Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (New) EXAMINATION – WINTER 2015

Subject Code:2140907 **Date:19/12/2015**

Subject Name: APPLIED THERMAL AND HYDRAULIC ENGINEERING

Time: 2:30pm to 5:00pm **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)**	1) In what way knowledge of heat transfer is useful in your field of engineering? 2) Write the most general equation in Cartesian coordinate system and in the cylindrical coordinates system for heat transfer by conduction.	**03** **04**
	(b)	Explain in brief about various modes of heat transfer.	**07**
Q.2	**(a)**	With neat sketch explain Rankine cycle for thermal power plant. Plot the same cycle on T-s and h-s diagram also.	**07**
	(b)	Differentiate between open cycle and closed cycle gas turbine power plant. Plot schematic diagram, p-v and T-s diagram for open cycle gas turbine power plant.	**07**
		OR	
	(b)	With neat sketch explain simple vapor compression refrigeration (VCR) cycle. Plot the same cycle on T-s and p-h diagram also.	**07**
Q.3	**(a)**	Define the following; 1) density,2) viscosity, 3) surface tension, 4) capillarity, 5) gauge pressure, 6) absolute pressure, 7) fluid.	**07**
	(b)	State and prove Bernoulli's equation.	**07**
		OR	
Q.3	**(a)**	Enlist various devices used to measure pressure of the fluid. With neat sketch explain working and construction of Bourdon tube pressure gauge.	**07**
	(b)	Give broad classification of notches and weirs.	**07**
Q.4	**(a)**	Define the following; 1) cavitation, 2)NPSH, 3) specific speed, 4) priming of pump.	**08**
	(b)	Classify Pelton turbine. With neat sketch explain working and construction of Pelton Turbine.	**06**
		OR	
Q.4	**(a)**	What are the applications of centrifugal pump? Draw neat sketch of centrifugal pump and indicate main parts and various heads also for above pump.	**06**
	(b)	Classify Francis turbine. With neat sketch explain working and construction of Francis Turbine.	**08**
Q.5	**(a)**	Differentiate between the followings; 1) Hydraulic pump and hydraulic turbine, 2) Impulse turbine and reaction turbine, 3) Reciprocating pump and rotary pump.	**09**
	(b)	What are the applications of Pitot tube? With neat sketch, explain working of Pitot tube.	**05**
		OR	

Q.5 **(a)** Differentiate between the followings; **09**

1) Conduction and convection,
2) Rankine cycle and Brayton cycle,
3) Axial flow pump and centrifugal flow pump.

(b) With neat sketch, explain working of venturimeter for flow measurement. **05**

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