Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III EXAMINATION – SUMMER 2015

Subject Code: 133401 **Date: 27/05/2015**

Subject Name: Thermodynamics and Thermal Engineering

Time: 02.30pm-05.00pm **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)**	Write down the steady flow energy equation clearly indicating the various terms.	**07**
	(b)	Explain Kelvin-plank statement and clauses statement with neat sketches.	**07**
Q.2	**(a)**	Explain the working of single stage reciprocating air compressor with a neat sketch.	**07**
	(b)	In an Otto cycle the temperature at beginning and end of isentropic compression are 316 K and 596 K respectively. Determine air standard efficiency and compression ratio. Take $\gamma = 1.4$	**07**
		OR	
	(b)	Compare the efficiency of Otto, diesel and dual cycle for same compression ratio and heat rejection with help of p-v and T-S diagram.	**07**
Q.3	**(a)**	Write a note on First law of thermodynamics.	**07**
	(b)	Define Ideal and non-ideal gas. How they get differ with each other in their behavior? Explain the entropy change of an ideal gas.	**07**
Q.3	**(a)**	Briefly explain the various properties of steam.	**07**
	(b)	Define entropy and irreversibility. Discuss their relationships.	**07**
Q.4	**(a)**	Explain about vapour compression refrigeration system with suitable sketches.	**07**
	(b)	Briefly explain the centralized air conditioning with a neat sketch.	**07**
		OR	
Q.4	**(a)**	Give the applications of refrigerant.	**07**
	(b)	Explain summer air conditioning with a neat sketch.	**07**
Q.5	**(a)**	Derive the equation for conduction of heat through a plane wall.	**07**
	(b)	Derive the equation for conduction of heat through a radial wall.	**07**
		OR	
Q.5	**(a)**	Describe the principle of psychometric and refrigeration in detail.	**07**
	(b)	Write down the properties of refrigerant in detail.	**07**

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