

**Power Station Practice**

P. Pages : 2

Time : Three Hours



TKN/KS/16/7477

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data wherever necessary.
  10. Diagrams and chemical equations should be given wherever necessary.
  11. Illustrate your answers wherever necessary with the help of neat sketches.
  12. Use of non programmable calculator is permitted.
  13. Use graph paper if required.

1. a) Explain base load plants and peak load plants. 4
- b) A proposed generating station is expected to have a daily load cycle as under. 10
- | Time in hours | Load in KW |
|---------------|------------|
| 11pm-6am      | 2000       |
| 6am-8am       | 3500       |
| 8am-12noon    | 8000       |
| 12noon-1pm    | 3000       |
| 1pm-5pm       | 7500       |
| 5pm-7pm       | 8500       |
| 7pm-9pm       | 10,000     |
| 9pm-11pm      | 4500       |
- Generating station has a maximum demand of 10MW.
- |                                     |                      |
|-------------------------------------|----------------------|
| i) Draw daily load curve            | ii) Find load factor |
| iii) Choose size and number of sets | iv) Reserve Capacity |
| v) Plant Factor                     | vi) Plant use factor |
| vii) Prepare operation schedule.    |                      |
- OR**
2. a) Even if maximum demand and load factor of two systems are same, their load duration curve may not be same. Justify. 4
- b) Find cost of generation per kwh from the following data. 10
- Capacity of the plant = 110MW.  
 Capital Cost = Rs. 8000 / KW installed Interest & Depreciation = 10% on capital  
 fuel consumption = 0.75 kg/kwhr. Fuel cost = Rs.5000/tonne.  
 Salaries & maintenance = 20% of annual fuel cost.  
 Maximum Demand = 100MW. Load Factor = 60%
3. a) Explain the ash handling plant in thermal power stations. What is its importance. 6

- b) A steam station is installed at a cost of Rs.  $2 \times 10^8$ . Assuming a salvage value of 15%, a useful life of 25yrs. and interest rate is 8%. Find the annual depreciation result by sinking fund method and straight line method. 7
- OR**
4. a) Explain the working of two auxiliaries used for increasing the overall efficiency of thermal power station. 6
- b) What is the need of Raw Water Cooling System in Thermal Power Station ? Explain in brief close loop and open loop cooling system. 7
5. a) A hydro electric power station has a catchment area of 500sq.km. The average annual rainfall in the area is 125cm. The average available head in the reservoir is 300m. Assuming plant efficiency as 85%, and average run off is 70%. Calculate the available power. 7
- b) Explain the working of pumped storage hydroelectric plant with the help of neat diagram. Explain its utility. 6
- OR**
6. a) Explain three different ways of classification of hydroelectric plants. 6
- b) What is water hammer ? How is it reduced in hydropower plants ? 7
7. a) Explain the following terms. 6
- i) Half life and radioactive decay rate      ii) Binding Energy and Mass defect.
- b) Explain with a neat and labeled diagram, the working of nuclear reactor and show different components. 7
- OR**
8. a) Explain pressurized water Reactor (PWR), with neat diagram. 7
- b) Describe the methods of disposing solid, liquid and gaseous waste in a Nuclear Power Plant. 6
9. a) Explain static excitation system for a modern power plant alternator. 7
- b) Explain the working of AVR (Automatic Voltage Regulator) in detail with suitable diagram. 7
- OR**
10. a) Starting with a general equation of power tariff, describes its various types. Discuss how can we devise a tariff which will discourage the consumers from maintaining poor power factor ? 7
- b) A industrial consumer having a maximum demand of 100KW, maintains a load factor of 60%. The tariff rates are: Rs. 75per KVA of maximum demand per annum plus 15 paise per kwh of energy consumed. 7
- If the average p.f. is 0.8 lag, calculate the total energy consumed per annum and the annual electricity bill.
11. a) What do you mean by co-generation Describe in brief about rejected heat utilisation system. 6
- b) What are co-generation technologies ? Explain any one of them in brief. 7
- OR**
12. a) What are advantages and constraints of captive power generation ? 6
- b) Describe different types of captive power plants. 7

\*\*\*\*\*