GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– IV EXAMINATION – SUMMER 2020

Subject Code: 2140907   **Date:26/10/2020**
Subject Name: Applied Thermal and Hydraulic Engineering
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.**

Q.1	**(a)**	List the main component of Steam Power Plant and Describe the function of a condenser in steam power plant.	**03**
	(b)	Explain briefly the various modes of Heat Transfer with example.	**04**
	(c)	Explain with T-S and p-V diagram of Brayton cycle for Gas turbine Power plant.	**07**
Q.2	**(a)**	Define Co-efficient of performance and 1 Ton of refrigeration (TR).	**03**
	(b)	In a constant pressure open cycle gas turbine air enters the compressor a 1 bar and 17°C where it is compressed to a pressure ratio of 7. The gases enter the gas turbine at 740°C and expand to original pressure. Calculate Turbine work output and Compressor work Input. Assume, Υ=1.4. C_p=1.0 kj/kg k for air & gases Neglect the mass of fuel.	**04**
	(c)	Describe the simple vapour compression refrigeration system with T-S and P-H Diagram.	**07**
		OR	
	(c)	Explain working of Rankine cycle with its P-V, T-S and h-s diagrams.	**07**
Q.3	**(a)**	Define Natural and force convection.	**03**
	(b)	State and derive Fourier's law of conduction heat transfer.	**04**
	(c)	Deduce the expression for conduction heat transfer through a composite wall.	**07**
		OR	
Q.3	**(a)**	Define absorptivity, reflectivity and transmissivity.	**03**
	(b)	Explain different types of fins and their application.	**04**
	(c)	Explain with neat diagram, the arrangement and working of parallel flow heat exchanger.	**07**
Q.4	**(a)**	Define the term: Specific gravity, kinematic viscosity, mass density.	**03**
	(b)	Explain the Pascal's law with usual notation.	**04**
	(c)	Classification of manometers and explain U-tube differential manometer.	**07**
		OR	
Q.4	**(a)**	List the assumptions which are made while deriving Bernoulli's equation.	**03**
	(b)	Explain the surface tension.	**04**
	(c)	Deduce the Euler's equation of motion along a stream line.	**07**
Q.5	**(a)**	Classification of reciprocating pump.	**03**
	(b)	Define NPSH? State its importance.	**04**
	(c)	Explain with neat sketch the function of main component of centrifugal pump.	**07**
		OR	
Q.5	**(a)**	Define hydraulic turbine and classify hydraulic turbine.	**03**
	(b)	Explain draft tube and its importance.	**04**
	(c)	Explain with neat sketch the Kaplan turbine.	**07**

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