JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Make-up Examination-Nov-2025

Ph.D.-I Semester (BT/BI)

COURSE CODE (CREDITS): 24 P1WBT231 (2) MAX. MARKS: 25

COURSE NAME: Biochemical Calculations

COURSE INSTRUCTORS: Dr. Poonam Sharma MAX. TIME: 1 Hour 30 Min

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	Explain the role of different type of interactions for solubility of an solute.	3
Q2(a)	Discuss hypertonic and hypotonic solutions	3
(b)	How the spontaneity of a reaction depends upon Gibbs Free Energy?	3
Q3(a).	The conduction of heat from a hot body to a cold body is reversible or irreversible process. Explain	3
(b).	For exothermic reactions, K decreases with increasing temperature while for endothermic reactions K increases with temperature. Justify the statement	3
Q4(a).	Discuss the variation Michaelis-Menten kinetics for high substrate and low substrate concentrations.	3
(b).	An enzyme with a Km value of 5 mM has a reaction rate of 200 mmol/min at a substrate concentration of 0.5 mmol. What is the maximum reaction rate that this enzyme can achieve when it is saturated with substrate?	3
Q5.	*Aspergillus niger* is used to produce gluconic acid. Product synthesis is monitored in a fermenter, gluconic acid concentration is measured as a function of time for the first 39 h of culture. Time (h) — Acid concentration (gl^{-1}) 0 — 3.6 16 — 22 24 — 51 28 — 66 32 — 97 39 — 167 (a) Determine the rate constant	4

(81)