[Total No. of Questions - 9] [Total No. of Printed Pages - 4]
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B. Tech 5th Semester Examination

Electrical Power Generation (O.S.)

EE-5001

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Question Paper consists of five sections A, B, C, D & E. Section E is compulsory. Attempt five questions in all selecting one question from each of the sections A, B, *C* & D and all the subparts of the question in section E. Use of non-programmable calculator is allowed.

SECTION - A

1. (a) Define the term diversity factor and justify that the load factor of a supply system is improved by an increase in diversity factor of load.

   (b) Find maximum demand, daily energy consumption and load factor of a power supply system having following data:

Sr. No.	Type of Load	Max. Demand	Load factor	Diversity of group
i.	Residential	1000 KW	20%	1.2
ii.	Commercial	2000 KW	25%	1.1
iii.	Industrial	10000 KW	80%	1.25

Assume overall system diversity factor as 1.3. **(6+14=20)**

2. (a) What do you understand by the terms firm power, hot & cold reserves, spinning reserves in case of power system operation? Explain.

(b) A consumer in a residential colony has a connected load of 10 lamps each of 100W at his premises and the power demand throughout the day is varying as per following table. Plot the load curve and find out energy consumption during 24 hours as well as the average load, load factor and demand factor.

Midnight to 6 A.M.	200 W
6 A.M. to 8 A.M	100 W
8 A.M. to 6 P.M.	No load
6 P.M. to 8 P.M.	600 W
8 P.M. to 10 P.M.	1000 W
10 P.M. to midnight	300 W

(6+14=20)

SECTION - B

3. (a) Give the detailed description of feed water and steam flow circuit for a boiler turbine unit in a steam power plant.

(b) Explain the role of surge tank, forebay, penstock, spillway and trash rack in case of a storage reservoir type power plant. **(10+10=20)**

4. (a) Explain the operation of different components of a storage reservoir hydroelectric plant.

(b) What are the main components of a nuclear power plants? Explain in detail. **(10+10=20)**

SECTION - C

5. (a) Discuss ash handling mechanism in a thermal plant by presenting a schematic view of whole process.

   (b) What are the site facilities available for protection of operating personnel in case of a nuclear power plant? Explain in detail. **(10+10=20)**

6. (a) What is the role of condensers in thermal and nuclear plants? Discuss in detail.

   (b) What is the role of station batteries in power plants? Describe the basic maintenance required for such batteries. **(10+10=20)**

SECTION - D

7. (a) Describe in detail mechanism of load sharing and transfer of load between alternators in case of interconnected stations.

   (b) What do you understand by load dispatch? For satisfactory centralized operation, what are the facilities required at load dispatcher end? Explain. **(10+10=20)**

8. (a) What is the effect of transmission loss on optimal scheduling of power plants? Explain.

   (b) Derive the conditions for optimum economic dispatch neglecting transmission losses. **(10+10=20)**

SECTION - E

9. (a) What are the advantages of interconnecting two or more generating stations?

   (b) Define the terms average load and demand factor in reference to the electrical systems.

[P.T.O.]

(c) Explain water hammer phenomenon in hydrostations.

(d) What are the causes of low power factor in a power network? Explain.

(e) What is the impact of load factor on the cost of generation in a power system?

(f) List the auxiliary equipments required in case of diesel power plant.

(g) What are the advantages of nuclear power generation over other form of generations?

(h) What are the loss coefficients associated with transmission of power?

(i) Give classification of turbines on the basis of water head available at a proposed site for hydo-station.

(j) Define terms heat rate and incremental cost in relation to power plants. **(10×2=20)**