Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (New) EXAMINATION – WINTER 2015

Subject Code:2140106 **Date:01/01/2016**

Subject Name: Basic Engineering Thermodynamics

Time: 2:30pm to 5:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Show the comparison of Microscopic approach and Macroscopic approach.	**07**
	(b)	Define Following terms: i. Thermodynamic System ii. Boundary iii. Open System iv. Closed System v. Isolated System vi. Intensive Properties vii. Extensive Properties	**07**
Q.2	**(a)**	Derive general steady flow energy equation (SFEE).	**07**
	(b)	Explain i. PMM1 ii. Steady flow process and Unsteady flow process	**07**
		OR	
	(b)	Fluid enters a nozzle with a velocity of 50 m/s and initial enthalpy is 3000 kJ/kg. The enthalpy of fluid at the exit of nozzle is 2700 kJ/kg. Assume that no heat interaction between nozzle and surroundings takes place. Calculate i. Velocity of fluid at the exit of nozzle ii. The mass flow rate when inlet area is $0.1 m^2$ and specific volume at inlet is $0.2\ m^3/kg$. iii. The exit area of nozzle when the specific volume at the nozzle exit is $0.5\ m^3/kg$.	**07**
Q.3	**(a)**	Write a short note on p-v-T Surface.	**07**
	(b)	Write a short note on Entropy.	**07**
		OR	
Q.3	**(a)**	Explain Kelvin-Plank statement of second law of thermodynamics in detail.	**07**
	(b)	Explain Carnot Cycle with schematic and T-s diagram.	**07**
Q.4	**(a)**	Write a short note on Clausious Theorem.	**07**
	(b)	Explain First law of thermodynamics foe a closed system undergoing a cycle.	**07**
		OR	
Q.4	**(a)**	Write a short note on Helmholtz and Gibbs function.	**07**
	(b)	Write a note on Available and Unavailable energy.	**07**
Q.5	**(a)**	With neat sketch explain Otto Cycle in detail.	**07**
	(b)	With neat sketch explain Rankine Cycle in detail.	**07**
		OR	
Q.5	**(a)**	With neat sketch explain Brayton Cycle in detail.	**07**
	(b)	Write Comparison of Carnot and Rankine Cycle.	**07**

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