JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-III Semester (BI)

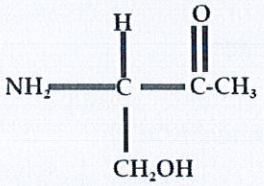
COURSE CODE (CREDITS): 18B11BI311 (3) MAX. MARKS: 25

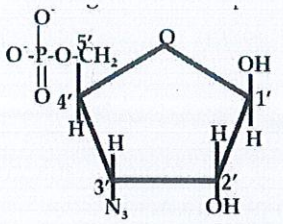
COURSE NAME: Cell and Molecular Biology

COURSE INSTRUCTORS: Dr. Abhishek MAX. TIME: 1 Hour 30 Minutes

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	There are four major classes of biological macromolecules: carbohydrates, proteins, lipids and nucleic acids a. Monomers for which class(s) of macromolecules always have phosphorous? b. Which class(s) of macromolecules may serve as biological catalysts? c. Differentiate between α 1-4 glycosidic linkage and β 1-4 glycosidic linkage d. Draw the structure of one purines (adenine) and one pyrimidines (thymine)	CO-1	4
Q2	The following is a schematic of a non-essential amino acid.  a. Circle the group that participates in forming a peptide bond if this amino acid was added to a growing peptide chain. b. If this is the terminal amino acid of a growing peptide chain, will it form a peptide bond with an incoming amino acid (Yes/ No)? Briefly explain your choice. c. Number of peptide bonds found in tripeptide? d. Which amino acid pair has the simplest and most complex structures?	CO-1	4
Q3	After the structure and composition of biological membranes were discovered, and their complexity accepted, different models of membranes were created to investigate in detail the interactions between the main membrane components. Viz. unit membrane model, sandwich model and fluid mosaic model. a. Among all fluid mosaic models is most accepted one, explain why? [1]	CO-2	7

	b. Illustrate the fluid mosaic model of plasma membrane. [2] c. What evidence supports the fluid mosaic model of the cell membrane? [1] d. What do you understand by Phagocytosis, Pinocytosis and Receptor-mediated endocytosis [3]		
Q4	The following schematic represents ribose phosphate, a pentose sugar molecule.  a. On the schematic circle a group that would participate in a condensation reaction that joins two such molecules. b. What do you think; the sugar in the schematic is ribose or deoxyribose? Give suitable reasons in support of your answer c. Plasma membranes having a higher concentration of unsaturated fats show higher fluidity compared to those with a higher concentration of saturated fats. Explain why this is so.	CO-1	3
Q5	In cellular biology, membrane transport refers to the collection of mechanisms that regulate the passage of solutes such as ions and small molecules through biological membranes. a. Justify the statement with suitable example that "Plasma membranes are selectively permeable" [1] b. What do you understand by Active and Passive Transport? What do you think Osmosis and facilitated diffusion is active transport or passive? give suitable reason in support of your answer [2] c. There are two main classes of membrane transport proteins: Carriers and Channels differentiate between them. What will happen if transporter protein gets mutated or defected? [1] d. Cell junctions are specialized structures in the plasma membrane that allow cells to interact with each other and the extracellular matrix: explain in detail about Gap junction, and desmosomes and their significance in cellular system [3]	CO-2	7