Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2023

Subject Code:2140907 Date:11-01-2024

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	List the main component of Gas Power Plant and Describe the function of a compressor in Gas power plant.	**03**
	(b)	Explain Rankine cycle with neat sketch.	**04**
	(c)	Explain Brayton cycle for Gas power plant with H-S and P-V diagram.	**07**
Q.2	**(a)**	Define following term related to psychrometry; (i) wet bulb temperature, (ii) dry bulb temperature, (iii) relative humidity.	**03**
	(b)	Explain simple air craft refrigeration system.	**04**
	(c)	Explain simple Vapour compression Refrigeration cycle (VCR) with neat sketch.	**07**
		OR	
	(c)	Illustrate with a neat sketch, construction and working of Pelton Wheel.	**07**
Q.3	**(a)**	Define Conduction, Convection and Radiation heat transfer.	**03**
	(b)	Derive equation for Critical thickness of insulation.	**04**
	(c)	Derive expression for LMTD for Counter flow heat Exchanger.	**07**
		OR	
Q.3	**(a)**	Define black body, opaque body and gray body.	**03**
	(b)	Write a note on surface heat transfer co-efficient.	**04**
	(c)	Derive the expression for conduction heat transfer through a composite wall.	**07**
Q.4	**(a)**	Define Density, Dynamic viscosity and Surface tension.	**03**
	(b)	Derive the Euler's equation of motion along a stream line.	**04**
	(c)	State and prove Pascal's law for fluid static.	**07**
		OR	
Q.4	**(a)**	Define absolute pressure, atmospheric pressure and gauge pressure	**03**
	(b)	Explain U-tube manometer with neat figure	**04**
	(c)	State and prove hydrostatic law.	**07**
Q.5	**(a)**	Give the classification of pumps.	**03**
	(b)	Define the following; 1) Cavitation, 2) NPSH, 3) specific speed, 4) priming of the pump.	**04**
	(c)	With neat sketch explain working and construction of Francis Turbine.	**07**
		OR	
Q.5	**(a)**	What is draft tube? What is its importance?	**03**
	(b)	Differentiate between impulse and reaction hydraulic turbines	**04**
	(c)	Explain performance Characteristics of hydraulic turbine.	**07**

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