Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2132502 Date: 11/06/2019

Subject Name: Engineering Thermodynamics & Heat transfer

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.**

			MARKS
Q.1	**(a)**	How Engineering Thermodynamics & Heat Transfer will be helpful to you?	**03**
	(b)	Explain the following terms: (1) System (2) Property (3) Boundary (4) Pure substance	**04**
	(c)	State First Law of Thermodynamics. Explain the application of it to open and close systems.	**07**
Q.2	**(a)**	Explain the following terms: (1) Entropy (2) Triple point (3) Critical Point	**03**
	(b)	Define energy and exergy with suitable example.	**04**
	(c)	Write Kelvin's and Clausius statements of second law. Describe the concept of reversibility and irreversibility	**07**
		OR	
	(c)	Write a short note on Carnot Cycle.	**07**
Q.3	**(a)**	Classify various types of irreversibility.	**03**
	(b)	Derive general steady flow energy equation.	**04**
	(c)	Explain the process of steam formation using p-v and h-s diagram.	**07**
		OR	
Q.3	**(a)**	Compare the terms: conduction and convection.	**03**
	(b)	Explain the following laws: (1) Fourier's Law of heat conduction (2) Newton's Law of cooling	**04**
	(c)	Define Property. State difference between Microscopic approach and Macroscopic approach.	**07**
Q.4	**(a)**	Differentiate between laminar and turbulent flows.	**03**
	(b)	Differentiate between steady state and transient heat conduction.	**04**
	(c)	State the types of heat convection and differentiate between them.	**07**
		OR	
Q.4	**(a)**	Write the general three dimensional general heat conduction equation in: (1) Cartesian co-ordinates (2) Cylindrical co-ordinates (3) Spherical co-ordinates	**03**
	(b)	Discuss the factors which affect the convective heat transfer coefficient.	**04**
	(c)	Derive the dimensional less numbers as applied to the analysis of forced convection by dimensional analysis.	**07**

Q.5	**(a)**	Define Reflectivity, Absoprtivity and Transmissivity of a surface.	**03**
	(b)	State and express in equation: Stefan Boltzmann law of radiation and Kirchhoff's law of radiation.	**04**
	(c)	Classify various heat exchangers. Explain any one in brief.	**07**

OR

Q.5	**(a)**	What do you mean by fouling factor? What are causes of fouling?	**03**
	(b)	How the cross-flow and multipass heat exchangers are analyzed using LMTD method?	**04**
	(c)	Define Radiation. Classify and explain various types of bodies.	**07**

****