

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3132504****Date:28-07-2023****Subject Name:Basic and Applied Thermodynamics****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. 1) Thermodynamics 2) System 3) Process	03
	(b) Give statements of following terms in thermodynamics. 1) Zeroth law of thermodynamics 2) First law of thermodynamics 3) second law of thermodynamics	04
	(c) Define internal energy and prove that internal energy is a property of system.	07
Q.2	(a) Define 1) Sensible heat 2) Latent heat 3) Specific Heat.	03
	(b) Discuss Concept of PMM1 and PMM2.	04
	(c) A rigid tank, 50 litres in volume, contains water at 120 °C and 0.6 dryness fraction. The tank is then cooled to -10 °C. Determine the heat transfer during the process.	07
	OR	
	(c) Derive equation for Steady State Steady flow Energy Equation (SSSF).	07
Q.3	(a) Show that violation of Kelvin plank statement leading to violation of Clausius statement.	03
	(b) Write a short note on Entropy	04
	(c) Explain Brayton cycle and Derive an expression for air-standard efficiency. $\eta = 1 - \frac{T_4 - T_1}{T_3 - T_2}$	07
	OR	
Q.3	(a) Differentiate Otto and Diesel cycle.	03
	(b) Write down limitations of first law of thermodynamics.	04
	(c) Explain inequality of Clausius.	07
Q.4	(a) Define Refrigeration and COP of Refrigerator	03
	(b) Explain vapour compression system equipment nomenclature.	04
	(c) Determine expression for efficiency of Rankine cycle with neat sketch of their main components, P -V and T-S diagram	07
	OR	
Q.4	(a) Explain briefly heat engine and heat pump.	03
	(b) Write short note on Reheat Cycle with schematic arrangement.	04
	(c) Determine expression for efficiency of Carnot cycle with neat sketch of their main components, P -V and T-S diagram	07
Q.5	(a) Explain types of steam turbines.	03
	(b) Write short note on Bell-Coleman cycle.	04
	(c) What do you mean by governing of steam turbine? State various methods of governing and explain with neat sketch the Nozzle Control Governing.	07

OR

- Q.5**
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|------------|---|-----------|
| (a) | Explain working of reaction turbine with neat sketch. | 03 |
| (b) | Illustrate working of impulse turbine with neat sketch. | 04 |
| (c) | List out methods of steam turbine compounding and explain any one with neat sketch in detail. | 07 |
