

CBCS SCHEME

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18EE42

Fourth Semester B.E. Degree Examination, Jan./Feb. 2023 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. Discuss the following in the hydroelectric plant
i) Hydrograph
ii) Load duration curve
iii) Mass curve. (06 Marks)
- b. Explain with neat block diagram Hydropower Generation (General Arrangement). (06 Marks)
- c. Observe the average weekly discharge (Q) measured at a site is given below :

Week	1	2	3	4	5	6	7	8	9	10
$\theta(\text{m}^3/\text{sec})$	500	500	350	200	300	800	1100	900	400	200

- i) Calculate the average discharge available
ii) Plot the hydrograph
iii) Plot flow-duration curve. (08 Marks)

OR

- 2 a. Explain the factors to be considered for the selection of site for a hydroelectric power plant. (06 Marks)
- b. Describe the following with respect to hydroelectric power plant.
i) Dam ii) Penstock iii) Surge tank. (06 Marks)
- c. Sketch and explain with schematic diagram :
i) Low head hydro power plant
ii) Medium head power plant
iii) High head power plant. (08 Marks)

Module-2

- 3 a. Describe with neat sketch the working of the steam power plant. (06 Marks)
- b. Explain the factors to be considered for the site selection for steam power plant. (06 Marks)
- c. Describe with a neat diagram the working of open cycle Gas turbine. (08 Marks)

OR

- 4 a. Explain with block diagram the process of fuel handling in a thermal power plant. (06 Marks)
- b. Explain with neat sketch the components of diesel power plant. (06 Marks)
- c. Discuss the merits, demerits and application of diesel power plant. (08 Marks)

Module-3

- 5 a. Discuss the schematic arrangement of nuclear power plant and mention its disadvantages. (06 Marks)
- b. Describe the factors to be considered for selection of site for nuclear power plant. (06 Marks)
- c. Discuss the pressurized water reactor and mention its advantages and disadvantages. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 6 a. Describe the factors to be considered for economics of nuclear power plant. (06 Marks)
b. With a schematic diagram, explain about the Heavy Water Reactor. (08 Marks)
c. List the advantages and disadvantages of nuclear power plant. (06 Marks)

Module-4

- 7 a. Discuss the various equipments used in the electric substation. (06 Marks)
b. Discuss the factors to be considered for site selection of a substation. (06 Marks)
c. Explain the advantages and disadvantages of gas insulated substation. (08 Marks)

OR

- 8 a. Describe the different types of Bus bar arrangement. Sketch the double bus bar arrangement. (08 Marks)
b. Discuss the interconnected power system and mention in advantages and disadvantages. (06 Marks)
c. Explain the importance of Gas insulated substation and mention in application. (06 Marks)

Module-5

- 9 a. Define the term Tariff and explain its objectives and requirements. (06 Marks)
b. Derive an expression for most-economical power factor when KW demand is kept constant. (08 Marks)
c. A load of 500KW at 0.8 power factor logging is taken by industrial concern. The tariff is Rs. 400 per KVA and maximum demand per year plus one rupee per kwh. The cost of installation of capacitor banks is Rs. 600 per year and the interest and depreciation is 11% . Find :
i) The most – economical power factor
ii) Rating of capacitor bank to improve the power factor. (06 Marks)

OR

- 10 a. Define the term power factor. List the causes of low power factor. (06 Marks)
b. Derive an expression for most economical power factor when KVA demand is kept constant. (06 Marks)
c. The equipment in an power station cost Rs. 15,60,000 and has salvage value of 60,000 at the end of 25 years. Determine the depreciated value of the equipment at the end of 20years on the following methods.
i) Straight line method
ii) Diminishing value method. (08 Marks)
