JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Sc.-Ist Semester (B.T. and Microbiology)

COURSE CODE (CREDITS): **20MS1BT111 (3)** MAX. MARKS: **25**

COURSE NAME: **Biochemistry**

COURSE INSTRUCTORS: **Jitendraa Vashistt** MAX. TIME: **1 Hour 30 Min**

Note: *(a) All questions are compulsory. (b) The candidate is allowed to use calculator for solving numerical problems.*

Q. No.	Question	Marks
Q1	Explain the structural similarities and dissimilarities between glucose, mannose and galactose. Also define the molecular property which these molecule share with each other.	3
Q2.	Differentiate between the following. a) Induced fit model and lock and key model b) Competitive inhibition and non-competitive inhibition	3
Q3.	Define the different factors responsible for the stability of a protein for maintaining the biological active structure.	4
Q4.	Evaluate the Michaelis-Menten constant (MM) for the following enzymatic reaction $E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_2} E + P$ where E: Enzyme, S: Substrate and P is Product. K_1 constant is $3X10^8 M^{-1}sec^{-1}$, K_{-1} constant of reverse reaction is $4X10^4 M^{-1}sec^{-1}$ and the K_2 constant is $2X10^3 M^{-1}sec^{-1}$.	5
Q5.	If you want to purify the following protein which is the best design strategy for purification? Also you need to explain the principle of chromatography employed for purification. a) Protein with large molecular weight differences b) Anionic proteins	5
Q6.	a) Explain the relation of K_m with relation to velocity of the reaction and enzyme saturation in an enzymatic reaction. b) If you need to decide one enzyme from two isoforms of an enzyme 'A' and 'B' which have Km value of 4M and 8M, respectively. If both enzymes have same K_{cat} of $24X10^3$ s^{-1}. Which isoform will show best catalytic efficiency?	5