JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Make-up Examination-Nov-2025

B.Tech – III[rd] 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

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

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

Q.No	Question	CO	Marks
Q1(a)	Why metabolism is called as the set of life-sustaining chemical transformations?	CO-2	2
(b)	1 mole of α-tin at 1 atm and 13°C changes to 1 mole of β-tin at same temp and pressure. If the enthalpy of transition is 2090 $Jmol^{-1}$ Calculate entropy of transition.	CO-1	2
Q2(a)	Absolute or 100% ethanol is produced from a mixture of 95% ethanol and 5% water using the Keyes distillation process. A third component, benzene, is added to lower the volatility of the alcohol. Under these conditions, the overhead product is a constant-boiling mixture of 18.5% ethanol, 7.4% H_2O and 74.1% benzene. Use the following data to calculate the volume of benzene which should be fed to the still in order to produce 250 litres. Absolute ethanol: (density 100% alcohol = 0.785 g cm^{-3}) ; (density benzene = 0.872 g cm^{-3}).	CO-4	5
(b)	Differentiate between Lineweaver-Burk plot and Lamngmuir plot of Michaelis-Menten kinetics.	CO-3	4
Q3(a)	Discuss the principles of bioenergetics with examples.	CO-2	3
(b)	Explain the working of Ideal Heat Engine.	CO-1	4
Q4.	Calculate the efficiency of Heat engine working between two temperatures 40° C and 100°C.	CO-1	2
Q5.	Initial rate data is listed below. Calculate Vmax and Km Lactose concentration (mol l^{-1} X 10^{2}) Initial reaction velocity (mol l^{-1} min^{-1} X 10^{3}) 2.50 1.94 2.27 1.91 1.84 1.85 1.35 1.80 1.25 1.78 0.730 1.46	CO-3	3

16