

Total No. of Questions :10]

[Total No. of Printed Pages : 4

Roll No

ME - 602
B.E. VI Semester
Examination, December 2012
Power Plant Engineering

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks :35

Note: Attempt questions as per the given internal choices. All parts of a question should be attempted in continuation.

Unit-I

- I. (a) Discuss in brief various types of solar thermal collectors and give their applications. 10
- (b) Explain the different types of geothermal sources. 10

OR

- II. (a) How the biomass can be utilized for power production? Write short note on biogas plant. 10
- (b) Explain the working of open cycle MHD generator. 10

Unit-II

- III. (a) Name the various methods of ash handling. Describe the pneumatic system of ash handling. 10
- (b) Discuss the factors considered for the site selection of the thermal power plant. 10

[2]

OR

- IV (a) Discuss the pulverized coal firing system. Enlist the various feeding systems used to fire pulverized coal. 10
- (b) Discuss the need of feed water treatment in thermal power plant. Describe few methods used for this. 10

Unit-III

- V (a) Explain the difference between chemical and nuclear reactions. 5
- (b) With a neat sketch, explain the working of CANDU reactor and function of each component. What is calendria? 15

OR

- VI. (a) Discuss advantages and disadvantages of nuclear power plant. Also compare nuclear power plant with thermal and hydroelectric power plant. 10
- (b) Describe the cladding in nuclear reactors. Write in brief the properties of three cladding materials. 10

Unit-IV

- VII (a) Discuss the advantages of hydroelectric plant. Also discuss the advantages of combined operation of hydroelectric and thermal power plants. 10
- (b) How are dams classified? Briefly describe few important types of dams. 10

OR

- VIII(a) The runoff data in millions of cubic meter per month of a river at a particular site for each successive month is tabulated as given below: 15

1.5	2.1	3	8.4	13	13	7.7	2.9	2.5	2.3	1.9	1.7
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Determine the minimum capacity of a reservoir required to allow the above volume of water to be drawn off at a uniform rate assuming that there is no loss of water over the spillway.

- (b) When and why are surge tanks and forebays provided? 5

15

Unit-V

11

- IX (a) Define diversity factor and load factor. Prove that the load factor of a power system is improved by an increase in diversity of load. 7

- (b) The nature of load required by the consumers for 24 hours is tabulated as given below:

Time period	6-10	10-18	18-20	20-24	0-6
Load (MW)	120	160	100	40	20

If the above load is taken by combined thermal and pumped storage power plant, then find the input to the thermal power plant. Take the thermal efficiency of thermal power plant at base load equal to 35%. In pump storage plant the efficiency of the pump is 80% and water turbine is 88%.

13

OR

- X. (a) A load having maximum demand of 150 MW and a load factor of 60 % may be supplied by the following schemes:
(a) A thermal power plant capable of supplying whole load

(b) A thermal power plant in combination with a pumped storage power plant capable of supplying 150×10^6 kWh per annum with a maximum output of 60 MW.

Calculate the cost of energy per unit in each of two cases and recommend the suitable scheme using following data:

Capital cost of thermal power plant = Rs. 7000 per kW

Capital cost of pumped storage power plant = Rs. 4000 per kW

Operating cost of thermal power plant = 70 paise per kWh

Operating cost of pumped storage power plant = 15 paise per kWh

Interest and depreciation for thermal power = 15% plant

Interest and depreciation for pumped storage = 12% power plant

Assume that no spare capacity is used. 15

(b) What are the principal factors involved in fixing of a tariff? 5
