Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (EE) PT   (Sem.–5)

ELECTRIC GENERATION & ECONOMICS
Subject Code : BTEE-502
M.Code : 70555

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Answer briefly :

1. What are peak load plants?

2. What do you mean by a load duration curve?

3. Define utilization factor.

4. Discuss the effect of load factor on cost of energy.

5. Define power factor.

6. What are the objectives of tariff making?

7. Discuss the methods of loading turbo generators.

8. What do you mean by hydrothermal scheduling?

9. Write a short note on the impact of power plant pollution of aquatic life.

10. Discuss the scope of cogeneration in India.

SECTION-B

11. The yearly load duration of a power plant is a straight line. The maximum load is 30 MW and the minimum load is 20 MW. The capacity of the plant is 35 MW. Find (a) plant capacity factor (b) load factor

12. A region has a maximum demand of 500 MW at a load factor of 50%. The load duration curve can be assumed to be a triangle. The utility has to meet this load by setting up a generating system which is partly hydro and partly thermal. The costs are as under:

    Hydro plant: Rs 7200 per kW per annum + operating expenses Rs 0.36 per kWh.

    Thermal plant Rs. 3600 per kW per annum + operating expenses Rs 1.56 per kWh.

    Determine the capacity of hydro plant, capacity of thermal plant, energy generated annually by each and overall generation cost per kWh.

13. A steam plant having an installed capacity of 200 MW is to be set up. The investment on the plant is Rs. 12,000 per kW of installed capacity. The useful life of the plant may be taken as 25 years and salvage value of plant is 25% of initial cost. Find the annual depreciation reserve by :

    a) Straight line method.

    b) Sinking fund method if interest rate is 8 %.

14. What considerations govern the selection of sites for steam plants? How does the plant location affect the reliability of electric supply?

15. The incremental costs in Rs. Per MW-hour of two 250 MW units are as under:

$$\frac{dC_1}{dP_1} = 0.3P_1 + 40$$

$$\frac{dC_2}{dP_2} = 0.2P_2 + 40$$

    The minimum load of each is 30 MW. Find the load division between the two units as the total load varies from 40 MW to 500 MW.

SECTION-C

16. A system consists of two plants (i.e. Plant 1 and Plant 2) connected by a transmission line. The load is at plant 2. The transmission line loss calculations reveal that a transfer of 100 MW from plant 1 to plant 2 means a loss of 15 MW. Find the required generation at each plant for λ - 60. Assume that the incremental costs of the two plants are given as:

$$\frac{dC_1}{dP_1} = 0.2P_1 + 22\,Rs\,/\,MWh$$

$$\frac{dC_2}{dP_2} = 0.15P_2 + 30\,Rs\,/\,MWh$$

17. a) What are the different types of tariffs? Explain them in detail.

    b) Discuss the various methods of power factor improvement.

18. Explain briefly :

    a) Topping and Bottoming Cycles

    b) Hydro-thermal co-ordination

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.