Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2021

Subject Code:2132502 Date:14/09/2021

Subject Name:Engineering Thermodynamics & Heat transfer

Time:10:30 AM TO 01:00 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)**	Differentiate between macroscopic approach and microscopic approach.	**03**
	(b)	What are different types of Thermodynamic Systems? Explain with suitable example.	**04**
	(c)	State the first law of thermodynamics. Mention its success and limitations?	**07**
Q.2	**(a)**	Define **(i)** Enthalpy, **(ii)** Entropy and **(iii)** Exergy.	**03**
	(b)	Define Irreversibility. Explain internal irreversibility.	**04**
	(c)	State Kelvin-Plant statement of second law of thermodynamics. Verify that violation of Kelvin Plank statement leads to violation of Clausius statement.	**07**
		OR	
	(c)	Write a short note on Carnot Cycle (Reversible Cycle).	**07**
Q.3	**(a)**	Define the following terms: (a) Thermal energy reservoir (b) Heat Pump (c) Mechanical energy reservoir.	**03**
	(b)	Explain the concept of available and unavailable energy. When does the system become dead.	**04**
	(c)	Write a short note on phase rule.	**07**
		OR	
Q.3	**(a)**	What do you mean by PMM1 and PMM2 ?	**03**
	(b)	Explain the process of steam formation using h – s chart.	**04**
	(c)	Derive general steady flow energy equation.	**07**
Q.4	**(a)**	State silent features of shape factor.	**03**
	(b)	Explain with neat sketch Boundary Layer concept.	**04**
	(c)	Explain conduction and flow of heat through a composite wall when resistances are in series.	**07**
		OR	
Q.4	**(a)**	Differentiate between free convection and forced convection.	**03**
	(b)	Explain the following laws: (a) Fourier's Law of heat conduction (b) Newton's Law of cooling.	**04**
	(c)	Explain & classify types of Convection.	**07**
Q.5	**(a)**	Explain detailed classification of heat exchangers.	**03**
	(b)	Explain & draw the pool boiling curve.	**04**
	(c)	Define the term boiling. Sketch the boiling curve and explain key regimes and features.	**07**
		OR	
Q.5	**(a)**	Explain emissivity and absortivity of a surface.	**03**
	(b)	Differentiate between Black Body and Gray Body.	**04**
	(c)	Derive the equation for logarithmic mean temperature difference (LMTD) for parallel flow heat exchanger.	**07**

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