VIT

Vellore Institute of Technology

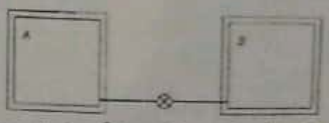
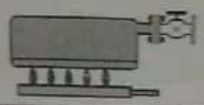
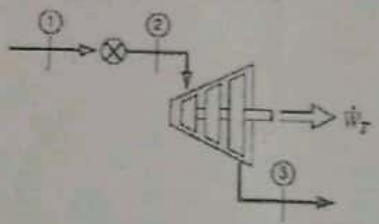
Programme Name & Branch: B. Tech (BME, BCL, BMA, BPI)

Course Name & Code: Engineering Thermodynamics& MEE 1003

Class Number: 2253 Slot: A2+TA2+V3 Exam Duration: 90 mins Maximum Marks:50

General instruction(s):

Authorized steam tables, gas tables and thermodynamic tables permitted.

Section – A (5 x 10 = 50 Marks)*		
S.No.	Question	Course Outcome (CO)
1.	Determine whether water at each of the following states is a compressed liquid, superheated vapor, or a mixture of saturated liquid and vapor. (1) 10 MPa, 0.003 m^3/kg (2) 1 MPa, 190°C (3) 200°C, 0.1 m^3/kg (4) -20°C, 200 kPa	1
2.	Two tanks, both containing water are connected as shown.  Tank A is at 200 kPa, v = 0.5 m^3/kg, V_A = 1 m^3. Tank B contains 3.5 kg at 0.5 MPa and 400°C. The valve is now open and both come to a uniform state. Find the final specific volume.	1
3.	Two kilograms of water at 120°C with a quality of 25% has its temperature raised 20°C in a constant volume process. What are the heat transfer and work in the process? 	2
4.	A small turbine is operated at part load by throttling a 0.25 kg/s steam supply at 1.4 MPa and 250°C down to 1.1 MPa before it enters the turbine, and the exhaust is at 10 kPa. If the turbine produces 110 kW, find the exhaust temperature (and quality if saturated).  	2
5.	Refrigerant R-12 at 95°C with x = 0.1 flowing at 2 kg/s is brought to saturated vapor in a constant pressure heat exchanger. The energy is supplied by a heat pump with a COP β' = 2.5. Find the required power to drive the heat pump.	3