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AMC/AFNS/NUMS Biology-3 Test Preparation

Biological Molecules

1. Biological molecules are mainly composed of:

- A. Carbon, hydrogen, and oxygen
- B. Sodium, chlorine, and iron
- C. Gold, silver, and copper
- D. Helium, neon, and argon

Correct Answer: A. Carbon, hydrogen, and oxygen

Explanation: Biological molecules are chemical compounds present in living organisms. Most of them are mainly composed of carbon, hydrogen, and oxygen. Some also contain nitrogen, phosphorus, and sulfur. These elements combine to form carbohydrates, proteins, lipids, and nucleic acids, which are essential for life.

2. The main classes of biological molecules are:

- A. Carbohydrates, proteins, lipids, and nucleic acids
- B. Metals, gases, salts, and acids
- C. Water, oxygen, carbon dioxide, and nitrogen
- D. Vitamins, minerals, soil, and air

Correct Answer: A. Carbohydrates, proteins, lipids, and nucleic acids

Explanation: The four major classes of biological molecules are carbohydrates, proteins, lipids, and nucleic acids. Each group performs specific functions in living organisms. Carbohydrates provide energy, proteins build structures and enzymes, lipids store energy and form membranes, while nucleic acids store genetic information.

3. Carbohydrates are mainly composed of:

- A. Carbon, hydrogen, and oxygen
- B. Carbon, nitrogen, and sulfur
- C. Sodium, chlorine, and oxygen
- D. Calcium, phosphorus, and iron

Correct Answer: A. Carbon, hydrogen, and oxygen

Explanation: Carbohydrates are organic compounds mainly made of carbon, hydrogen, and oxygen. The ratio of hydrogen to oxygen is usually 2:1, similar to water. Common examples include glucose, fructose, sucrose, starch, cellulose, and glycogen.

4. The general formula of many carbohydrates is:

- A. $C_nH_{2n}O_n$
- B. $NH_2-CHR-COOH$
- C. $R-COOH$
- D. $C_5H_{10}N_2O_3$

Correct Answer: A. $C_nH_{2n}O_n$

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Explanation: Many simple carbohydrates have the general formula $C_nH_{2n}O_n$, which shows that carbon, hydrogen, and oxygen are present in a 1:2:1 ratio. For example, glucose has the formula $C_6H_{12}O_6$. However, not all carbohydrates strictly follow this formula.

5. The simplest carbohydrates are called:

- A. Monosaccharides
- B. Disaccharides
- C. Polysaccharides
- D. Peptides

Correct Answer: A. Monosaccharides

Explanation: Monosaccharides are the simplest carbohydrates and cannot be hydrolyzed into smaller sugars. They are sweet, soluble in water, and provide quick energy. Common examples include glucose, fructose, and galactose.

6. Glucose is an example of:

- A. Monosaccharide
- B. Disaccharide
- C. Polysaccharide
- D. Lipid

Correct Answer: A. Monosaccharide

Explanation: Glucose is a monosaccharide because it consists of a single sugar unit. It is the most important energy source for cells. During cellular respiration, glucose is broken down to release energy in the form of ATP.

7. Sucrose is composed of:

- A. Glucose and fructose
- B. Glucose and galactose
- C. Glucose and glucose
- D. Fructose and galactose

Correct Answer: A. Glucose and fructose

Explanation: Sucrose is a disaccharide made by the combination of glucose and fructose. It is commonly known as table sugar. Plants transport sugar mainly in the form of sucrose.

8. Lactose is composed of:

- A. Glucose and fructose
- B. Glucose and galactose
- C. Glucose and glucose
- D. Amino acids

Correct Answer: B. Glucose and galactose

Explanation: Lactose is a disaccharide found in milk. It is made of glucose and galactose. The enzyme lactase digests lactose into its two monosaccharides. Deficiency of lactase causes lactose intolerance.

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9. Starch is a storage polysaccharide found in:

- A. Plants
- B. Animals
- C. Bacteria only
- D. Viruses

Correct Answer: A. Plants

Explanation: Starch is the main storage carbohydrate in plants. Plants store extra glucose in the form of starch, especially in seeds, roots, and tubers. Humans digest starch into glucose for energy.

10. Glycogen is a storage polysaccharide found in:

- A. Plants
- B. Animals
- C. Fungi only
- D. Algae only

Correct Answer: B. Animals

Explanation: Glycogen is the storage form of glucose in animals. It is mainly stored in the liver and muscles. When the body needs energy, glycogen is broken down into glucose.

11. Cellulose is mainly found in:

- A. Plant cell wall
- B. Animal muscles
- C. Blood plasma
- D. Nucleus

Correct Answer: A. Plant cell wall

Explanation: Cellulose is a structural polysaccharide present in the cell walls of plants. It gives strength and rigidity to plant cells. Humans cannot digest cellulose because they lack the enzyme cellulase, but it acts as dietary fiber.

12. Proteins are polymers of:

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

Correct Answer: B. Amino acids

Explanation: Proteins are large biological molecules made up of amino acid units. Amino acids join together by peptide bonds to form polypeptide chains. These chains fold into specific shapes that determine protein function.

13. The bond between amino acids is called:

- A. Glycosidic bond
- B. Peptide bond
- C. Ester bond

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D. Hydrogen bond only

Correct Answer: B. Peptide bond

Explanation: A peptide bond is formed between the amino group of one amino acid and the carboxyl group of another amino acid. During this process, a water molecule is removed. Many amino acids joined by peptide bonds form a protein.

14. Amino acids contain:

- A. Amino group and carboxyl group
- B. Phosphate group only
- C. Fatty acid and glycerol
- D. Nitrogen base only

Correct Answer: A. Amino group and carboxyl group

Explanation: Every amino acid contains an amino group, a carboxyl group, a hydrogen atom, and a variable R group attached to a central carbon atom. The R group determines the specific properties of each amino acid.

15. Enzymes are mostly:

- A. Carbohydrates
- B. Proteins
- C. Lipids
- D. Minerals

Correct Answer: B. Proteins

Explanation: Most enzymes are proteins that act as biological catalysts. They speed up chemical reactions by lowering activation energy. Their specific three-dimensional shape forms an active site where the substrate binds.

16. Lipids are insoluble in:

- A. Water
- B. Ether
- C. Chloroform
- D. Benzene

Correct Answer: A. Water

Explanation: Lipids are non-polar molecules, so they do not dissolve in polar solvents like water. However, they dissolve in organic solvents such as ether, chloroform, and benzene. This property helps lipids form cell membranes.

17. Fats and oils are made up of:

- A. Glycerol and fatty acids
- B. Amino acids and glucose
- C. Nucleotides and phosphate
- D. Starch and cellulose

Correct Answer: A. Glycerol and fatty acids

Explanation: Fats and oils are lipids formed by the combination of glycerol and fatty acids. A

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triglyceride contains one glycerol molecule attached to three fatty acid chains. These molecules store large amounts of energy.

18. The bond formed between glycerol and fatty acids is called:

- A. Peptide bond
- B. Glycosidic bond
- C. Ester bond
- D. Ionic bond

Correct Answer: C. Ester bond

Explanation: An ester bond forms between the hydroxyl group of glycerol and the carboxyl group of a fatty acid. This bond is formed during condensation and water is released. Triglycerides contain three ester bonds.

19. Phospholipids are important components of:

- A. Cell membrane
- B. Cell wall only
- C. Ribosomes only
- D. Chromosomes only

Correct Answer: A. Cell membrane

Explanation: Phospholipids are major components of the cell membrane. They form a bilayer in which hydrophilic heads face water and hydrophobic tails face inward. This structure helps control movement of substances into and out of the cell.

20. Waxes are examples of:

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

Correct Answer: B. Lipids

Explanation: Waxes are lipids that form protective waterproof coatings on leaves, fruits, skin, feathers, and insect exoskeletons. They help reduce water loss and protect surfaces from damage.

21. Nucleic acids are polymers of:

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

Correct Answer: C. Nucleotides

Explanation: Nucleic acids such as DNA and RNA are made up of nucleotide units. Each nucleotide consists of a sugar, a phosphate group, and a nitrogenous base. Nucleic acids store and transmit genetic information.

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22. A nucleotide consists of:

- A. Sugar, phosphate, and nitrogenous base
- B. Glycerol, fatty acid, and phosphate
- C. Amino group, carboxyl group, and R group
- D. Glucose, fructose, and galactose

Correct Answer: A. Sugar, phosphate, and nitrogenous base

Explanation: Each nucleotide has three parts: a pentose sugar, a phosphate group, and a nitrogenous base. In DNA, the sugar is deoxyribose, while in RNA, the sugar is ribose.

23. DNA stands for:

- A. Deoxyribonucleic acid
- B. Dioxiribose nitrogen acid
- C. Deoxyribose nuclear atom
- D. Double nitrogen acid

Correct Answer: A. Deoxyribonucleic acid

Explanation: DNA stands for deoxyribonucleic acid. It is the hereditary material found in living organisms. DNA carries genetic instructions for growth, development, reproduction, and protein synthesis.

24. RNA stands for:

- A. Ribonucleic acid
- B. Ribosome nuclear atom
- C. Red nucleic acid
- D. Ribose nitrogen acid

Correct Answer: A. Ribonucleic acid

Explanation: RNA stands for ribonucleic acid. It helps in protein synthesis by carrying genetic information from DNA to ribosomes. Major types of RNA include mRNA, tRNA, and rRNA.

25. The sugar present in DNA is:

- A. Ribose
- B. Deoxyribose
- C. Glucose
- D. Fructose

Correct Answer: B. Deoxyribose

Explanation: DNA contains deoxyribose sugar. Deoxyribose has one less oxygen atom than ribose sugar. This difference helps distinguish DNA from RNA.

26. The sugar present in RNA is:

- A. Ribose
- B. Deoxyribose
- C. Sucrose
- D. Lactose

Correct Answer: A. Ribose

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Explanation: RNA contains ribose sugar. Ribose has an oxygen atom at the second carbon position, while deoxyribose lacks this oxygen. This structural difference affects the stability and function of RNA.

27. The nitrogenous base found in RNA but not in DNA is:

- A. Adenine
- B. Guanine
- C. Uracil
- D. Thymine

Correct Answer: C. Uracil

Explanation: RNA contains uracil instead of thymine. DNA contains adenine, thymine, guanine, and cytosine, while RNA contains adenine, uracil, guanine, and cytosine. In RNA, uracil pairs with adenine.

28. The nitrogenous base found in DNA but not in RNA is:

- A. Uracil
- B. Thymine
- C. Cytosine
- D. Guanine

Correct Answer: B. Thymine

Explanation: Thymine is present in DNA but absent in RNA. In DNA, thymine pairs with adenine through hydrogen bonds. RNA uses uracil in place of thymine.

29. Water is important for living organisms because it:

- A. Acts as a universal solvent
- B. Stores genetic information
- C. Forms peptide bonds only
- D. Works only as a gas

Correct Answer: A. Acts as a universal solvent

Explanation: Water is called a universal solvent because many substances dissolve in it. Most biochemical reactions occur in aqueous medium. Water also helps in transport, temperature regulation, digestion, excretion, and maintaining cell shape.

30. The most abundant inorganic compound in living organisms is:

- A. Protein
- B. Water
- C. Lipid
- D. DNA

Correct Answer: B. Water

Explanation: Water is the most abundant inorganic compound in living organisms. It forms a major part of cells, blood, cytoplasm, and body fluids. It supports metabolic reactions and helps maintain life processes.



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