JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE-UP EXAMINATION-NOV-2025

MSc-I Semester (BT)

Course Code(Credits): 20MS1BT112 (3) Max. Marks: 25

Course Name: Cell and Molecular Biology

Course Instructors:Dr. Abhishek Chaudhary Max. Time: 1.5 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q.No	Question	Marks
Q1	According to Fluid Mosaic Model (FMM) Lipid bilayer form the basic structural framework of cell membrane, it is the membrane protein that performs the most of the specific functions. These proteins are responsible for activity like transport, communication and recognition, which give each membrane its unique properties. a. Explain how proteins interact with the lipid bilayer in eight different ways. b. It was noted that in certain cell types, protein makes up 25% of the membrane mass, whereas in other cell types, it makes up more than 70%. Explain why. c. What does "phospholipid" mean to you? Describe their purpose and classify them using appropriate examples. Do you think phospholipids are essential for maintaining the fundamental structural integrity of cell membranes? d. Why is cholesterol regarded as a double-edged sword?	4+2+3 +1
Q2	The process that initiates the copying of a double-stranded DNA molecule into two identical copies is known as DNA replication. Initiating replications at the origin of replications requires a variety of proteins and enzymes, and it is a basic process that is strictly regulated. Describe the detailed roles of the enzymes and proteins listed below in relation to DNA replication. (7) a. DNA gyrase b. Dam methylase c. DnaA Protein d. DnaB protein e. DnaC Protein f. SSB protein g. Primase	7
Q3	Answer the following question a. Human DNA contains 20% C on a molar basis. What are the mole percents of A, G, and T? support your answer with proper justification. b. DNA isolated from the bacterial virus M13 contains 25% A, 33% T, 22% C, and 20% G. Do these results strike you as peculiar? Why or why not? How might you explain these values?	2+2

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Q4	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" a. 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.	2+2

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