

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? **03**
2) Write the most general equation in Cartesian coordinate system and in the cylindrical coordinates system for heat transfer by conduction. **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; **07**
1) density, 2) viscosity, 3) surface tension, 4) capillarity, 5) gauge pressure, 6) absolute pressure, 7) fluid.
- (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; **08**
1) cavitation, 2) NPSH, 3) specific speed, 4) priming of pump.
- (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; **09**
1) Hydraulic pump and hydraulic turbine,
2) Impulse turbine and reaction turbine,
3) Reciprocating pump and rotary pump.
- (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**
