Code: 9A03710

R09

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain briefly the sources of energy.
(b) How are chemical fuels classified? Explain any three.

2 (a) How are dust collectors classified?
(b) How can the capacity of a stream power plant be determined?

3 In constant volume Otto cycle, the pressure at the end of the compression is 15 times that at the start, the temperature of air at the beginning of the compression is 38℃ and maximum temperature attained in the cycle is 950℃, determine: (i) Compression ratio. (ii) Thermal efficiency of the cycle. (iii) Work done per kg of air. Take $\gamma = 1.4$.

4 (a) Compare the air fuel ratio in a gas turbine combustion chamber with the diesel engine combustion chamber.
(b) A gas turbine plant of 800 kW capacities takes the air at 1.01 bar and 15℃. The pressure ratio of the cycle is 12 and maximum temperature is limited to 1150℃. A regenerator of 75% effectiveness is added in the plant to increase the overall efficiency of the plant. The pressure drop in the combustion chamber is 0.15 bar as well as in the regenerator is also 0.15 bar. Assuming the isentropic efficiency of the compressor 85% and of the turbine 92%. Determine the plant thermal efficiency. Neglect the mass of the fuel.

5 Explain a high speed power plant and give its layout clearly.

6 (a) Give the classification of tidal power plant and explain any one.
(b) Describe the working of a solar power plant.

7 Give the functions and materials for the following:
(a) Reflector.
(b) Control rods.
(c) Biological shield.

8 (a) Name the elements that make the operating expenditure of a power plant.
(b) Enumerate various types of tariff and explain any two of them.

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