

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER– III EXAMINATION – SUMMER 2026****Subject Code:3130109****Date:19-06-2026****Subject Name:Thermodynamics for Aeronautical Engineering****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define Following terms: i. Thermodynamic System ii. Boundary iii. Open System	03
	(b) Explain Carnot Cycle with schematic and T-s diagram.	04
	(c) Write a short note on Clausious Theorem.	07
Q.2	(a) Differentiate between intensive and extensive properties.	03
	(b) Explain PMM1 in detail.	04
	(c) Derive general steady flow energy equation (SFEE).	07
	OR	
	(c) Explain First law of thermodynamics for a closed system undergoing a cycle.	07
Q.3	(a) No work transfer is involved in free expansion –Justify.	03
	(b) What do you understand by thermodynamic equilibrium?	04
	(c) Explain the laws of thermodynamics with their physical importance.	07
	OR	
Q.3	(a) Derive MAXWELL's equations.	03
	(b) Establish relationship between Cp and Cv.	04
	(c) Derive expression for the efficiency of Otto cycle.	07
Q.4	(a) Derive the expressions for coefficient of volume expansion and coefficient of isothermal compressibility for a perfect gas.	03
	(b) What do you mean by Critical Point? Discuss.	04
	(c) Write the generalized energy equation for steady flow process. Reduce it for the following systems 1. Gas turbine and 2. Nozzle	07
	OR	
Q.4	(a) Derive an expression for pdV work for isothermal process.	03
	(b) Write down the four processes which constitute the Brayton cycle. Show Brayton cycle on P –V diagram and T–s diagram.	04
	(c) With neat sketch explain Carnot vapor cycle.	07
Q.5	(a) State the processes of Dual Cycle.	03
	(b) Explain Gibbs-Dalton law.	04
	(c) Write a note on Available and Unavailable energy.	07
	OR	
Q.5	(a) Define point function and path function with example.	03
	(b) Draw P-V and T-s diagrams of Rankine Cycle.	04
	(c) Draw and explain Brayton cycle with Reheating and Regeneration.	07
