JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT (35)

TEST -1 EXAMINATION- 2025

MSc (Micro) - Semester IV

COURSE CODE (CREDITS): 24MS1MB311 (3-0-0) MAX. MARKS: 15

COURSE NAME: Microbial Genetics and Physiology

COURSE INSTRUCTORS: Dr Tyson/Dr Ashok Nadda MAX. TIME: 1 Hour

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

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

Q.No	Question	Marks
Q1	a) Name two main categories of gene mutations. b) What is the difference between point mutation and frame shift mutation?	3
Q2	Which signaling molecules are used in Gram-negative and Gram-positive bacteria for quorum sensing?	2
Q3.	a) Differentiate between Class I and Class II transposable elements. b) How can transposable elements cause mutations? What are insertion sequences (IS elements)? Mention one useful role of transposable elements in genome evolution.	3
Q4.	Explain the general molecular steps involved in the uptake and incorporation of exogenous DNA by a competent cell.	3
Q5	Three different Hfr strains (Hfr1, Hfr2 and Hfr3) were crossed with the same F^- strain. Interrupted mating gave the following first-gene entry orders: Hfr1: his → pro → lac → gal Hfr2: lac → gal → arg → thr Hfr3:thr → arg → his → pro (a) Using these data, deduce the most likely circular gene map for these markers. (b) Explain why different Hfr strains give different gene entry orders.	2
Q6	Wollman and Jacob (1955) extended the work of Lederberg and Tatum by using interrupted mating to study gene transfer in E. coli. (a) Describe the principle of the interrupted mating technique used by Wollman and Jacob. (b) How did their experiment demonstrate that genes are transferred in a linear and time-dependent manner during conjugation?	2