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Fourth Semester B.E. Degree Examination, Feb./Mar. 2022 Power Generation and Economics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain: i) Base load plants ii) Peak load plants. (06 Marks)
- b. A hydro electric power station operates under a mean head of 50 metres. The reservoir employed has a catchment area of 500km². The average rainfall in this area is 150cm per annum. Determine the capacity of the station for which it should be designed. Assume that 25% of the rainfall is lost due to evaporation, 7.5% of the head is lost in penstock, turbine efficiency as 85% alternator efficiency as 95% and load factor as 60%. (06 Marks)
- c. How do you choose the size and number of generating units? (08 Marks)

OR

- 2 a. Explain briefly the operation of pelt on wheel turbine. (06 Marks)
- b. Describe with a neat sketch, the principle of operation of a pumped storage power plant. (08 Marks)
- c. Discuss briefly the advantages of Hydro-electric power plants. (06 Marks)

Module-2

- 3 a. What is meant by Pulverised fuel firing? What are the advantages of pulverized fuel firing? (06 Marks)
- b. Explain the importance of Ash handling in a steam power plant. Explain any one type of ash handling system. (08 Marks)
- c. With a neat sketch, explain balanced draught system. (06 Marks)

OR

- 4 a. Discuss briefly the merits and demerits of diesel electric power plants. (06 Marks)
- b. With a schematic arrangement, discuss the elements of simple gas turbine power plant. (10 Marks)
- c. What are factors to be considered while selecting a site for diesel electric power plant? (04 Marks)

Module-3

- 5 a. Draw a schematic arrangement of a nuclear power plant. Explain briefly. (08 Marks)
- b. Write a brief note on Nuclear waste disposal. (06 Marks)
- c. Discuss the merits of nuclear power plants. (06 Marks)

OR

- 6 a. With a neat sketch, explain the working of a pressurized water reactor. (10 Marks)
- b. Explain nuclear chain reaction. (06 Marks)
- c. Explain briefly the shielding that is adopted in a nuclear power plant. (04 Marks)

Module-4

- 7 a. With a neat sketch, explain main and transfer bus arrangement. (08 Marks)
b. Briefly explain the salient features of gas insulated substation. (08 Marks)
c. Explain briefly the operation of High Voltage Disconnect Switches (Isolators). (04 Marks)

OR

- 8 a. Write short notes on:
i) Lightning arrestors (08 Marks)
ii) Current transformers
b. Briefly explain:
i) Resistance grounding (08 Marks)
ii) Reactance grounding. (04 Marks)
c. What are the advantages of gas insulated substations?

Module-5

- 9 a. Explain sinking fund method used for the determination of annual depreciation charges. (08 Marks)
b. Explain the factors affecting tariff. (06 Marks)
c. What are the causes of low power factor? (06 Marks)

OR

- 10 a. Explain the following terms:
i) Demand factor (06 Marks)
ii) Load factor (08 Marks)
iii) Diversity factor
b. Explain the various types of consumers.
c. A single phase motor connected to a 240V, 50Hz supply takes a current of 20Amperes at a power factor of 0.75 lagging. A capacitor is shunted across the motor terminals to improve the power factor to 0.9. Determine the capacitance of the capacitor to be used. (06 Marks)
