JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION-2026

MTech-I Semester (BT)

Course Code(Credits): 13M11BT111 (3) Max. Marks: 15

Course Name: Advances in Molecular Cell Biology

Course Instructors:Dr. Abhishek Chaudhary Max. Time: 1 Hour

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

(b)Marks are indicated against each question in square brackets.

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

Q.No	Question	Marks
Q1	Genomic DNA of a species contains 15% cytosine (C) on a molar basis. Calculate the mole percentages of adenine (A), guanine (G), and thymine (T). Also, explain why centromeric DNA sequences are generally rich in A–T base pairs.	3
Q2	A researcher isolates two compounds from a DNA hydrolysate. Compound X contains a nitrogenous base and a pentose sugar, whereas Compound Y contains the same components along with a phosphate group. Identify compounds X and Y and explain how their structures differ and their significance in DNA biology	3
Q3	Explain how phosphodiester bonds are formed between nucleotides with suitable example and analyze their importance in determining the structure and directionality of DNA and RNA.	3
Q4	Amino acids are the fundamental building blocks of proteins. Explain the general structure of an α-amino acid and analyze how variations in the side chain determine the chemical properties of different amino acids.	3
Q5	What do you mean by DNA supercoiling? Explain how supercoiling arises and distinguish between positive and negative supercoiling.	3

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