

Power Station Practice

P. Pages : 2

NRJ/KW/17/4528

Time : Three Hours



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 whenever necessary.

1. a) What are the different sources of Energy. Explain in detail. 7
- b) The annual working cost of a power station is represented by the formula $Rs (a+bkw + ckwh)$ where the various terms have their usual meaning. Determine the values of a, b & c for a 60 Mw station operating at annual load factor of 50% from the following data. 7
- i) Capital cost of building and equipment is $Rs 5 \times 10^6$
 - ii) The annual cost of seed, oil, taxation & wages of operating staff is Rs. 9,00,000.
 - iii) The interest & depreciation on building & equipment are 10% per annum.
 - iv) Annual cost of Organization and interest on cost of site etc is Rs 5,00,000

OR

2. a) Explain base load & peak load plant. 4
- b) Give advantages of interconnected grid system. 4
- c) A generating station has the following daily load cycle. 6
- | Time (hrs) | 0-6 | 6-10 | 10-12 | 12-16 | 16-20 | 20-24 |
|------------|-----|------|-------|-------|-------|-------|
| Load (Mw) | 40 | 50 | 60 | 50 | 70 | 40 |
- Draw the load Curve & find
- i) Maximum demand ii) Units generated per day
 - iii) Average Load iv) Load factor

3. a) What parameters Should be considered while site solution for thermal power plant. 6
- b) Explain coal handling plant in detail. 7

OR

4. Write short notes on. 4
- i) Economiser. 4
 - ii) Air preheater. 4
 - iii) Electrostatic precipitator. 5
5. a) Explain three different ways of classification of hydroelectric power plants. 7

- b) Define and explain the following terms referred to hydropower plants. 7
 i) Run off. ii) Hydrograph. iii) Flow duration curve.
- OR**
6. a) Plot hydro-graph & find the average inflow & the power that can be developed at an effective head of 150m and a turbine – generator efficiency of 0.85. Find storage capacity of reservoir based on data given & neglect losses. 6
 The average rates of inflow during 12 month for a river are
 Jan 1000 Cu-m/Sec July 2400 Cu-m/sec
 Feb 800 Cu-m/sec Aug 2400 Cu-m/sec
 March 600 Cu-m/sec Sept. 1000 Cu-m/sec
 April 400 Cu-m/sec Oct. 400 Cu-m/sec
 May 400 Cu-m/sec Nov. 400 Cu-m/sec
 June 1200 Cu-m/sec Dec. 1000 Cu-m/sec
- b) Write short note on. 4
 i) Surge tank. 4
 ii) Spillway.
7. a) Explain the process of fission reaction in reactor. 3
 b) What is binding energy and mass defect. 4
 c) Explain with neat sketch "Boiling Water Reactor" (BWR) 6
- OR**
8. a) Explain the purpose of the following items with reference to nuclear reactor. 7
 i) Fuel ii) Moderator iii) Coolant
 b) Explain with advantages and disadvantages of Heavy water cooled Nuclear reactor (CANDU) 6
9. a) Explain Exciter instability. 6
 b) Explain ARV in detail with suitable diagram. 7
- OR**
10. a) Maximum demand of a consumer is 30A at 220 V and his total energy consumption is 9750 kWh. If the energy is charge at the rate of Rs. 1 kWh for first 500 hrs, plus Rs. 1.25 per kWh for all additional kWh. Estimate his annual bill & equivalent flat rate. 6
 b) State types of tariff. Explain any two of them in detail. 7
11. a) What are the prospects of change in energy supply in India? 6
 b) What are different cogeneration technologies? 7
- OR**
12. a) Find the generation cost of a captive power plant installed in a sugar mill from the following data: size of the plant 25 Mw, total capital cost Rs. 800 million, interest' rate 10% life of plant 20 years. The plant will use bagasse as fuel which is free of cost. Annual operation and maintenance costs 5% of capital cost, load factor 60%, subsidy 30%. 7
 b) What are the constraints of captive power generation. 6
