JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech.-III[rd] Semester (BT)

COURSE CODE (CREDITS): 25B11BT313(4) MAX. MARKS: 15

COURSE NAME: Thermodynamics and Chemical processes

COURSE INSTRUCTOR: Prof. Poonam Sharma MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

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

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1(a)	Mention two criteria for feasibility of reaction	II	1
(b)	Specific heat at constant pressure is always greater than specific heat at constant volume. Justify the statement.	II	2
Q2(a)	Why ATP molecules are considered as universal currency of energy?		1
Q3(a)	State and prove the principle of increase of entropy	I	2
(b)	Calculate the actual change in Gibbs free energy ΔG for the conversion of Fructose-6- phosphate to Fructose -1,6-biphosphate at 37 °C. $\Delta G'^{o}$ = -17.2KJ/mol. Given [Fructose-6- phosphate] = 0.5 mM and [Fructose -1,6-biphosphate] = 0.1 mM	II	2
Q4(a)	Calculate the change in entropy when 10 grams of ice at ice point is converted into steam at steam point.(Latent heat of ice = 80 cal/gm, Latent heat of steam = 540 cal/gm)	I	2
(b)	A Carnot engine working between a source at temperature 27°C and a sink at -73°C delivers 300 calories of heat to the latter in one cycle. Calculate the work performed in joules by the engine per cycle.	I	2
Q5	Describe the construction and working of a diesel Engine based upon diesel cycle. Explain its merits over petrol engine.	I	3