

2002 SCHEME

EE51



Fifth Semester B.E. Degree Examination, Dec.08 / Jan.09

Electrical Power Generation

Time: 3 hrs.

Max. Marks:100

Note : Answer any FIVE full questions.

- a. Draw a neat schematic diagram of a hydroelectric plant and explain the functions of various components. (08 Marks)
 - b. Discuss how hydroelectric plants are classified. (06 Marks)
 - c. Explain the phenomenon of water hammer in hydroelectric power station. State the procedure to overcome this problem. (06 Marks)
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- a. Describe with the aid of neat diagram how power is generated in a thermal power station. (08 Marks)
 - b. Describe how coal is handled starting from delivery of coal to final combustion stage. (06 Marks)
 - c. Write short notes on: i) Air pre-heater ii) Super heater. (06 Marks)
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- a. Explain the factors to be considered for selection of site of a Nuclear power station. (06 Marks)
 - b. Classify the nuclear reactors. Briefly explain the boiling water reactor. (10 Marks)
 - c. What are the advantages of nuclear power station? (04 Marks)
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- a. What are the advantages and disadvantages of diesel electric station? (06 Marks)
 - b. Explain working of gas turbine plant with neat diagram. (06 Marks)
 - c. Describe the methods to improve the thermal efficiency of a gas turbine plant. (08 Marks)
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- a. Define the terms: i) Diversity factor. ii) Plant use factor. iii) Load factor. (06 Marks)
 - b. Find the maximum demand, daily energy consumption, load factor of supply system having following loads:

Type of load	Maximum demand (kW)	Load factor (%)	Diversity factor of group
Residential load	1000	20	1.2
Commercial load	2000	25	1.1
Industrial load	10000	80	1.25

- Assume an overall diversity is 1.3. What are the connected loads under each category if the demand factor for residential, commercial and industrial loads are 80, 90 and 100 respectively. (08 Marks)
- c. What are the disadvantages and causes of low power factor? (06 Marks)
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- a. Derive the condition under which the installation of power factor improvement plant for increasing kW capacity of generating station is preferable to installing additional generating equipment. (08 Marks)
 - b. A power plant is working at its maximum KVA capacity with lagging power factor of 0.7. It is now required to increase its kW capacity to meet the demand of additional load. This is done:
 - i) By increasing the power factor to 0.85 lagging by pf correction equipment.
 - ii) By installing additional generation plant costing Rs.800/KVA.
 What is the maximum cost/KVAR of pf correction equipment that make its use more economical than the additional plant? (08 Marks)
 - c. List the different types of Tariff used in power system. (04 Marks)



- 7 a. What are the different types of bus bar arrangement used in substations? Illustrate your answer with suitable diagram. (06 Marks)
- b. Explain the various methods of connecting short circuit current limiting reactors in the power system. (06 Marks)
- c. A generating system has 3 sections bus bars connected with a tie-bus bar through 6% reactors rated at 5000 KVA. Each generator is of 5000 KVA with 12% reactance and is connected to one of the bus bars. Find total steady input to a dead short circuit between the lines on one of the section of bus bar, i) with reactor ii) without reactor. (08 Marks)

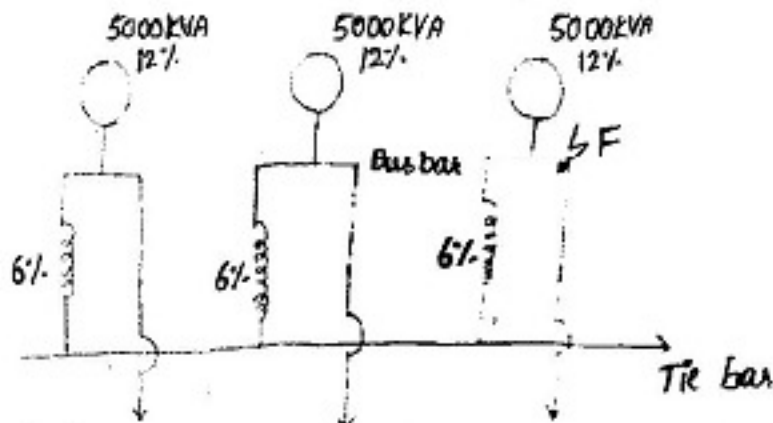


Fig. Q7 (c)

- 8 a. What is transformer substation? What are the different types of transformer substations? Illustrate your answer with suitable diagram. (08 Marks)
- b. What is solid grounding? What are its advantages? (06 Marks)
- c. Describe arc suspension coil grounding. (06 Marks)