B.E. Electrical (Electronics & Power) Engineering (MODEL CURRICULUM) Sem-VI

TE205 (PCC) : Power Systems-II : Operations & Control

P. Pages : 2 **GUG/W/22/13879**

Time : Three Hours * 3 1 0 8 * Max. Marks : 80

Notes :
1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.
5. Use of programmable calculator is prohibited.
6. Draw neat and proper diagram/sketches.
7. Read the question paper carefully (Branch, Semester, Scheme) before attempting the questions.

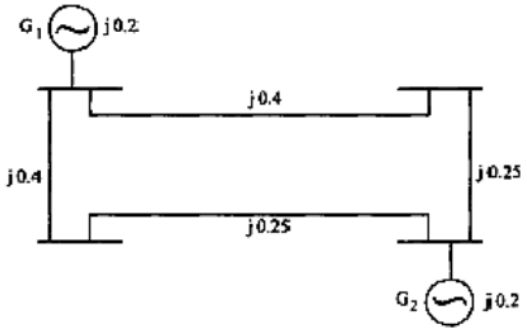
1. a) Explain the different types of buses classification for load flow studies with its specified and unspecified parameter relevance to load flow studies. **8**

b) Explain the flow chart for Gauss-Seidel method without PV buses. **8**

OR

2. a) Derive and explain about static load flow equations. **8**

b) Form the Y_{BUS} by using singular transformation for the network shown below. Including the generator buses. **8**



3. a) What is mean by swing curve? Derive the swing equation for synchronous machine. **8**

b) A single machine connected to infinite bus has H = 3.0 pu, and Xd' = 0.25 pu and line reactance = 0.1 pu. Initially the bus voltage (generator bus) is 1.4 pu and the generator was delivering a power of 75 MW. At t = 0, s a 3 phase short circuit occurred at the generator bus. Find the variation of rotor angle with respect to time up to t = 0.15 second, taking time step of 0.05 second. Given that, base MVA is 100 and infinite bus voltage is 1.0 pu. Use Euler's method. **8**

OR

4. a) With the help of flow chart, discuss Runge-Kutta fourth order (RK4) method used for transient stability study of power system. **8**

b) Explain equal area criterion of stability applied to a machine connected to infinite bus when sudden loss of one of parallel lines. **8**

5. a) Explain the turbine model and derive the generator load model for load frequency control under steady state operation of isolated power system. **8**

b) With necessary diagrams, briefly describe DC excitation systems, AC excitation systems and Brushless AC excitation systems. **8**

OR

6. a) Derive the model of speed governing system operating under steady state condition of isolated power system. **8**

b) A 100 MVA synchronous generator operates on full load at frequency of 50 Hz. The load is suddenly reduced to 50 MW. Due to time lag in governor system, the steam valve begins to close after 0.4 seconds. Determine the change in frequency that occurs in this time. **8**

7. a) Explain the energy control objective as per their level of decomposition of control centre. **8**

b) What is meant by corrective rescheduling? Describe the same as per levels of power system security. **8**

OR

8. a) Explain the concept of Phasors Measurement units and Wide-Area Measurement systems. **8**

b) What is meant by power system security? Explain the function of power system security. **8**

9. a) What is meant by corrective rescheduling? Describe the same as per levels of power system security. **8**

b) Explain the function of supervisory control and data acquisition (SCADA) with its block diagram. **8**

OR

10. a) Define the spot pricing. Explain the advantages and disadvantages of spot pricing. **8**

b) Describe the transmission line pricing along with key points as per guidelines. **8**

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