

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST 1 EXAMINATION- AUG. 2025

B.Tech (BT) IIIrd Semester

COURSE CODE: 25B11BT313

MAX. MARKS : 15

COURSE NAME: Thermodynamics and Chemical processes

COURSE CREDITS: 4

MAX. TIME: One Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.No	Question	CO	Marks
Q1(a)	Under what conditions the enthalpy change is equal to the internal energy change?	I	2
(b)	Explain coupling of reactions with the help of an example.	II	2
Q2(a)	Calculate the maximum efficiency of a heat engine operating between 110°C and 25°C. What would be the efficiency of the engine if temperature of source is raised to 140°C and temperature of sink remaining same.	III	2
(b)	An exothermic and endothermic reaction depends upon the heat content and enthalpy. Justify	I	2
Q3(a)	Explain the working and performance of Carnot refrigerator.	III	2
(b)	For the hydrolysis of ATP: $\text{ATP} \leftrightarrow \text{ADP} + \text{P}$ If equilibrium concentrations of $\text{ATP} = 1 \times 10^{-7} \text{M}$, $\text{ADP} = 0.165 \text{M}$ and $\text{P} = 0.1 \text{M}$. What is the equilibrium constant and ΔG° for the hydrolysis of ATP at 37°C?	II	2
(c)	Calculate the increase in entropy when 1 gram of ice at -10°C is converted into steam at 100°C (Specific heat of ice = 0.5 and Latent heat of steam = 540 cal/gram)	III	3