

**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Power System Operation & Control**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. What is control centre of a power system? Explain the function of control centre. (06 Marks)
- b. With the help of a block diagram, explain the function of typical digital computer control and monitoring system in a power system. (08 Marks)
- c. Explain the objectives and functions of AGC in a power system. (06 Marks)
- 2 a. Draw the schematic of load frequency control and excitation voltage regulators of a generator and explain. (08 Marks)
- b. Explain with block diagram, the modeling of, (i) Speed governing system (ii) Turbine (iii) Generator and load. (12 Marks)
- 3 a. With a block diagram representation, explain tie-line bias control of a two area load frequency control. (12 Marks)
- b. Two machines operate in parallel to supply a load of 400 MW, the capacities of the machines are 200 MW and 500 MW. Each has a droop characteristic of 4%. Their governors are adjusted so that the frequency is 100% on full load. Calculate the load supplied by each unit and the frequency at this load. The system frequency is 50 Hz. (08 Marks)
- 4 a. Explain briefly the components/equipments of power system that can generate and / or absorb reactive power. (06 Marks)
- b. Derive the equation to get the relation between voltage, power and reactive power at a node. (08 Marks)
- c. In the radial transmission system shown in Fig. Q4 (c), all p.u. values are referred to the voltages bases shown and 100 MVA. Determine the power factor at which the generator must operate. (06 Marks)

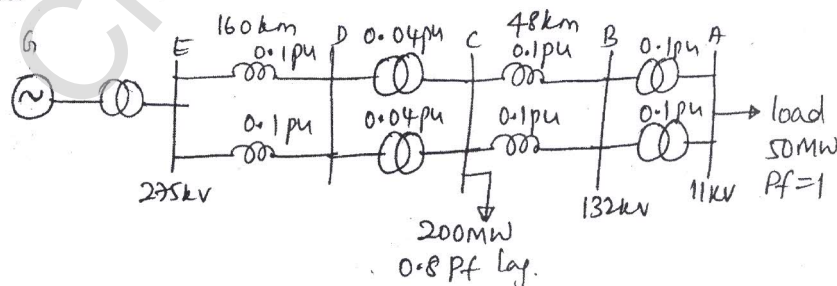


Fig. Q4 (c)

**PART – B**

- 5 a. Explain with flow chart unit commitment solution method. (10 Marks)
- b. Define unit commitment problem. (04 Marks)
- c. Discuss the constraints in unit commitment for thermal plants. (06 Marks)

- 6 a. Explain the Security-Constrained Optimal Power Flow (SCOPF) function of power system security with an example. (06 Marks)
- b. Explain with the help of flow chart contingency analysis using sensitivity factors. (08 Marks)
- c. Explain the factors affecting power system security. (06 Marks)
- 7 a. Explain the weighted least square estimation method of power system state estimation. (10 Marks)
- b. Explain : (i) Suppression of bad data and  
(ii) Identification of bad data in state estimation problem. (10 Marks)
- 8 a. What are the requirements for power system adequacy assessment and also explain the adequacy indices. (10 Marks)
- b. Define reliability and explain the three modes of failure of a system. (10 Marks)

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