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B.Tech.(EE)(2011 Onwards)/(EE)PT

B.Tech.(Electrical & Electronics)(2011 & 2012 Batch) (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

1) Answer briefly :

- What is Mass curve?
- What is the significance of Lagrange's multiplier in economic operation of steam plants?
- What is a reservoir?
- Draw the single line diagram of hydro power station.
- Differentiate between : Power and Power factor.
- List the objectives of tariff making.
- What is the need of load forecasting?
- Differentiate between: Base load and Peak load plants.
- Define 'Run-off'. How is it measured?
- What are co-ordination equations?

SECTION-B

- 2) Hydro-electric plant costs Rs. 300 per kW of installed capacity. The total annual charges consist of 5% interest; depreciation at 2%; operation and maintenance at 2%; and insurance, rent, etc. 1.5%. Determine a suitable two-part tariff if the losses in transmission and distribution are 12.5% and diversity of load is 1.25. Assume that maximum demand on the station is 80% of the capacity annual load factor is 40%. What is the overall cost of generation per kWh?
- 3) What are the factors that affect the site selection for the steam plants?
- 4) Explain the heat rate curve and incremental production cost curve with reference to Steam units.
- 5) A load having maximum peak of 150MW can be supplied by either a hydro electric plant or a steam power plant. The costs are as follows :
Capital cost of steam plant = Rs. 700 per kW installed
Capital cost of hydro-electric plant = Rs. 1600 per kW installed
Operating cost of steam plant = Rs. 0.03 per kWh
Operating cost of hydro-electric plant = Rs. 0.006 per kWh
Interest on capital costs 8%. Calculate the minimum load factor above which the hydro-electric plant will be more economical.
- 6) What are the commonly used types of tariffs? Discuss these clearly specifying the applicability or suitability of each tariff.

SECTION-C

- 7) a) It is desired to correct the power factor to 0.96 by means of static capacitors connected across each phase of a 3-phase, 440V, 50Hz motor installation having a maximum load of 50kVA at a power factor of 0.78. What must be the capacity of each delta connected condenser?
b) What are the environmental problems associated with nuclear power plants?
- 8) a) Explain in detail, the thermal dispatch problem with network losses. Also, discuss the applicability of lambda iteration method to solve this problem. What is the significance of penalty factor?
b) Discuss the Topping and Bottoming cycles related to cogeneration.
- 9) An electric supply undertaking has a maximum demand of 85 MW with an annual load factor of 52%. The capital cost of distribution is Rs. 1800000 with a diversity factor of 1.4. The capital cost of transmission is Rs. 2000000 with a diversity factor of 1.28. The efficiency of transmission system is 88% and that of distribution is 90%. The generating cost inclusive of capital cost is Rs. 78 per kW of maximum demand plus 2.5 Paise per kWh. Calculate the annual cost per kW of maximum demand and the cost per kWh supplied (i) at the substation, (ii) at the consumer's premises.

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.