Name :
Roll No:

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM – 686 666

DEPARTMENT OF MECHANICAL ENGINEERING
FIRST SESSIONAL EXAMINATION, FEBRUARY 2026
FOURTH SEMESTER (ME)

B24ME2T06 ENGINEERING THERMODYNAMICS

Time – 1.5 Hour **Max: 40 Marks**

PART-A

Answer All Questions

1.	Explain the terms state, change of state, path, process, cycle and quasistatic process. Represent them in a p-v diagram.	**[CO 1]**	**3 Marks**
2.	i) Distinguish between intensive and extensive properties. ii) Explain thermodynamic equilibrium.	**[CO 1]**	**3 Marks**
3.	Apply the first law of thermodynamics to a closed system undergoing a change state and show that energy is a property of the system.	**[CO 2]**	**3 Marks**
4.	i) What is PMM1? Why it is not possible? ii) Why does free expansion have zero work transfer?	**[CO 2]**	**3 Marks**

PART-B

Answer All Questions

5. a	Explain the working of constant volume gas thermometer. Explain how a constant volume gas thermometer can be used to measure the correct value of steam point.	**[CO 1]**	**6 Marks**
5.b	The e.m.f. in a thermocouple with the test junction at $t°C$ on the gas thermometer scale and the reference junction at the ice point is given by $e = 0.25\,t - 4 \times 10^{-4} t^2\ mV$. The millivoltmeter is calibrated at ice and steam points. What will this thermometer read in a place where the gas thermometer reads 60°C?	**[CO 1]**	**8 Marks**
6. a	Derive steady flow energy equation. How can you relate S.F.E.E with Euler and Bernoulli Equations?	**[CO 2]**	**6 Marks**
6. b	In a gas turbine the gas enters at the rate of 5 kg/s with a velocity of 50 m/s and enthalpy of 900 kJ/kg and leaves the turbine with a velocity of 150 m/s and enthalpy of 400 kJ/kg. The loss of heat from the gases to the surroundings is 25 kJ/kg. Assume for gas $R = 0.285$ kJ/kg K and $c_p = 1.004$ kJ/kg K and the inlet conditions to be at 100 kPa and 27°C. Determine the power output of the turbine and the diameter of the inlet pipe.	**[CO 2]**	**8 Marks**

VISION

Mentoring to Ensure Excellence

MISSION

- To facilitate comprehensive and integrated development of students by providing quality education that encourages sustainable practices
- To mold disciplined and socially committed engineers capable of assuming professional leadership upholding national integrity