

Q1. Which of the following is a reducing sugar?

- A. Sucrose
- B. Lactose
- C. Cellulose
- D. Starch

☒ Answer: B. Lactose

Explanation: Lactose contains a free aldehyde group, making it a reducing sugar. Sucrose does not.

Q2. What type of bond joins two monosaccharides in a disaccharide?

- A. Peptide bond
- B. Hydrogen bond
- C. Glycosidic bond
- D. Phosphodiester bond

☒ Answer: C. Glycosidic bond

Explanation: A glycosidic bond is a covalent bond that joins carbohydrate molecules in disaccharides and polysaccharides.

Q3. Which of the following is a monosaccharide?

- A. Maltose
- B. Glucose
- C. Cellulose
- D. Glycogen

☒ Answer: B. Glucose

Explanation: Glucose is a simple sugar (monosaccharide). Maltose and glycogen are disaccharide and polysaccharide, respectively.

Q4. Cellulose is a polymer of:

- A. α -glucose
- B. β -glucose
- C. Fructose
- D. Galactose

✓Answer: B. β -glucose

Explanation: Cellulose is composed of β -1,4 linked glucose units, making it unbranched and rigid.

Q5. Which carbohydrate is found abundantly in the exoskeleton of arthropods?

- A. Glycogen
- B. Starch
- C. Chitin
- D. Cellulose

✓Answer: C. Chitin

Explanation: Chitin is a modified polysaccharide found in fungal cell walls and arthropod exoskeletons.

Q6. Which of the following carbohydrates is branched and stored in animal tissues?

- A. Glycogen
- B. Starch
- C. Cellulose
- D. Lactose

✓Answer: A. Glycogen

Explanation: Glycogen is a highly branched polymer of glucose and is the main storage polysaccharide in animals.

Q7. Which disaccharide is composed of glucose and galactose?

- A. Maltose
- B. Sucrose
- C. Lactose
- D. Trehalose

✓Answer: C. Lactose

Explanation: Lactose = Glucose + Galactose

Maltose = Glucose + Glucose

Sucrose = Glucose + Fructose

Q8. Which of the following is not a function of carbohydrates?

- A. Structural support in plants
- B. Energy storage
- C. Enzyme catalysis
- D. Immediate energy source

☒ Answer: C. Enzyme catalysis

Explanation: Enzyme catalysis is a protein function, not carbohydrate. Carbs provide energy and structure.

Q9. Which of these has $\alpha(1\rightarrow4)$ and $\alpha(1\rightarrow6)$ glycosidic bonds?

- A. Cellulose
- B. Starch
- C. Glycogen
- D. Lactose

☒ Answer: C. Glycogen

Explanation: Glycogen has $\alpha(1\rightarrow4)$ in the main chain and $\alpha(1\rightarrow6)$ linkages at branch points.

Q10. Match the carbohydrate with its correct type:

- | | |
|-------------|-------------------|
| A. Glucose | 1. Disaccharide |
| B. Sucrose | 2. Polysaccharide |
| C. Glycogen | 3. Monosaccharide |
| D. Lactose | 1. Disaccharide |

Options:

- A. A-3, B-1, C-2, D-1
- B. A-1, B-3, C-2, D-2
- C. A-3, B-2, C-1, D-3
- D. A-3, B-2, C-3, D-1

☒ Answer: A. A-3, B-1, C-2, D-1

Explanation:

Glucose = monosaccharide

Sucrose, Lactose = disaccharides

Glycogen = polysaccharide

Q11. Proteins are made up of:

- A. Nucleotides
- B. Monosaccharides
- C. Amino acids
- D. Fatty acids

☒ Answer: C. Amino acids

Explanation: Proteins are polymers of amino acids joined by peptide bonds.

Q12. Which of the following amino acids is non-polar?

- A. Serine
- B. Glutamic acid
- C. Leucine
- D. Lysine

☒ Answer: C. Leucine

Explanation: Leucine is hydrophobic and non-polar; serine and glutamic acid are polar, lysine is basic.

Q13. A peptide bond is formed between:

- A. Two fatty acids
- B. Amino group of one amino acid and carboxyl group of another
- C. Two phosphate groups
- D. Sugar and nitrogen base

☒ Answer: B.

Explanation: A peptide bond links the -NH_2 of one amino acid and -COOH of another via dehydration.

Q14. The quaternary structure of a protein refers to:

- A. Sequence of amino acids
- B. Local folding (α -helix, β -sheet)

- C. 3D folding of single polypeptide
- D. Association of multiple polypeptides

✓Answer: D. Association of multiple polypeptides

Explanation: Quaternary structure arises when more than one polypeptide chain assembles to form a functional protein (e.g., hemoglobin).

Q15. Which of the following lipids has a structural role in membranes?

- A. Phospholipids
- B. Triglycerides
- C. Cholesterol
- D. Waxes

✓Answer: A. Phospholipids

Explanation: Phospholipids form the lipid bilayer of cell membranes.

Q16. Which of the following is not a function of proteins?

- A. Enzymatic activity
- B. Transport
- C. Hormonal function
- D. Genetic information storage

✓Answer: D. Genetic information storage

Explanation: Storage of genetic info is a function of nucleic acids, not proteins.

Q17. Which of the following is an essential amino acid?

- A. Glycine
- B. Tyrosine
- C. Methionine
- D. Alanine

✓Answer: C. Methionine

Explanation: Essential amino acids cannot be synthesized by the body; methionine is one of them.

Q18. Match the protein type with its function:

- | | |
|-------------|-----------------------|
| A. Collagen | 1. Hormone |
| B. Insulin | 2. Enzyme |
| C. Amylase | 3. Structural protein |
| D. Antibody | 4. Defense |

Options:

- A. A-3, B-1, C-2, D-4
- B. A-1, B-3, C-4, D-2
- C. A-3, B-4, C-1, D-2
- D. A-2, B-1, C-3, D-4

☒ Answer: A. A-3, B-1, C-2, D-4

Explanation:

Collagen → structural

Insulin → hormone

Amylase → enzyme

Antibody → defense

Q19. Which of the following statements about lipids is correct?

- A. All lipids are polymers
- B. Lipids are hydrophilic
- C. Cholesterol is a steroid
- D. Fatty acids have peptide bonds

☒ Answer: C. Cholesterol is a steroid

Explanation: Cholesterol is a steroid lipid involved in membrane fluidity and precursor to hormones.

Q20. Which of these molecules is NOT a lipid?

- A. Triglyceride
- B. Phospholipid
- C. Waxes

D. Cellulose

✓Answer: D. Cellulose

Explanation: Cellulose is a polysaccharide, not a lipid.

Q21. Which of the following is not found in RNA?

A. Ribose

B. Uracil

C. Thymine

D. Adenine

✓Answer: C. Thymine

Explanation: RNA contains uracil instead of thymine. DNA has thymine.

Q22. The bond linking nitrogenous base to sugar in a nucleotide is called:

A. Glycosidic bond

B. Peptide bond

C. Ester bond

D. Phosphodiester bond

✓Answer: A. Glycosidic bond

Explanation: In nucleotides, the nitrogen base is linked to the 1' carbon of sugar via N-glycosidic bond.

Q23. Which of the following correctly matches DNA and RNA?

A. DNA is single-stranded, RNA is double-stranded

B. DNA contains uracil, RNA contains thymine

C. DNA has deoxyribose; RNA has ribose

D. DNA has ribose; RNA has deoxyribose

✓Answer: C. DNA has deoxyribose; RNA has ribose

Explanation: Sugar in DNA is deoxyribose, and in RNA it's ribose.

Q24. Which of the following statements about enzymes is true?

- A. All enzymes are carbohydrates
- B. Enzymes are consumed during reactions
- C. Enzymes lower activation energy
- D. Enzymes make reactions non-specific

✓Answer: C. Enzymes lower activation energy

Explanation: Enzymes speed up reactions by lowering activation energy without being consumed.

Q25. An example of a competitive inhibitor is:

- A. Cyanide
- B. Succinic acid
- C. Malonate
- D. Penicillin

✓Answer: C. Malonate

Explanation: Malonate competes with succinate for succinate dehydrogenase, acting as a competitive inhibitor.

Q26. Which coenzyme is involved in redox reactions?

- A. NAD^+
- B. Coenzyme A
- C. Biotin
- D. ATP

✓Answer: A. NAD^+

Explanation: NAD^+ (nicotinamide adenine dinucleotide) is a key redox coenzyme that carries electrons.

Q27. Match the vitamin with its coenzyme role:

- | | |
|--------------------------------|-------------------|
| A. Niacin (B_3) | 1. CoA |
| B. Riboflavin (B_2) | 2. FAD |
| C. Pantothenic acid | 3. NAD^+ |
| D. Biotin | 4. Carboxylation |

Options:

- A. A-3, B-2, C-1, D-4
- B. A-2, B-3, C-4, D-1

C. A-1, B-2, C-3, D-4

D. A-4, B-1, C-2, D-3

✓Answer: A. A-3, B-2, C-1, D-4

Explanation:

Niacin → NAD⁺

Riboflavin → FAD

Pantothenic acid → Coenzyme A

Biotin → coenzyme for carboxylation

Q28. Enzymes are highly specific because of:

A. Active site shape

B. High energy bonds

C. Low temperature stability

D. Presence of water

✓Answer: A. Active site shape

Explanation: Enzymes are specific due to shape of the active site, which binds to only specific substrates.

Q29. Which of the following is a conjugated protein?

A. Albumin

B. Haemoglobin

C. Trypsin

D. Insulin

✓Answer: B. Haemoglobin

Explanation: Haemoglobin = globin (protein) + heme (non-protein prosthetic group) → conjugated protein.

Q30. Which of the following best defines a metabolic pathway?

A. Single enzyme catalysis

B. Breakdown of DNA

- C. Series of enzyme-catalyzed reactions
- D. Fat accumulation

✓Answer: C. Series of enzyme-catalyzed reactions

Explanation: A metabolic pathway consists of multiple enzyme-mediated steps, e.g., glycolysis.

Q31. Which of the following statements about enzymes is false?

- A. They speed up chemical reactions.
- B. They are consumed during the reaction.
- C. They work best at an optimum pH and temperature.
- D. They are specific for a particular substrate.

✓Answer: B. They are consumed during the reaction.

Explanation: Enzymes remain unchanged after catalyzing a reaction. They are reusable and not consumed.

Q32. The active site of an enzyme:

- A. Is rigid and non-specific
- B. Changes its shape randomly
- C. Binds to any molecule
- D. Has a specific shape complementary to the substrate

✓Answer: D. Has a specific shape complementary to the substrate

Explanation: According to the lock and key model, enzymes have an active site specific to their substrate.

Q33. Which of the following enzymes breaks down starch into maltose?

- A. Invertase
- B. Amylase
- C. Maltase
- D. Lipase

✓Answer: B. Amylase

Explanation: Amylase hydrolyzes starch into maltose, a disaccharide.

Q34. Which of the following is not true for enzyme catalysis?

- A. Enzymes lower the activation energy
- B. Enzymes alter the Gibbs free energy of reaction
- C. Enzymes are specific to substrates
- D. Enzyme activity depends on pH and temperature

☒ Answer: B. Enzymes alter the Gibbs free energy of reaction

Explanation: Enzymes do not alter the ΔG (Gibbs free energy) of a reaction. They only lower the activation energy.

Q35. The term “turnover number” of an enzyme refers to:

- A. Number of enzyme molecules produced per minute
- B. Number of substrate molecules converted per minute by one enzyme molecule
- C. The rate at which enzymes degrade
- D. The amount of product formed per gram of enzyme

☒ Answer: B. Number of substrate molecules converted per minute by one enzyme molecule

Explanation: Turnover number is the measure of enzyme efficiency.

Q36. Which of the following types of enzymes catalyze joining of two molecules using ATP?

- A. Hydrolases
- B. Ligases
- C. Lyases
- D. Isomerases

☒ Answer: B. Ligases

Explanation: Ligases join two large molecules using energy from ATP (e.g., DNA ligase).

Q37. Enzymes are primarily made up of:

- A. Lipids
- B. Carbohydrates
- C. Proteins
- D. Nucleic acids

☒ Answer: C. Proteins

Explanation: Most enzymes are globular proteins in nature.

Q38. An example of a coenzyme is:

- A. Zinc
- B. FAD
- C. Mg^{2+}
- D. Mn^{2+}

☒ Answer: B. FAD

Explanation: FAD (flavin adenine dinucleotide) is a coenzyme derived from vitamin B₂, which aids in redox reactions.

Q39. Which of the following is correct regarding enzyme-substrate interaction?

- A. All enzymes fit all substrates
- B. Only charged molecules can be substrates
- C. Enzyme and substrate bind at random locations
- D. The enzyme binds the substrate at a specific active site

☒ Answer: D. The enzyme binds the substrate at a specific active site

Explanation: Enzymes are highly specific and bind substrates at their active site.

Q40. Which factor can denature an enzyme?

- A. Proper pH
- B. Low temperature
- C. High temperature
- D. Water

☒ Answer: C. High temperature

Explanation: High temperature can denature proteins by disrupting hydrogen bonds and altering shape.

Q41. Which class of enzymes catalyzes rearrangement within a molecule?

- A. Transferases
- B. Isomerases

C. Oxidoreductases

D. Ligases

✓answer: B. Isomerases

Explanation: Isomerases convert one isomer into another by rearranging bonds internally.

Q42. A non-protein part that is essential for the activity of some enzymes is called:

A. Apoenzyme

B. Cofactor

C. Substrate

D. Catalyst

✓answer: B. Cofactor

Explanation: A cofactor can be a metal ion or an organic molecule (coenzyme) that assists the enzyme.

Q43. Inhibition of an enzyme by a molecule that binds to the active site is called:

A. Non-competitive inhibition

B. Competitive inhibition

C. Allosteric inhibition

D. Feedback inhibition

✓answer: B. Competitive inhibition

Explanation: Competitive inhibitors bind to the active site, blocking the substrate.

Q44. The complete and active enzyme with its cofactor is called:

A. Apoenzyme

B. Isoenzyme

C. Holoenzyme

D. Proenzyme

✓answer: C. Holoenzyme

Explanation: Holoenzyme = Apoenzyme + Cofactor, fully functional and catalytically active.

Q45. In feedback inhibition, the inhibitor is usually:

- A. The enzyme
- B. The first substrate
- C. The final product
- D. An intermediate compound

☒ Answer: C. The final product

Explanation: In feedback inhibition, the final product binds to the enzyme's regulatory site and slows the reaction pathway.