GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV(NEW) EXAMINATION – WINTER 2022

Subject Code:2140907   **Date:13-12-2022**
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)**	Explain any one method of improving thermal efficiency of Rankine cycle in detail.	**03**
	(b)	Why aircraft cooling is required? Explain it.	**04**
	(c)	State Bernoulli's equation and write assumptions and applications of Bernoulli's equation.	**07**
Q.2	**(a)**	Briefly explain Net Positive Suction Head (NPSH).	**03**
	(b)	Enlist the different methods of improving efficiency of Brayton cycle and explain any one in detail.	**04**
	(c)	Explain the following terms: (i) Viscosity (ii) Capillary tube (iii) Surface tension.	**07**
		OR	
	(c)	What is Euler's equation of motion? Derive Euler's momentum equation.	**07**
Q.3	**(a)**	Give comparison between open cycle and closed cycle gas turbines.	**03**
	(b)	Explain with schematic diagram open cycle gas turbine with regeneration.	**04**
	(c)	What is Manometer? Explain bourdon tube pressure gauge with a neat sketch.	**07**
		OR	
Q.3	**(a)**	What is the function of fins in heat transfer? State applications of fins.	**03**
	(b)	Explain draft tube and its importance.	**04**
	(c)	What is refrigerant? What are the desirable properties of refrigerant?	**07**
Q.4	**(a)**	Explain in brief about various modes of heat transfer.	**03**
	(b)	Explain the concept of overall heat transfer coefficient.	**04**
	(c)	Draw the neat and labeled sketch of vapour compression refrigeration cycle with T-S and P-h diagram.	**07**
		OR	
Q.4	**(a)**	Explain cavitation in detail.	**03**
	(b)	Write short note on classification of centrifugal pump.	**04**

(c) Classify Francis Turbine. With neat sketch explain working and construction of Francis Turbine. **07**

Q.5 (a) Give broad classification of notches and weirs. **03**

(b) Define (1) Surface Tension, (2) capillarity, (3) gauge pressure and (4) fluid. **04**

(c) Explain the working of a simple air cooling system used for aircraft. **07**

OR

Q.5 (a) Explain in brief about thermal contact resistance. **03**

(b) Sate and prove Hydrostatic law. **04**

(c) Derive expression for LMTD for parallel flow heat Exchanger. **07**

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