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TME - 801

(Following Paper ID and	Roll No. t	o be	filled	in	your	Answer	Book)
PAPER ID: 0480	Roll No.						

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.

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?

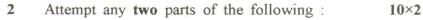
(c) A power station has the installed capacity of 180 MW. Calculate the cost of generation from the data given below:

Capital cost = $Rs.300 \times 10^6$

Rate of interest and depreciation = 18%Annual cost of fuel, salaries and taxation = $Rs 36 \times 10^6$

Load Factor = 0.4

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



- (a) What do you mean by 'supercritical boilers' and 'supercharged boilers'?Explain with neat sketch the construction and
 - 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.



- Attempt any two parts of the following: 10×2
 - (a) Explain the following lubrication system in a diesel engine:
 - (i) Wet pump lubrication system

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

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