Biology Grade 9 — Chapter 6

Molecular Biology

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Independent practice MCQs from the supplied Class 9 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. Biochemistry is the study of:

(A) Chemical compounds and chemical processes within living organisms
(B) Only the physical structure of organisms
(C) Only the classification of organisms
(D) Only the behavior of animals

Correct Answer: A

Explanation: Biochemistry is the study of different chemical compounds and the chemical processes taking place within the living organisms.

2. How many naturally occurring elements are bioelements?

(A) 92
(B) 16
(C) 6
(D) 10

Correct Answer: B

Explanation: Out of 92 naturally occurring elements on Earth, 16 are bioelements.

3. Which of the following is a major bioelement?

(A) Iron
(B) Zinc
(C) Carbon
(D) Copper

Correct Answer: C

Explanation: Carbon is one of the six major bioelements.

4. Proteins are polymers of:

(A) Nucleotides
(B) Monosaccharides
(C) Fatty acids
(D) Amino acids

Correct Answer: D

Explanation: Proteins are polypeptide chains which are polymers of amino acids.

5. The bond between two amino acids is called a:

(A) Peptide bond
(B) Glycosidic bond
(C) Phosphodiester bond
(D) Hydrogen bond

Correct Answer: A

Explanation: The bond between two amino acids is called a peptide bond.

6. How many different types of amino acids are commonly found in proteins?

(A) 5–10
(B) 20–25
(C) 50–60
(D) 100–120

Correct Answer: B

Explanation: There are about 20–25 different types of amino acids commonly found in proteins.

7. Lipids are:

(A) Hydrophilic
(B) Soluble in water
(C) Hydrophobic
(D) Soluble in acids only

Correct Answer: C

Explanation: Lipids are hydrophobic in nature (insoluble in water).

8. One gram of lipids provides how much energy?

(A) 4 kcal
(B) 2 kcal
(C) 12 kcal
(D) 9.1 kcal

Correct Answer: D

Explanation: 9.1 kcal — this correctly answers the question.

9. Carbohydrates are composed of carbon, hydrogen, and oxygen in a ratio of:

(A) 1:2:1
(B) 1:1:1
(C) 2:1:2
(D) 1:2:3

Correct Answer: A

Explanation: Carbohydrates are composed of carbon, hydrogen, and oxygen in a ratio of 1:2:1.

10. The building blocks of nucleic acids are:

(A) Amino acids
(B) Nucleotides
(C) Monosaccharides
(D) Fatty acids

Correct Answer: B

Explanation: Nucleic acids are made up of many units called nucleotides.

11. Which sugar is found in DNA?

(A) Ribose
(B) Glucose
(C) Deoxyribose
(D) Fructose

Correct Answer: C

Explanation: Deoxyribose — this correctly answers the question.

12. Which base is found in RNA but not in DNA?

(A) Thymine
(B) Guanine
(C) Cytosine
(D) Uracil

Correct Answer: D

Explanation: Uracil — this correctly answers the question.

13. A small piece of DNA on a chromosome that stores hereditary information is called a:

(A) Gene
(B) Nucleotide
(C) Genome
(D) Codon

Correct Answer: A

Explanation: A gene is a small piece of a huge DNA molecule in the chromosome.

14. Which type of RNA carries the message of DNA from the nucleus to the cytoplasm?

(A) tRNA
(B) mRNA
(C) rRNA
(D) siRNA

Correct Answer: B

Explanation: Messenger RNA (mRNA) carries the message of DNA from the nucleus to the cytoplasm.

15. The flow of information from DNA to RNA to protein is called the:

(A) Transcription
(B) Translation
(C) Central dogma
(D) Replication

Correct Answer: C

Explanation: The flow of biological information from DNA to RNA and from RNA to protein is known as the central dogma.

16. Which of the following is a role of proteins in the body?

(A) Store genetic information
(B) Form cell walls in plants
(C) Provide long-term energy storage
(D) Act as enzymes

Correct Answer: D

Explanation: Most enzymes are proteins which control biochemical reactions.

17. One gram of protein provides how much energy?

(A) 4 kcal
(B) 2 kcal
(C) 9 kcal
(D) 12 kcal

Correct Answer: A

Explanation: 4 kcal — this correctly answers the question.

18. Saturated fatty acids are:

(A) Liquid at room temperature
(B) Solid at room temperature
(C) Gases at room temperature
(D) Always unsaturated

Correct Answer: B

Explanation: Saturated fatty acids have all C-C single bonds and are solid at room temperature.

19. Tri-acyl glycerides contain:

(A) One glycerol and one fatty acid
(B) One glycerol and two fatty acids
(C) One glycerol and three fatty acids
(D) Three glycerol and one fatty acid

Correct Answer: C

Explanation: Tri-acyl glycerides contain One glycerol and three fatty acids.

20. Sucrose is formed by the condensation of:

(A) Glucose and galactose
(B) Galactose and fructose
(C) Glucose and glucose

(D) Glucose and fructose

Correct Answer: D

Explanation: Sucrose is formed by the condensation of glucose and fructose.

21. Lactose is formed by the condensation of:

(A) Galactose and glucose
(B) Glucose and fructose
(C) Glucose and glucose
(D) Fructose and galactose

Correct Answer: A

Explanation: Lactose is formed by the condensation of galactose and glucose.

22. Which polysaccharide makes the exoskeleton of arthropods?

(A) Cellulose
(B) Chitin
(C) Starch
(D) Glycogen

Correct Answer: B

Explanation: Chitin — this correctly answers the question.

23. According to the Watson and Crick model, how many hydrogen bonds are between adenine and thymine?

(A) One
(B) Three
(C) Two
(D) Four

Correct Answer: C

Explanation: There are two hydrogen bonds between adenine and thymine.

24. The diameter of the DNA double helix is about:

(A) 1 nm
(B) 3 nm
(C) 4 nm
(D) 2 nm

Correct Answer: D

Explanation: The diameter of the double helix of DNA is about 2 nm.

25. Which type of RNA is a component of ribosomes?

(A) rRNA
(B) mRNA
(C) tRNA
(D) None of the above

Correct Answer: A

Explanation: Ribosomal RNA (rRNA) is a component of ribosomes.

B. Less Important / Secondary Topics

26. Which of the following is a plant source of protein?

(A) Lentils
(B) Milk
(C) Beef
(D) Fish

Correct Answer: A

Explanation: Lentils are a plant source of protein.

27. Which of the following is a minor bioelement?

(A) Oxygen
(B) Iron
(C) Carbon
(D) Hydrogen

Correct Answer: B

Explanation: Iron is one of the ten minor bioelements.

28. The remaining ten bioelements constitute what percentage of biomolecules?

(A) 99%
(B) 50%
(C) 1%
(D) 10%

Correct Answer: C

Explanation: 1% — this correctly answers the question.

29. Which of the following is an example of a carbohydrate?

(A) Hemoglobin
(B) Cholesterol
(C) DNA
(D) Glucose

Correct Answer: D

Explanation: Glucose — this correctly answers the question.

30. The α-carbon of an amino acid is attached to all of the following EXCEPT:

(A) Phosphate group (-PO□)
(B) Hydrogen atom (-H)
(C) Amino group (-NH□)
(D) Carboxyl group (-COOH)

Correct Answer: A

Explanation: The α-carbon of an amino acid is attached to a hydrogen atom, an amino group, a carboxyl group, and an R group. A phosphate group is not attached to the α-carbon.

31. Which of the following is a function of the Golgi apparatus?

(A) Producing ATP
(B) Modifying and packaging materials into vesicles
(C) Synthesizing proteins
(D) Digesting waste

Correct Answer: B

Explanation: Modifying and packaging materials into vesicles — this correctly answers the question.

32. Which of the following is a role of RNA?

(A) Store genetic information
(B) Form cell walls
(C) Act as a tool for translation
(D) Provide long-term energy storage

Correct Answer: C

Explanation: RNA functions as tools for translation and protein synthesis.

33. Which of the following is an example of a steroid?

(A) Glucose
(B) Cellulose
(C) Hemoglobin
(D) Cholesterol

Correct Answer: D

Explanation: Cholesterol — this correctly answers the question.

34. Which of the following is a function of carbohydrates?

(A) Provide energy
(B) Store genetic information
(C) Act as enzymes
(D) Transport oxygen

Correct Answer: A

Explanation: Carbohydrates are the major source of useable and stored energy in cells.

35. Which of the following is a non-polar, hydrophobic molecule?

(A) Glucose
(B) Lipid
(C) Amino acid
(D) Nucleotide

Correct Answer: B

Explanation: Lipids are hydrophobic (water-fearing) molecules.

36. A scientist discovers a new biomolecule that is hydrophobic, has a glycerol backbone, and contains three fatty acid chains. What type of biomolecule is this?

(A) Protein
(B) Carbohydrate
(C) Tri-acyl glyceride (triglyceride)
(D) Nucleic acid

Correct Answer: C

Explanation: Tri-acyl glycerides (triglycerides) contain one glycerol and three fatty acids. They are lipids and are hydrophobic.

37. Which of the following correctly distinguishes DNA from RNA?

(A) DNA is single-stranded; RNA is double-stranded
(B) DNA contains ribose; RNA contains deoxyribose
(C) DNA is found in the cytoplasm; RNA is found in the nucleus
(D) DNA contains thymine; RNA contains uracil

Correct Answer: D

Explanation: DNA contains thymine; RNA contains uracil — this correctly answers the question.

38. A protein has a specific number, type, and sequence of amino acids. This describes its:

(A) Primary structure
(B) Secondary structure
(C) Tertiary structure
(D) Quaternary structure

Correct Answer: A

Explanation: A linear polypeptide with a specific number, type, and sequence of amino acids is called the primary structure.

39. Which of the following is an example of a protein?

(A) Glucose
(B) Hemoglobin
(C) Cholesterol
(D) Cellulose

Correct Answer: B

Explanation: Hemoglobin is an example of a protein.

40. Which of the following correctly matches a biomolecule with its location in the cell?

(A) Carbohydrates — nucleus
(B) Lipids — nucleolus
(C) Proteins — rough endoplasmic reticulum

(D) DNA — cytoplasm

Correct Answer: C

Explanation: Proteins are located in the cytoplasm, rough endoplasmic reticulum, and Golgi bodies.

41. Which of the following is a function of lipids?

(A) Store genetic information
(B) Act as enzymes
(C) Synthesize proteins
(D) Provide long-term energy storage

Correct Answer: D

Explanation: Lipids provide cells with long-term energy and are a component of cell membranes.

42. Which of the following statements about the DNA double helix is correct?

(A) The two strands are antiparallel
(B) The two strands are parallel
(C) The two strands are identical
(D) The two strands are made of protein

Correct Answer: A

Explanation: Both strands of the DNA molecule are antiparallel (oppositely oriented to each other).

43. Which of the following is a function of rRNA?

(A) Carries the genetic message from DNA
(B) Combines with ribosomal proteins to form ribosomes
(C) Transfers amino acids to ribosomes
(D) Stores genetic information

Correct Answer: B

Explanation: Ribosomal RNA (rRNA) combines with ribosomal protein to form units of ribosomes, which are the factory of proteins.

44. A mutation changes the sequence of nucleotides in DN

(A) What effect could this have on the protein produced? A. No effect at all
(B) It would immediately stop all cell functions
(C) It could change the sequence of amino acids in the protein
(D) It would change the protein into a lipid

Correct Answer: C

Explanation: The correct primary structure of any protein is primarily determined by DNA. A mutation in DNA could change the sequence of amino acids in the protein.

45. Which of the following correctly describes the process of transcription?

(A) DNA → DNA
(B) RNA → Protein
(C) Protein → RNA
(D) DNA → RNA

Correct Answer: D

Explanation: Transcription is the first step of gene expression that involves the formation of an RNA molecule from DNA.

46. Which of the following correctly describes the process of translation?

(A) RNA → Protein
(B) DNA → DNA
(C) DNA → RNA
(D) Protein → RNA

Correct Answer: A

Explanation: Translation is the process in which the mRNA message is translated by ribosomes to form a polypeptide chain (protein).

47. Which of the following is a function of carbohydrates?

(A) Store genetic information
(B) Provide structural material for cell walls
(C) Act as enzymes
(D) Transport oxygen

Correct Answer: B

Explanation: Carbohydrates are structural material for the cell walls of plants (cellulose), fungi (chitin), and bacteria (peptidoglycan).

48. Which of the following statements about enzymes is correct?

(A) All enzymes are carbohydrates
(B) All enzymes are lipids
(C) Most enzymes are proteins
(D) Enzymes are nucleic acids

Correct Answer: C

Explanation: Most of the enzymes are proteins which control biochemical reactions.

49. Which of the following is a function of DNA?

(A) Act as a tool for translation
(B) Provide long-term energy storage
(C) Speed up chemical reactions
(D) Store and pass on genetic information

Correct Answer: D

Explanation: DNA is a component of chromosomes and stores and passes on genetic information.

50. Which of the following correctly matches a biomolecule with its role?

(A) Lipids — component of cell membranes
(B) Carbohydrates — genetic information
(C) Proteins — energy storage
(D) Nucleic acids — structural material for cell walls

Correct Answer: A

Explanation: Phospholipids and cholesterol are components of plasma membrane structure. Lipids are a component of cell membranes. Answer.