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**5E3126****5E3126****B.Tech. Vth Semester (Main/Back) Examination, Dec. 2010/Jan. 2011****Electrical Engineering****5EE4 Generation of Electrical Power****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

*Attempt overall Five questions selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

**Unit - I**

1. a) What are the advantages of nuclear generation? What points are considered in the site selection for nuclear plants? (8)
- b) Discuss in brief the reasons of present power crisis in India. How the conditions can be ignored? (8)

**OR**

Draw the schematic diagram of a modern steam power station and explain its operation with its important components. (16)

**Unit - II**

2. a) Explain the conversion of solar energy into electric energy in a solar power plant. (8)
- b) How can geothermal energy utilized for electricity generation? (8)

**OR**

- a) Discuss briefly, renewable and non - renewable energy sources. (8)
- b) Explain the impact of thermal and hydro power station on environment. (8)

**Unit - III**

- a) A generating station has a connected load of 23 MW and a maximum demand of 20 MW, the units generated being  $61.5 \times 10^6$  per annum. (8)

Calculate :

- i) Demand factor.
  - ii) Average demand.
  - iii) Load factor.
- b) Define the following terms for a power station : (8)
- i) Annual plant capacity factor
  - ii) Diversity factor
  - iii) Utilization factor
  - iv) Load factor.

OR

- a) Compare the advantages and disadvantages of using synchronous condenser and a static capacitor for power factor improvement. (8)
- b) What are the disadvantages of low power factor? Why do some agencies put a penalty for low power factor? (8)

Unit - IV

- a) Explain the concept of "Co-generation". (8)
- b) What is the effect of load factor and load diversity factor on power system economics? Describe fixed and operating cost of hydro-electric power system. (8)

OR

- a) Calculate the most economical power factor when KW demand is constant. (8)
- b) Determine the generation cost per unit of energy from the following plant data: (8)

Installed capacity = 120 MW

Capital cost of plant = Rs. 10000 per KW

Interest and depreciation = 15%

Fuel consumption = 0.64 kg/KWh.

Fuel cost = Rs. 500 per 1000 kg

Salaries, wages, repairs and other operating costs per annum  
Rs.10,000,000/-

Peak load = 100 MW ;

Load factor = 60%.

## Unit - V

5. a) Give a comprehensive comparison of thermal, hydro and nuclear power sources. (8)
- b) What are the objectives of tariffs? What is the general form of tariff? Describe the straight meter rate and block meter rate tariffs. (8)

OR

- a) The monthly reading of a Consumer's meter are as follows :-

Max. demand = 50 KW

Energy consumed = 36000 KWh

Reactive energy = 23400 KVAR

If the tariff is Rs. 80 per KW of max. demand plus 8 paise per unit plus 0.5 paise per unit for each 1% of power factor below 86%, calculate the monthly bill of the consumer. (8)

- b) Discuss various types of reserve and size of plants. (8)
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