

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2020****Subject Code:2132502****Date:05/03/2021****Subject Name:Engineering Thermodynamics & Heat transfer****Time:10:30 AM TO 12:30 PM****Total Marks:56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Define following terms: 1. Thermodynamics 2. Open System 3. Closed System	03
	(b) Give the limitations of first law of thermodynamics and explain Kelvin plank statement with neat sketch.	04
	(c) Define thermodynamic work and show different modes of work transfer with neat sketch.	07
Q.2	(a) Define following terms: 1. Available Energy 2. Unavailable Energy 3. Availability	03
	(b) Explain Exergy for steady flow systems.	04
	(c) Derive equation for thermal efficiency of Carnot cycle with neat sketch.	07
Q.3	(a) Compare the terms: Conduction, Convection and Radiation.	03
	(b) Derive the equation of overall heat transfer coefficient for composite wall having resistance in series.	04
	(c) Illustrate P-V-T surface with neat sketch.	07
Q.4	(a) Differentiate between thermodynamics and heat transfer.	03
	(b) Derive one dimension steady state heat conduction equation through plane wall.	04
	(c) Illustrate P-T diagram for a pure substance with neat sketch.	07
Q.5	(a) Describe mechanism of heat transfer by conduction.	03
	(b) Discuss concept of convection and their types with neat sketch.	04
	(c) Derive the equation for convective heat transfer coefficient over a plate for forced convection.	07
Q.6	(a) Give Fourier's law of heat conduction.	03
	(b) Differentiate between Laminar and Turbulent flow.	04
	(c) Explain mechanism of natural convection and show convection current set up over horizontal plate, vertical plate and cylinder.	07
Q.7	(a) Write a short note on black body.	03
	(b) Discuss different types of bodies or surfaces in thermal radiation.	04
	(c) Illustrate classification of heat exchanger according to flow arrangement of fluids with neat sketch.	07

- Q.8** (a) Define following terms: **03**
1. Radiation
 2. Emissivity
 3. Stephan-Boltzmann law
- (b) Give the statement and proof of Kirchhoff's law. **04**
- (c) Derive LMTD equation for parallel flow heat exchanger. **07**
