17/2/25
9:30

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

M.Sc.- II Semester (Microbiology)

COURSE CODE (CREDITS): 21MS1MB211 (03) MAX. MARKS: 15

COURSE NAME: Enzymes & Bioprocess Technology

COURSE INSTRUCTORS: Dr. Saurabh Bansal 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	What are the unique features of an enzyme?	1
Q2	In a competitive inhibition, what happens to V_{max} and K_m if $[I] = K_i$?	1
Q3	At what percentage of its V_{max} does an enzyme function when the substrate concentration is 40% of the K_M?	1
Q4	How do temperature and pH affect enzyme activity?	2
Q5	If the enzyme phosphatase has $K_M = 2.0 \times 10^{-4}$ M and its substrate p-nitrophenyl phosphate is present at 5.0×10^{-4} M, find the rate of reaction a) as a fraction of V_{max}, and b) if $V_{max} = 3.0 \times 10^{-7}$ M s^{-1}	2
Q6	How are enzymes classified? Mention an example of each class.	3
Q7 a)	You have performed a series of experiments determining the Ki values for three competitive inhibitors. The following table lists the results: **Inhibitor** / **Ki (μM)** A / 4 B / 2 C / 0.5 Which inhibitor binds with higher affinity to the free enzyme?	1
Q7 b)	If the same concentration of inhibitor were used in each experiment, which inhibitor would give the smallest value of Km,app?	1
Q8	Differentiate between competitive and noncompetitive inhibition? Also draw neat Lineweaver-Burk plots and write down their respective equations and examples.	3