

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech – IIIrd Semester (BT)

COURSE CODE (CREDITS):25B11BT311(4)

MAX. MARKS: 25

COURSE NAME: Thermodynamics and Chemical Processes

COURSE INSTRUCTORS: Dr. Poonam Sharma

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

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

Q.No	Question	CO	Marks
Q1(a)	Differentiate between reaction kinetics and reaction thermodynamics	CO-3	2
(b)	Explain the role of energy in exergonic reactions and endergonic reactions with the help of energy level diagram.	CO-2	2
Q2(a)	Describe the importance of Thermodynamic processes.	CO-1	3
(b)	Discuss the variation of Michaelis-Menten kinetics for high substrate and low substrate concentrations	CO-3	3
Q3(a)	A mixture (A) (125 kg) contains 2.5% invert sugars and 50% water; rest can be considered as solids. Another mixture (B) (45 kg) containing 50% sucrose, 1% invert sugars, 18% water and the remainder solids. Both mixtures A and B mixed together in mixing tank. Water is also added as separate component. Final product containing 2% invert sugars as one component is obtained. (i) How much water is required? (ii) What is the concentration of sucrose in final product?	CO-4	4
(b)	How lineweaver-burk plot and langmuir plot from Michaelis-Menten kinetics are useful for the calculation of Vmax and Km.	CO-3	4
Q4.	Elaborate the different types of processes in Material balances	CO-4	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	CO-3	4
	(a) Determine the rate constant.		