A-LEVEL

Multiple-choice questions on Biomolecules

1. Which of the following is a monosaccharide?
A) Glucose
B) Sucrose
C) Starch
D) Cellulose
Answer: A) Glucose Explanation: Monosaccharides are the simplest carbohydrates, and glucose is a common example.

2. In a nucleotide, the sugar component is

derived from:
A) Ribose
B) Glucose
C) Deoxyribose
D) Fructose
Answer: C) Deoxyribose Explanation: Nucleotides, the building blocks of nucleic acids, contain either ribose (RNA) or deoxyribose (DNA) as the sugar component.

3. Which of the following is NOT a function of proteins?
A) Catalysis
B) Storage of genetic information
C) Structural support
D) Transport
Answer: B) Storage of genetic information Explanation: Proteins are not involved in storing genetic information; that role is carried out by nucleic acids (DNA and RNA).

4. Enzymes are examples of which class of biomolecules?
A) Carbohydrates

B) Proteins
C) Lipids
D) Nucleic acids
Answer: B) Proteins Explanation: Enzymes are specialized proteins that catalyze biochemical reactions.

5. Which of the following lipids is a major component of cell membranes?
A) Triglycerides
B) Phospholipids
C) Steroids
D) Waxes
Answer: B) Phospholipids Explanation: Phospholipids have a hydrophilic head and hydrophobic tail, making them essential for forming cell membranes.

6. What is the primary function of RNA?
A) Energy storage
B) Genetic information storage
C) Catalyzing reactions
D) Protein synthesis
Answer: D) Protein synthesis Explanation: RNA

is involved in protein synthesis, serving as a template for the synthesis of proteins.

7. Which amino acid is unique to collagen, a structural protein in connective tissues?
A) Glycine
B) Valine
C) Proline
D) Serine
Answer: C) Proline Explanation: Collagen contains a high proportion of proline, which contributes to its unique triple helix structure.

8. Which of the following is a function of carbohydrates in living organisms?
A) Energy storage
B) Insulation
C) Nucleic acid synthesis
D) Structural support
Answer: A) Energy storage Explanation: Carbohydrates, such as glycogen and starch, are essential for storing and providing energy.

9. The secondary structure of a protein is

stabilized by:
A) Peptide bonds
B) Hydrogen bonds
C) Disulfide bonds
D) Ionic bonds
Answer: B) Hydrogen bonds Explanation: The secondary structure of proteins, like alpha helices and beta sheets, is stabilized by hydrogen bonds.

10. Which of the following is a polysaccharide found in the cell walls of plants?
A) Cellulose
B) Chitin
C) Glycogen
D) Amylose
Answer: A) Cellulose Explanation: Cellulose is a polysaccharide that provides structural support in plant cell walls.

11. The building blocks of nucleic acids are:
A) Amino acids
B) Nucleotides
C) Fatty acids

D) Monosaccharides
Answer: B) Nucleotides Explanation: Nucleic acids, such as DNA and RNA, are composed of nucleotide monomers.

12. Which of the following is a characteristic of saturated fatty acids?
A) Double bonds between carbon atoms
B) Liquid at room temperature
C) Found in olive oil
D) Solid at room temperature
Answer: D) Solid at room temperature
Explanation: Saturated fatty acids lack double bonds and are typically solid at room temperature.

13. The structural and functional unit of a protein is:
A) Polypeptide chain
B) Amino acid
C) Nucleotide
D) Monosaccharide
Answer: B) Amino acid Explanation: Amino acids are the building blocks of proteins, and the

sequence of amino acids determines a protein's structure and function.

14. Which of the following is an example of a nitrogenous base found in DNA?
A) Adenine
B) Uracil
C) Cytosine
D) Guanine
Answer: A) Adenine Explanation: Adenine is one of the four nitrogenous bases in DNA.

15. The primary structure of a protein is determined by:
A) Hydrogen bonding
B) Peptide bonds
C) Disulfide bonds
D) Ionic bonds
Answer: B) Peptide bonds Explanation: The primary structure of a protein is the sequence of amino acids linked by peptide bonds.

16. Which of the following is a function of triglycerides?

A) Enzyme catalysis
B) Energy storage
C) Structural support
D) Genetic information storage
Answer: B) Energy storage Explanation: Triglycerides store energy in the form of fat and are a major component of adipose tissue.

17. The enzyme amylase breaks down:
A) Proteins
B) Nucleic acids
C) Carbohydrates
D) Lipids
Answer: C) Carbohydrates Explanation: Amylase is responsible for breaking down carbohydrates, specifically starches, into simpler sugars.

18. Which of the following is a function of DNA?
A) Catalyzing reactions
B) Energy storage
C) Genetic information storage
D) Structural support

Answer: C) Genetic information storage
Explanation: DNA carries the genetic information in cells and serves as a template for RNA synthesis.

19. What is the role of RNA polymerase in protein synthesis?
A) Transcription
B) Translation
C) Replication
D) Mutation
Answer: A) Transcription Explanation: RNA polymerase is responsible for synthesizing RNA from a DNA template during transcription.

20. Which of the following is a characteristic of phospholipids?
A) Water-soluble
B) Composed of three fatty acids
C) Amphipathic
D) Primary energy storage molecules
Answer: C) Amphipathic Explanation: Phospholipids have a hydrophilic head and hydrophobic tail, making them amphipathic and

crucial for cell membrane structure.

21. The conversion of glucose to pyruvate in glycolysis occurs in the:
A) Nucleus
B) Cytoplasm
C) Mitochondria
D) Endoplasmic reticulum
Answer: B) Cytoplasm Explanation: Glycolysis takes place in the cytoplasm of the cell.

22. Which of the following is a storage polysaccharide in animals?
A) Cellulose
B) Starch
C) Glycogen
D) Chitin
Answer: C) Glycogen Explanation: Glycogen is a storage polysaccharide in animals, stored primarily in the liver and muscles.

23. Which of the following is a nitrogenous base found in RNA but not in DNA?
A) Adenine

B) Thymine
C) Uracil
D) Cytosine
Answer: C) Uracil Explanation: RNA contains uracil, while DNA contains thymine.

24. The process of converting mRNA information into a sequence of amino acids is called:
A) Transcription
B) Translation
C) Replication
D) Reverse transcription
Answer: B) Translation Explanation: Translation is the process where the information carried by mRNA is used to build a corresponding protein.

25. What is the primary function of cholesterol in cell membranes?
A) Energy storage
B) Structural support
C) Fluidity regulation
D) Enzyme catalysis

Answer: C) Fluidity regulation Explanation: Cholesterol helps regulate the fluidity and flexibility of cell membranes.

26. The disaccharide lactose is composed of:
A) Glucose and galactose
B) Glucose and fructose
C) Glucose and glucose
D) Glucose and maltose
Answer: A) Glucose and galactose Explanation: Lactose is composed of one molecule of glucose and one molecule of galactose.

27. Which of the following is a function of RNA interference (RNAi)?
A) DNA replication
B) Protein synthesis inhibition
C) Lipid digestion
D) Carbohydrate metabolism
Answer: B) Protein synthesis inhibition Explanation: RNA interference regulates gene expression by inhibiting protein synthesis.

28. Which of the following statements about

enzymes is true?
A) Enzymes are consumed during reactions.
B) Enzymes change the equilibrium of a reaction.
C) Enzymes lower the activation energy of a reaction.
D) Enzymes are specific for one substrate.
Answer: C) Enzymes lower the activation energy of a reaction. Explanation: Enzymes facilitate reactions by lowering the activation energy required for the reaction to occur.

29. A peptide bond forms between the _____ of one amino acid and the _____ of another amino acid.
A) Amino group; carboxyl group
B) Carboxyl group; amino group
C) Hydroxyl group; phosphate group
D) Methyl group; amino group
Answer: B) Carboxyl group; amino group
Explanation: Peptide bonds form between the carboxyl group of one amino acid and the amino group of another.
30. Which of the following is a function of ATP

(adenosine triphosphate)?
A) Energy storage
B) Genetic information storage
C) Structural support
D) Energy currency in cells
Answer: D) Energy currency in cells
Explanation: ATP is the primary energy currency in cells, providing energy for cellular processes.

31. The shape of DNA is often described as a:
A) Single helix
B) Double helix
C) Triple helix
D) Quadruple helix
Answer: B) Double helix Explanation: DNA has a double helical structure, consisting of two antiparallel strands.

32. Which of the following is a characteristic of unsaturated fatty acids?
A) Solid at room temperature
B) Only single bonds between carbon atoms
C) Found in butter

D) Liquid at room temperature
Answer: D) Liquid at room temperature
Explanation: Unsaturated fatty acids have one or more double bonds and are typically liquid at room temperature.

33. The primary function of ribosomes is:
A) DNA replication
B) Protein synthesis
C) Lipid synthesis
D) ATP production
Answer: B) Protein synthesis Explanation: Ribosomes are cellular structures responsible for protein synthesis.

34. Which of the following is an example of a coenzyme?
A) NAD+
B) DNA
C) RNA
D) ATP
Answer: A) NAD+ Explanation: NAD+ is a coenzyme involved in redox reactions, accepting and donating electrons.

35. The process of breaking down complex molecules into simpler ones, usually accompanied by the release of energy, is called:
A) Anabolism
B) Metabolism
C) Catabolism
D) Photosynthesis
Answer: C) Catabolism Explanation: Catabolism involves the breakdown of complex molecules into simpler ones, often releasing energy.

36. The central dogma of molecular biology describes the flow of genetic information in cells. Which of the following represents the correct sequence in this process?
A) DNA replication → Transcription → Translation
B) Transcription → Translation → DNA replication
C) Translation → Transcription → DNA replication
D) DNA replication → Translation →

Transcription
Answer: A) DNA replication → Transcription → Translation Explanation: The central dogma describes the flow of genetic information as DNA replication, followed by transcription and then translation.

37. Which of the following is a function of chaperone proteins?
A) Catalyzing reactions
B) Assisting in protein folding
C) Storing genetic information
D) Forming cell membranes
Answer: B) Assisting in protein folding Explanation: Chaperone proteins help newly synthesized proteins