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**B 2275**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Fourth Semester

Mechanical Engineering

ME 237 — THERMAL ENGINEERING

Time : Three hours

Maximum : 100 marks

(Use of Steam table/charts and refrigeration table/charts is permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give any two examples for Boiler mounting and accessories.
2. Enumerate the function of feed check valve.
3. What is Diagram or Blading efficiency?
4. What are the advantages of velocity compounded impulse Turbine?
5. What is the function of idling jet in a carburettor?
6. What is the function of push rod and rocker arm?
7. What are the major losses in an IC Engine?
8. Differentiate between scavenging and supercharging.
9. What is a ton of refrigeration?
10. What is humidification and dehumidification?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the various criteria for selection of a boiler? (8)  
(ii) Explain the function of blow off cock and fusible plug. (8)

Or

- (b) Explain with a neat diagram, construction and working of any water tube boiler.

12. (a) (i) What are the different methods commonly used for governing steam turbines? (4)

(ii) The following data refer to a single stage impulse turbine : (12)

Isentropic nozzle enthalpy drop = 210 kJ/kg Nozzle efficiency = 90%  
 Nozzle angle = 25° Ratio of blade speed to whirl component of steam speed = 0.5 Blade velocity coefficient = 0.9. The velocity of steam entering the nozzle = 30 m/sec. Find (1) the blade angles at inlet and outlet if the steam enters the blades without shock and leaves the blades in an axial direction. (2) Blade efficiency and (3) power developed and (4) axial thrust if the steam flow rate is 10 kg/sec.

Or

(b) In a 50 percent reaction turbine stage running at 50 revolutions per second, the exit angles are 30° and the inlet angles are 50°. The mean diameter is 1 m. The steam flow rate is 10000 kg/min and the stage efficiency is 85%. Determine (i) the power output of the stage, (ii) The specific enthalpy drop in the stage and (iii) The percentage increase in the relative velocity of steam when it flows over the moving blades. (16)

13. (a) (i) Explain with neat sketch Air Cooling of Engines. (8)

(ii) Explain any one lubrication system adopted in multicylinder SI engines. (8)

Or

(b) (i) What is the purpose of cooling an I.C. Engine? (4)

(ii) What are the ill effects of improper cooling? (4)

(iii) What are the advantages and disadvantages of air-cooled system? (8)

14. (a) (i) What are the various stages of combustion in CI Engine? (6)

(ii) What are the variables affecting the 'Delay Period'? (10)

Or

(b) (i) Explain the methods of controlling Diesel knock. (6)

(ii) Explain the procedure to determine the Indicated Horse Power by means of Morse Test. (10)

15. (a) (i) Explain summer Air Conditioning with a neat layout. (10)
- (ii) Sketch various processes of summer Air Conditioning in a Psychometric chart. (6)

Or

- (b) Atmospheric air at 1.0132 bar has a DBT of 32°C and a WBT of 26°C. Compute.
- (i) The partial pressure of water vapour
- (ii) The specific humidity
- (iii) The relative humidity
- (iv) The degree of saturation
- (v) The density of air in the mixture
- (vi) The density of vapour in the mixture and
- (vii) The enthalpy of the mixture.
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