



Code: 13A03804

B.Tech IV Year II Semester (R13) Regular & Supplementary Examinations April 2018

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Mention various methods of pollution control.
 - Define cost.
 - State the significance for high pressure boiler.
 - List the properties of coal.
 - Mention the advantages of diesel power plant.
 - List the types of IC engines.
 - Mention the use of Hydrographs.
 - State the different types of pumped storage system used for hydro power plant.
 - List the types of solar collectors.
 - Define nuclear fission.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 The peak load on a thermal power plant is 75 MW. The loads having maximum demands of 35 MW, 20 MW, 15 MW and 18 MW are connected to the power plant. The capacity of the power plant is 90 MW and the annual load factor is 0.53. Calculate: (i) The average load on the power plant. (ii) The energy supplied per year. (iii) The demand factor. (iv) The diversity factor.

OR

- 3 Explain the following tariff:
- Straight meter rate.
 - Block meter rate.
 - Three - Part Tariff.

UNIT – II

- 4 In a steam power plant, operating on the ideal Rankine cycle, the steam enters the turbine at 5 MPa and 450°C and is condensed in the condenser at 15 kPa. Determine: (i) The thermal efficiency of the power plant (ii) The thermal efficiency if the boiler pressure is raised to 10 MPa while the turbine inlet temperature is kept constant at 450°C.

OR

- 5 The following results were obtained on full load during trial on a two stroke oil engine:
- Engine speed = 350 rpm, Net brake load = 600 N, mep = 2.75 bar, Oil consumption = 4.25 kg/h, Temperature of air in test room = 20°C, Air used per kg of oil = 31.5 kg, Temperature of exhaust gases = 390°C, Cylinder diameter = 220 mm, Stroke = 280 mm, Effective brake diameter = 1 meter, Calorific value of oil = 45000 kJ/kg, Proportion of hydrogen in fuel oil = 15%, Partial pressure of steam in exhaust gases = 0.04 bar, Mean specific heat of exhaust gases = 1 kJ/kgK, Specific heat of superheated steam = 2.1 kJ/kgK, Specific heat of water = 4.186 kJ/kgK. Determine: (i) Indicated power. (ii) Brake power. (iii) Mechanical efficiency. (iv) Draw the heat balance sheet for the test.

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UNIT – III

6 Explain the working principles of Combined cycle power plants.

OR

7 Explain the working principle of a closed cycle gas turbine power plant.

UNIT – IV

8 Explain in detail about following with neat sketch:

- (a) Intermediate hydro power stations.
- (b) Downstream hydro power station.

OR

9 Discuss the factors which should be considered while selecting a site for a hydroelectric plant.

UNIT – V

10 Discuss any two types of reactors with their advantages and disadvantages.

OR

11 Explain any one type of solar collectors and list their advantages and disadvantages.

