Roll No ....

JC Bose University of Science & Technology YMCA, Faridabad, Haryana
B. Tech 3rd Semester Mechanical Engineering
Thermodynamics (PCC-ME-301/21)
2nd Sessional Test, December 2024

Max. Marks: 15   **Time Allowed:** 90 minutes

Note: *Attempt all questions. Use of Steam Tables is allowed.*

Q. No.	Statement	Marks	CO
Q1(a)	Prove that there is loss in exergy whenever heat is transferred through a finite temperature difference.	2	CO2
(b)	A household refrigerator absorbs heat at $2^\circ C$ and rejects heat to the surroundings at $50^\circ C$. Its compressor is driven by 3kW motor and 50 MJ/hr are absorbed at the low temperature. Evaluate the amount rejected per hour and the irreversibility in J/hr.	3	CO2
Q2	A rigid vessel of 2 m³ volume is filled with superheated steam at 20 bar and 300° C. The vessel is cooled until the steam is just dry saturated. Calculate the mass of steam in the vessel, the final pressure of steam and the amount of energy transferred as heat to the surroundings.	5	CO3
Q3(a)	Derive the air standard efficiency of a diesel cycle. Also state the assumptions made.	2	CO4
(b)	Consider an air standard Otto cycle that has a heat addition of 2800 kJ/kg of air, a compression ratio of 8 and a pressure and temperature at the beginning of compression process of 1 bar and 300 K. Determine: (i) the maximum pressure and temperature in the cycle. (ii) the thermal efficiency and the mean effective pressure.	3	CO4

ALL THE BEST