Term End External Examination 1st Semester (Session-Feb 2025)

Subject: Biotechnology

Course No and Title: BTG122M/ Biomolecules Structure and Function

Time: 2.15 hours **Max Marks:100** **Min. Marks:40**

Section A: Objective Type Questions

Q1. Choose the appropriate Answer: (8x1.5=12)

i. Protein denaturation involves all of the following except

A Breaking of H-bonds **B** Loss of primary structure
C Loss of tertiary structure **D** Loss of activity

ii. At pI, an amino acid has

A Positive charge **B** Negative charge
C No net charge **D** Shows electrophoretic mobility

iii. In an enzyme catalyzed reaction at steady state

A All the active sites are saturated **B** Half of the active sites are saturated
C All the active sites are free **D** [ES] = 0

iv. A non-competitive inhibitor of an enzyme catalyzed reaction

A binds to the Michaelis complex [ES] **B** increases V_{max}
C Both A and B **D** K_m remains same

v. Which of the following is not a structural polysaccharide

A Bacterial cell wall **B** Chitin
C Cellulose **D** Inulin

vi. Which of the following complexes of ETS does not account for the pumping out of protons from the mitochondrial matrix?

A Complex I **B** Complex II
C Complex III **D** Complex IV

vii. In a nucleotide, sugar is attached to base by glycosidic bond between

A C-1' and N-1 of Pur and N-9 Pyr **B** C-1' and N-1 of Pyr and N-9 Pur
C C-5' and N-1 of Pur and N-9 Pyr **D** C-5' and N-1 of Pyr and N-9 Pur

viii. Which of the following sterol is present in the cell membrane of fungi?

A Ergosterol **B** Stigmasterol
C Haponoids **D** Cholesterol

Section-B: Descriptive Type Questions (Short Type)

Q2: Answer all the Questions (8 x 4 =32)

i. Draw the structure of Glycine at pH 2.0 and pH 12.0.

ii. List any four unique physio-chemical properties of water.

iii. Define 1 enzyme unit (IU).

iv. Draw a Lineweaver Burk plot showing competitive inhibition.

v. What are disaccharides? Give any two examples.

vi. Identify the non-reducing sugars; Glucose, sucrose, lactose, trehalose, and cellulose.

vii. How does unsaturation affect the melting point of fatty acids?

viii. List the differences between DNA and RNA.

Section – C: Descriptive Type Questions (Medium Type)

Answer all the questions: (4 x 7=28)

Q3. Compute the approximate molecular weight of a polypeptide composed of 10 amino acid residues.

OR

Differentiate between globular and fibrous proteins.

Q4. Give an outline classification of enzymes with an example.

OR

Define active site. What are its main features?

Q5. What are epimers? Draw any two epimers of glucose.

OR

Discuss in brief the structure of Glycogen.

Q6. What are phospholids? Give their functions.

OR

What are the constituents of a nucleotide? How is a polynucleotide formed?

Section – D: Descriptive Type Questions (Long Type)

Answer any two of the following: (2 x 14=28)

Q7. What are the different levels of protein structure? Discuss secondary structure in detail.

Q8. Draw the relation between maximum reaction rate, ν_{max} and substrate concentration[S] of an enzyme catalysed reaction assuming enzyme [E] binds single substrate.

Q9. Discuss in detail about the classification of carbohydrates.

Q10. Where are fatty acids oxidized? Discuss the oxidation of any saturated fatty acid.