Code: 13A03804 **R13**

B.Tech IV Year II Semester (R13) Advanced Supplementary Examinations July 2018

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Mention the various types of loads.
(b) What is meant by depreciation of a power station?
(c) State the functions of super heater in boilers.
(d) Mention the use of fuel beds.
(e) State the factors that should be considered while selecting a site for a diesel power plant.
(f) List the advantages of combined cycle power plant.
(g) Mention the different types of flow measurement methods.
(h) State the advantages of hydro power plant.
(i) Define chain reaction.
(j) List the effects of photo voltaic cell.

PART – B

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

UNIT – I

2 It is proposed to supply a load with a maximum demand of 100 MW and a load factor of 0.4. Choice is to be made from nuclear, hydro and steam power plants. Calculate the overall cost per kWh in each scheme.

Cost	Nuclear power plant	Hydro power plant	Steam power plant
capital/kW installed	Rs. 600	Rs. 4320	Rs. 2160
Interest	10%	10%	12%
Depreciation	10%	8%	12%
Operating cost/kWh	12 paise	6 paise	18 paise
Transmission and distribution cost per kWh	0.24 paise	0.96 paise	0.24 paise

OR

3 In a power distribution system a certain feeder supplies three distribution transformers each one supplying a group of transformers whose connected loads are as follows.

Transformer 1	Transformer 2	Transformer 3
Store lighting and power	Residence lighting	General power service & commercial lighting
(i) 10 kW, 5 H.P	(i) 0.5 kW	(i) 10 H.P, 5 kW
(ii) 4 kW	(ii) 20 kW	(ii) 15 H.P

Assuming motor efficiency 70% and suitable demand factor = 2.2 and diversity factor = 2.3. Calculate the maximum feeder load.

UNIT – II

4 Explain the ash handling system in the power plant.

OR

5 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.

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UNIT – III

6 With a neat sketch, explain diesel power plant and state its advantages.

OR

7 The gas turbine has an overall pressure ratio of 5:1 and a maximum cycle temperature of 550°C. The turbine drives the compressor and an electric generator, the mechanical efficiency of the drive being 97%. The ambient temperature is 20°C and the isentropic efficiencies of the compressor and the turbine are 0.8 and 0.83 respectively. Calculate the power output in kilowatts for an air flow of 15 kg/s. Calculate also the thermal efficiency and the work ratio. Neglect the changes in kinetic energy and the loss of pressure in combustion chamber.

UNIT – IV

8 Explain pumped storage plant with a neat sketch and list its advantages.

OR

9 Explain about different types of spill ways with neat sketch.

UNIT – V

10 Explain about horizontal and vertical types of wind mills with sketch.

OR

11 Explain the Pressurized Water Reactor with neat sketch.

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