

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2944

Roll No.

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### B. Tech.

(SEM. VIII) THEORY EXAMINATION 2011-12

### POWER PLANT ENGINEERING

Time : 3 Hours

Total Marks : 100

Note :—Use of Steam Table and Moiller Diagram are allowed.

1. Answer any *two* :—

(10×2=20)

(a) Describe the major sources of energy (Renewable and Non-renewable).

(b) Define :

(i) Load factor,

(ii) Diversity factor,

(iii) Capacity factor, and

(iv) Demand factor

(v) The following data is given for a steam power plant :—

Maxm. demand = 30 MW,

Load factor = 40%,

Coal consumption = 0.86 kg/kWh,

Boiler efficiency = 85%,

Turbine efficiency = 90%,

Price of Coal = Rs. 55 per tonne.

Determine :

- (i) Thermal efficiency of the station
- (ii) Coal bill of the station for one year.

(c) Answer the following :—

- (i) Discuss the principle for economic load sharing among different units in a power plant.
- (ii) Discuss load duration curve and energy load curve. Also draw these curves for a plant having constant load throughout the year.

2. Answer any *four* of the following :— (5×4=20)

- (a) Draw the general layout of thermal power plant.
- (b) Discuss the advantages and disadvantages of pulverised fuel firing over stator firing system.
- (c) State the principal requirements of good ash handling plant.
- (d) Discuss the working of Fluidized bed combustion system with neat sketch.
- (e) Discuss the working of gland sealing system with neat sketch.
- (f) Why feed water treatment is necessary ? State different methods of feed water treatment and discuss any one of them.

3. Answer any *two* :— (10×2=20)

- (a) With the help of a neat diagram, explain and describe the complete diesel cycle power plant.
- (b) Explain the working principle of
  - (i) Cogeneration plant and
  - (ii) Combined cycle power plant.

- (c) Discuss the construction and working of gas turbine combustion chamber. Why too lean air-fuel ratio is used for combustion in gas turbine plants ?

4. Answer any *two* :— (10×2=20)

(a) Explain the working principle of :

- (i) Gas Cooled Reactor and
- (ii) FBR.

(b) Answer the following :—

- (i) List the points to be considered for the selection of site for hydroelectric power plant.
- (ii) Discuss the methods used for finding average rainfall data.

(c) Explain with diagram, the working principle of :

- (i) Geothermal power plants and
- (ii) Tidal power plants.

5. Answer any *two* :— (10×2=20)

(a) (i) With the help of neat diagram explain the principle of an alternator.

(ii) What are the two ways of connecting the windings of the three phase alternator ?

(b) Describe the various (i) Temperature measurement instruments and (ii) Flow measurement instruments.

(c) (i) Discuss the harmful effects of CO<sub>2</sub>, CO, compounds of sulphur and oxides of nitrogen.

(ii) Discuss the methods of control of emission of SO<sub>x</sub> from power plant.