



G 1215

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION MAY 2015

Sixth Semester

Branch : Mechanical Engineering

ME 010 603—THERMAL SYSTEMS AND APPLICATIONS (ME)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. State the differences between boiler mountings and boiler accessories.
2. What is the function of a steam nozzle ?
3. Write the advantages of a gas turbine over a steam turbine.
4. What do you mean by sun tracking system ?
5. Draw the lay out of a diesel power plant.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. State the methods of increasing the thermal efficiency of a rankine cycle.
7. What do you mean by supersaturated flow in steam nozzles ?
8. Write the differences between axial and centrifugal compressors with figures.
9. Write in detail about solar collectors.
10. Explain spreader type stoker in coal combustion.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

- 11 (a) Explain a modern steam generator with a neat diagram.

Or

Turn over

- (b) A vessel having a capacity of 0.85 M^3 contains steam at 12 bar and 0.92 dry. Steam is blown off until the pressure drops to 6 bar. The valve is then closed and the vessel cooled until the pressure is 4 bar. Assuming during the blowing off period, enthalpy per kg of steam remains constant in the vessel, determine (i) the quantity of steam blown off (ii) quantity of steam in the vessel after cooling (iii) quality of steam in the vessel after cooling.
- 12 (a) Steam expands through a nozzle from 5 bar and dry saturated to a back pressure of 0.2 bar. Mass flow is 2 kg/sec. Calculate the exit and the throat areas under the following conditions :
- (i) Isentropic expansion with negligible velocity ; (ii) Isentropic expansion with initial velocity of 100 m/sec ; (iii) Friction loss at any pressure amounts to 10% of the total heat drop upto that pressure and initial velocity negligible.

Or

- (b) Derive the expression for maximum blade efficiency in a single stage impulse turbine.
- 13 (a) Draw the schematic diagram of a simple gas turbine cycle with reheat and explain briefly the working principle. Draw also the p-v and T-s diagrams of the cycle.

Or

- (b) Explain briefly about different types of combustion chambers of gas turbines.
- 14 (a) Describe solar thermal power generation.

Or

- (b) Explain the principle of conversion of solar energy into heat.
- 15 (a) Explain with the help of a detailed layout, operation of a steam power plant.

Or

- (b) Explain the following :
- (i) Coal burners ; (ii) cooling ponds and towers ; (iii) steam condensers.

(5 × 12 = 60 marks)

