



Printed Pages : 4

TME – 801

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

PAPER ID : 0480

Roll No.

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B. Tech.

(SEM. VIII) EXAMINATION, 2007-08

POWER PLANT ENGINEERING

Time : 3 Hours]

[Total Marks : 100

Note:

- (1) Attempt all questions.
- (2) All questions carry equal marks.
- (3) Use of steam table is allowed.
- (4) Be precise in your answer.

1 Attempt any **two** parts of the following : 10×2

(a) The percentage composition of a sample coal is C=90; H₂=3.5; O₂=3.0, N₂=1.0 and S=0.5; the remainder being ash. Estimate the minimum weight of air required for the combustion of 1 kg of this fuel, if 50% excess air is supplied. Also find the composition of the dry products of combustion.

(b) Define following terms:

- (i) Demand Factor
- (ii) Load Factor
- (iii) Diversity Factor
- (iv) Plant Capacity Factor

What is the significance of load curves? What is a load duration curve?



- (c) A power station has the installed capacity of 180 MW. Calculate the cost of generation from the data given below:

Capital cost = Rs.300 × 10⁶

Rate of interest and depreciation = 18%

Annual cost of fuel, salaries and taxation
= Rs.36 × 10⁶

Load Factor = 0.4

If the annual load factor is raised to 0.5,
calculate the saving in cost per kwh.

2 Attempt any **two** parts of the following : 10×2

- (a) What do you mean by 'supercritical boilers' and 'supercharged boilers'?

Explain with neat sketch the construction and working of Benson boiler.

- (b) Explain with the help of a neat diagram the arrangement of the Fluidised Bed Combustion System.

- (c) A prime mover uses 15000 kg. of steam per hour and develops 2450 kW. The steam is supplied at 30 bar and 350°C. The exhaust steam is condensed at 725 mm of Hg when atmospheric pressure is 755 mm Hg. The condensate temperature from the condenser is 31°C and the rise of temperature of circulating water is from 8°C to 18°C.

Determine :

- (i) The quality of steam entering the condenser.
(ii) The quantity of circulating cooling water and the ratio of cooling.



3 Attempt any **two** parts of the following: **10×2**

- (a) Explain the following lubrication system in a diesel engine :
 - (i) Wet pump lubrication system
 - (ii) Dry pump lubrication system
- (b) Explain working of a combined cycle power plant. Enlist the advantages of 'combined cycle'.
- (c) Describe with a neat sketch a closed cycle gas turbine. State advantages and disadvantages of gas turbine plants over thermal power plants.

4 Attempt any **two** parts of the following : **10×2**

- (a) Describe with the help of a neat sketch the construction and working of a pressurised water reactor (PWR). Compare a PWR with BWR (Boiling Water Reactor).
- (b) Explain the factors which should be considered while selecting a site for hydro-electric plant. Enumerate essential elements of a hydro-electric power plant.
- (c) Write short notes on:
 - (i) Geothermal plant
 - (ii) MHD generator.

5 Attempt any **two** parts of the following : **10×2**

- (a) Explain how the following is carried out;
 - (i) Transformer protection;
 - (ii) Bus protection
 - (iii) Protection of transmission lines.



- (b) What is a transducer? Explain briefly:
- (i) Electrical transducers
 - (ii) Electromagnetic transducers.
- (c) What is particulate emission ? How is it controlled?
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