JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

M.Sc. (Microbiology) - II Semester

COURSE CODE (CREDITS): 18MS1BT313 (3) MAX. MARKS: 15

COURSE NAME: RECOMBINANT DNA TECHNOLOGY

COURSE INSTRUCTORS: Dr. Rahul Shrivastava MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory. (b) Calculators are NOT allowed.*

Q.No.	Question	Marks
Q1	You are provided with a linear double stranded DNA of 4,500 bp which has the following restriction profile: • **BamHI** cuts at 1,200 bp and 3,100 bp. • **HindIII** cuts at 2,000 bp. Calculate the number and size of restriction digestion fragments obtained in each case: a. If you digest the linear DNA with only **BamHI** b. If you digest the linear DNA with only **HindIII** c. If you digest the linear DNA with **BamHI** and **HindIII** together (double digestion)	**[1 X 3=3]**
Q2	***Experimental Strategy:*** A RDT student is cloning a **1 kb gene** into an expression vector. The gene has one internal **BamHI** site. The gene must be inserted in the correct direction so that it can be expressed under the promoter. The student uses enzymes **EcoRI** at the 5' end, and **XhoI** at the 3' end to cleave the insert. Answer the following related to the strategy used: i. Which restriction enzymes will be used to digest the expression vector MCS? ii. Why is correct **orientation** important in cloning into an expression vector? iii. What is the advantage of using **two different** restriction enzymes for cloning? iv. What will be the probable outcome if the insert is digested with BamHI and EcoRI **instead of** XhoI and EcoRI	**[1 X 4=4]**
Q3	Can bacterial cells of *Mycobacterium tuberculosis* and *Escherichia coli* be transformed by a plasmid using the same transformation method? Evaluate, and elaborate the methods used in each case, with reason for your answer.	**[2+2=4]**
Q4	Write a note on essential components of a plasmid and role of each component in its functionality.	**[4]**

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