

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

MGM's, Jawaharlal Nehru Engineering College, Aurangabad

Mid Semester Examination – Sept.-Oct. 2019

Course: S.Y. B. Tech in Mechanical Engineering

Subject Name: THERMODYNAMICS

Subject Code: BT-MEC 305

Max Marks: 20

Date: - Oct. 9, 2019

Duration: - 1 Hr.

Instructions to the Students:

1. Use of scientific calculator is permitted
2. Draw schematic diagrams whenever necessary
3. Assume suitable data if necessary
4. Mark one correct answer for MCQs

		(Level/CO)	Marks
Q. 1	Choose the correct answer.		6
1	Density of fluid is	CO1	1
	a) Extensive property b) Intensive Property c) Path Function d) None of these		
2	Thermodynamic equilibrium is	CO1	1
	a) Thermal Equilibrium b) Chemical Equilibrium c) Mechanical Equilibrium d) All of these		
3	Isochoric Process involves	CO3	1
	a) Constant Pressure b) Constant Volume c) Constant Temperature d) Constant Entropy		
4	Kelvin-Planck statement states no heat engine exists	CO2	1
	a) Without Heat Gain b) Without Heat Rejection c) Without Work d) None of these		
5	Absolute thermodynamic temperature is expressed as	CO2	1
	a) temperature in °C b) temperature in °F c) temperature in K d) None of these		
6	Work and Heat transfers are	CO1	1
	a) State Function b) Path Function c) Properties of System d) None of these		
Q. 2	Solve Any Two of the following.		6
(A)	Define Zeroth Law of Thermodynamics and explain with scientific example	CO2	3
(B)	A gas starts with 200 J of the internal energy and 180 J of heat is added to the gas which produce 70 J work. Determine the final Internal energy of the gas ?	CO2	3
(C)	Explain Clausius statement with scientific example of refrigerator	CO2	3
Q. 3	Solve Any One of the following.		8
(A)	A turbine operates under steady flow conditions, receiving steam 1.2 MPa at 188 °C with enthalpy 2785 kJ/kg and velocity 33.3 m/s at elevation of 3 m. This steam leaves the turbine at 20 kPa with enthalpy 2512 kJ/kg and velocity 100 m/s with elevation 0 m. Heat is lost to the surrounding at the rate of 0.29 kJ/s. If the steam flow rate through the turbine is 0.42 kg/s, what is the power output of the turbine in kW ?	CO3	8
(B)	In an insulated Nozzle, enthalpy of fluid passing is 3000 kJ/kg and velocity is 60 m/s while at the exit the enthalpy reduced to 2762 kJ/kg. The nozzle is kept horizontal. If the inlet area is 0.1 m ² and specific volume at inlet is 0.187 m ³ /kg, determine the velocity at exit of nozzle and mass flow rate through the nozzle.	CO3	8
	*** End ***		