2026

(FYUGP)

(4th Semester)

ZOOLOGY

(MINOR)

Paper : ZOO/M4

(Fundamentals of Biochemistry)

Full Marks : 75
Pass Marks : 40%

Time : 3 hours

The figures in the margin indicate full marks for the questions.

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

Choose the correct option : 1×15=15

1. The general molecular formula of a monosaccharide is

(a) $C_n(H_2O_2)_n$, where n represents the number of carbon atoms

(b) $C_n(H_2O)_n$, where n represents the number of carbon atoms

(c) $C_{2n}(H_2O)_n$, where n represents the number of carbon atoms

(d) $C_n(H_2O)$, where n represents the number of carbon atoms

2. Where does the enzymatic reactions of glycolysis take place in the eukaryotic cell?

(a) Nucleus

(b) Mitochondria

(c) Cytosol

(d) Endoplasmic reticulum

3. Which one of the following composes lactose?

(a) Glucose and Glucose

(b) Galactose and Fructose

(c) Glucose and Fructose

(d) Glucose and Galactose

4. The components of a triacylglyceride are

(a) a sphingosine backbone and a fatty acid

(b) glycerol and three phosphate groups

(c) glycerol and three fatty acid molecules

(d) glycerol, two fatty acids and a phosphate group

5. Glycerophospholipid's backbone is composed of

(a) glycerol-3-phosphate

(b) cholesterol

(c) sphingosine

(d) monosaccharide

6. Which of the following steroids is associated with plasma membrane?

(a) Cholesterol *(b)* Estradiol

(c) Testosterone *(d)* Cortisol

7. An amino acid exists primarily as a zwitter-ion

(a) at a pH equal to its isoelectric point

(b) at a pH above to its isoelectric point

(c) at a pH below to its isoelectric point

(d) None of the above

8. Which of the following bonds is the most common in the primary structure of protein?

(a) Ionic bond

(b) Peptide bond

(c) Hydrogen bond

(d) Disulfide bond

9. Which of the following is considered a non-essential amino acid?

(a) Histidine

(b) Aspartate

(c) Phenylalanine

(d) Lysine

10. Which of the following nucleotides pairs with adenine?

(a) Cytosine (C)

(b) Uracil (U)

(c) Thymine (T)

(d) Both (b) and (c)

11. Which part of the tRNA molecule is associated with the attachment of the amino acid?

(a) The D-loop

(b) The variable loop

(c) The 5′ end

(d) The 3′ end

12. Which of the following types of DNA is the most physiologically prevalent form?

(a) A-DNA (b) B-DNA

(c) Z-DNA (d) All of the above

(Continued)

13. An enzyme is given a unique Enzyme Commission (EC) number on the basis of its

(a) catalytic reaction

(b) structure

(c) codon

(d) molecular weight

14. Absolute specificity of enzyme means

(a) an enzyme catalysing a reaction with only one specific substrate

(b) the ability of an enzyme to distinguish between stereoisomers

(c) an enzyme which hydrolyzes peptide bonds adjacent to aromatic amino acids

(d) None of the above

15. Molecules that bind to an enzyme at a site other than the active site and alter its activity are called

(a) cofactors

(b) substrate

(c) competitive inhibitors

(d) allosteric effectors

SECTION—II

(*Marks* : 10)

Write short notes on any *five* of the following : 2×5=10

1. Disaccharides
2. Steroids
3. Essential and non-essential amino acids
4. Bonds stabilizing protein structure
5. Denaturation and renaturation of DNA
6. Cofactors
7. Isozymes

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

Answer *all* questions : 10×5=50

1. Give a detailed account of the structure of monosaccharides with appropriate diagrams and examples. 10

Or

Explain in detail the pathway of gluconeogenesis.

2. Explain the structure, properties and biological significance of phospholipids. 10

Or

Explain the structure, properties and biological significance of glycolipids.

3. Describe the general structure of α-amino acids. Add a note on its properties. 6+4=10

Or

Describe the primary, secondary, tertiary and quaternary levels of protein organization. 10

4. Explain the structure of a nucleotide with suitable diagrams. 10

Or

Write notes on the following : 5×2=10

(a) C_0t curves

(b) Types of DNA

5. Explain the mechanism of enzyme action. What are the factors affecting the rate of enzyme-catalysed reactions? 6+4=10

Or

Explain the derivation of the Michaelis-Menten equation for enzyme-catalysed reaction.

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