Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2021

Subject Code:2140907 Date:31/12/2021

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.**

Q.1	**(a)**	Define steam rate, thermal conductivity and ton of refrigeration.	**03**
	(b)	How the subject "ATHE" is related to electrical engineering branch.	**04**
	(c)	Explain with T-S and p-V diagram of Brayton cycle for Gas turbine Power plant.	**07**
Q.2	**(a)**	Write the classification of heat exchangers.	**03**
	(b)	Explain Rankine cycle with P-V and T-S diagram.	**04**
	(c)	What do you mean by cavitation? Explain the cavitation phenomenon in detail. State the places in the turbines and pumps where cavitation is generally occurred.	**07**
		OR	
	(c)	Describe the simple Vapour compression refrigeration system with T-S and P-H Diagram.	**07**
Q.3	**(a)**	Briefly explain Net Positive Suction Head (NPSH).	**03**
	(b)	What is the function of fins in heat transfer? State applications of fins.	**04**
	(c)	State and prove Bernoulli's equation.	**07**
		OR	
Q.3	**(a)**	Define critical thickness of insulation. What are its applications?	**03**
	(b)	Plot the temperature distribution along the length of following heat exchangers:(i) parallel flow, (ii) counter flow, (iii) evaporator, and (iv) condenser.	**04**
	(c)	Explain with neat diagram, the arrangement and working of parallel flow heat exchanger.	**07**
Q.4	**(a)**	Describe the absolute pressure, atmospheric pressure and gauge pressure.	**03**
	(b)	Explain bourdon tube pressure gauge with a neat sketch.	**04**
	(c)	Explain the working of a simple aircooling system used for aircraft.	**07**
		OR	
Q.4	**(a)**	List out various properties of fluid. Define one of them.	**03**
	(b)	What is refrigerant? What are the desirable properties of refrigerant?	**04**
	(c)	Derive equation for discharge through orifice meter.	**07**
Q.5	**(a)**	Differentiate between impulse and reaction hydraulic turbines.	**03**
	(b)	'Aluminum utensils are not preferred for cooking purpose'. Justify.	**04**

	(c)	Explain with neat sketch the function of main component of centrifugal pump.	**07**

OR

Q.5	**(a)**	Differentiate between Francis and Kaplan turbines.	**03**
	(b)	Explain need of multistaging for reciprocating compressor	**04**
	(c)	Derive expression for LMTD for Counter flow heat Exchanger.	**07**

****