647510 **BSCboMJ203x-2C** **Seat No :_____**

B.Sc. Semester - 2 (NEP-2020) Examination

MARCH/APRIL-2025

BOT: Biomolecules (Major-3)

Time: 2.00 Hours **Mark: 50**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q-1 **Answer according to instructions :** **(10)**

1) State the second law of thermodynamics and explain its significance in biological systems.
2) Distinguish between: Primary bonds and secondary bonds.

OR

Q-1 **Answer according to instructions :** **(10)**

1) How do pH and buffers function in biological systems, and why are they essential for maintaining physiological balance?
2) Differentiate between endergonic and exergonic reactions with suitable examples.

Q-2 **Answer according to instructions :** **(10)**

1) Explain the classification of carbohydrates with suitable examples.
2) Differentiate between primary and secondary structures of proteins with suitable examples.

OR

Q-2 **Answer according to instructions :** **(10)**

1) Differentiate between disaccharides and oligosaccharides with examples and mention their biological significance.
2) Describe the general structure of an amino acid and explain the significance of its functional groups.

Q-3 **Answer according to instructions :** **(10)**

1) Explain the structure and functions of triacylglycerols and discuss their physical and chemical properties.
2) Illustrate the structure of nitrogenous bases and explain the role of nucleotides in cellular metabolism

OR

Q-3 **Answer according to instructions :** **(10)**

1) Describe the general structure of fatty acids and explain their biological functions
2) Differentiate between DNA and RNA based on their structure and function

Q-4 **Answer according to instructions :** **(10)**

1) Describe the characteristics of an enzyme's active site and explain how it determines substrate specificity.
2) Differentiate between competitive, non-competitive, and uncompetitive enzyme inhibition with examples.

OR

Q-4 **Answer according to instructions :** **(10)**

1) Discuss the factors affecting enzyme activity, such as temperature, pH, and substrate concentration.
2) Explain the classification of enzymes based on the type of reaction they catalyze.

Q-5 **Answer according to instructions :** **(10)**

1) How do proteins contribute to essential biological processes in living organisms?
2) How does the molecular structure of water contribute to its unique properties? Explain with examples.

OR

Q-5 **Answer according to instructions :** **(10)**

1) Derive the Michaelis-Menten equation and explain the significance of Km and Vmax.
2) What are essential fatty acids? Discuss their significance and sources in the human diet.

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