers are linked together to form a polymer
 - (d). A process by which a polymer is dissolved in a solvent

Answer: (c).

This is a knowledge-level question as it requires the recall of the definition of polymerization.

11. What are the two types of polymerization reactions?

- | | |
|---|--|
| (a). Condensation and substitution | (b). Addition and substitution |
| (c). Addition and condensation polymerization | (d). Depolymerization and polymerization |

Answer: (c).

This is a knowledge-level question as it requires the recall of the types of polymerization reactions.

12. Which type of polymerization reaction involves the elimination of a small molecule?
- | | |
|----------------------------------|----------------------------------|
| (a). Addition polymerization | (b). Condensation polymerization |
| (c). Substitution polymerization | (d). Radical polymerization |

Answer: (b).

This is a comprehension-level question as it requires the understanding of the mechanism of condensation polymerization.

13. Which type of polymerization reaction involves the use of free radicals?
- | | |
|----------------------------------|----------------------------------|
| (a). Addition polymerization | (b). Condensation polymerization |
| (c). Substitution polymerization | (d). Radical polymerization |

Answer: (a).

This is a comprehension-level question as it requires the understanding of the mechanism of addition polymerization.

14. What is the mechanism of addition polymerization?
- | |
|---|
| (a). The formation of a covalent bond between monomers through the elimination of a small molecule |
| (b). The addition of monomers to a growing polymer chain through a reactive intermediate called a free radical, cation or anion |
| (c). The repeated reaction between two different types of monomers to form a polymer |
| (d). The opening of a cyclic monomer to form a linear polymer |

Answer: (b).

This is a comprehension-level question as it requires the understanding of the mechanism of addition polymerization.

15. What is the mechanism of condensation polymerization?
- (a). The formation of a covalent bond between monomers through the elimination of a small molecule
 - (b). The addition of monomers to a growing polymer chain through a reactive intermediate called a free radical, cation or anion
 - (c). The repeated reaction between two different types of monomers to form a polymer
 - (d). The opening of a cyclic monomer to form a linear polymer

Answer: (a).

This is a comprehension-level question as it requires the understanding of the mechanism of condensation polymerization.

16. Which type of polymerization reaction produces less waste?
- (a). Addition polymerization
 - (b). Condensation polymerization
 - (c). Substitution polymerization
 - (d). Radical polymerization

Answer: (a).

This is an application-level question as it requires the application of knowledge about the advantages of addition polymerization.

17. Which type of polymerization reaction can produce a wider range of polymers?
- (a). Addition polymerization
 - (b). Condensation polymerization
 - (c). Substitution polymerization
 - (d). Radical polymerization

Answer: (b).

This is an application-level question as it requires the application of knowledge about the advantages of condensation polymerization.

18. What is the difference between addition and condensation polymerization?
- (a). Addition polymerization involves the elimination of a small molecule, while condensation polymerization does not
 - (b). Addition polymerization is a type of chain-growth polymerization, while condensation polymerization is a type of step-growth polymerization
 - (c). Addition polymerization requires highly purified monomers, while condensation polymerization does not

(d). Addition polymerization is less sensitive to impurities

Answer: (b).

19. Which type of polymer is formed from a single monomer?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Interpolymer

Answer: (a). Homopolymer.

This type of polymer is formed from a single monomer.

20. Which type of polymer is formed from two different monomers?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Interpolymer

Answer: (b). Copolymer.

This type of polymer is formed from two different monomers.

21. Which type of polymer is formed from three different monomers?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Interpolymer

Answer: (c). Terpolymer.

This type of polymer is formed from three different monomers.

22. Which type of polymer is formed from more than three different monomers?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Interpolymer

Answer: (d). Interpolymer.

This type of polymer is formed from more than three different monomers.

23. Which type of polymer has a linear, branched, or crosslinked structure?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Polymer blend

Answer: (a). Homopolymer.

This type of polymer can have a linear, branched, or crosslinked structure.

24. Which type of polymer is formed by mixing two or more different polymers?

(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Polymer blend

Answer: (d). Polymer blend.

This type of polymer is formed by mixing two or more different polymers.

25. Which type of polymer is formed by chemical reactions between two different polymers?
(a). Homopolymer (b). Copolymer (c). Terpolymer (d). Polymer blend

Answer: (d). Interpolymer.

This type of polymer is formed by chemical reactions between two different polymers.

26. Which type of polymer is a natural polymer found in plants and animals?
(a). Synthetic polymer (b). Biopolymer (c). Elastomer (d). Thermoplastic

Answer: (b). Biopolymer.

This type of polymer is a natural polymer found in plants and animals.

27. Which type of polymer is made from petrochemicals?
(a). Biopolymer (b). Synthetic polymer (c). Elastomer (d). Thermoset

Answer: (b). Synthetic polymer.

This type of polymer is made from petrochemicals.

28. Which type of polymer can be easily molded and reshaped by heating and cooling?
(a). Thermoplastic (b). Thermoset (c). Elastomer (d). Biopolymer

Answer: (a). Thermoplastic.

This type of polymer can be easily molded and reshaped by heating and cooling.

29. Which type of polymer is rigid and cannot be easily reshaped once it is set?
(a). Thermoplastic (b). Thermoset (c). Elastomer (d). Biopolymer

Answer: (b). Thermoset.

This type of polymer is rigid and cannot be easily reshaped once it is set.

30. Which type of polymer has the ability to stretch and return to its original shape?
(a). Thermoplastic (b). Thermoset (c). Elastomer (d). Biopolymer

Answer: (c). Elastomer.

This type of polymer has the ability to stretch and return to its original shape.