Printed Pages : 4   TME – 801

(Following Paper ID and Roll No. to 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.*

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

(a)   The percentage composition of a sample coal is
      C=90; H_2=3.5; O_2=3.0, N_2=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 × 10^6

     Rate of interest and depreciation = 18%

     Annual cost of fuel, salaries and taxation
     = Rs.36 × 10^6

     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 350ºC. The exhaust steam
         is condensed at 725 mm of Hg when
         atmospheric pressure is 755 mm Hg. The
         condensate temperature from the condenser is
         31ºC and the rise of temperature of circulating
         water is from 8ºC to 18ºC.

         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)   Explalin 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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