TE205 - Power Systems II (Operations and Control)

P. Pages : 2

GUG/W/23/13879

Time : Three Hours

7466

Max. Marks : 80

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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 slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
6. Read the question paper carefully (Branch, Semester, Scheme) before attempting the question.
7. Every question has equal weightage.
8. Use of programmable calculator is prohibited.
9. Draw neat and proper diagram/sketches.
10. Don't' use red pen for writing the answers.
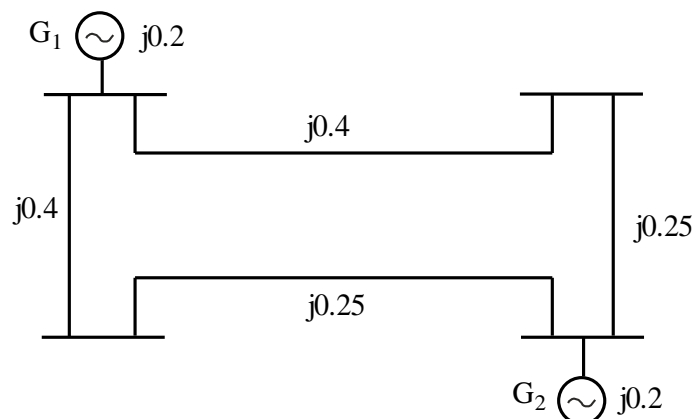11. Don't write any other comment except answers of questions.

1. a) Explain the formulation of Bus admittance matrix (Y_{BUS}) by direct inspection method with example. **8**

b) Explain the flow chart for NR method without PV buses. **8**

OR

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

3. a) What mean by steady state stability? Derive the derivation of synchronizing coefficient stability. **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**

OR

4. a) 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 which is cleared at t = 0.15 s. Find the variation of rotor angle with respect to time up to t = 0.40 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**

b) Explain objectives of transient stability studies. State and explain the assumptions made for transient stability studies. **8**

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

b) What do you understand by compensation by shunt capacitor and reactors? **8**

OR

6. a) Explain the concept of automatic voltage regulator of the alternator. **8**

b) Two generators rated 200 MW and 400 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. The speed changers are so set that the generators operate at 50 Hz sharing the full load of 600 MW in the ratio of their ratings. If the load reduces to 400 MW, how will it be shared among the generators and what will the s)/ steam frequency be? Assume free governor operation. The speed changers of the governors are reset so that the load of 400 MW is shared among the generators at 50 Hz in the ratio of their ratings. What are the no load frequencies of the generators. **8**

7. a) Explain the Components of Energy Control Centre with block diagram. **8**

b) Explain the System Security Assessment of a Power System in detail. **8**

OR

8. a) State and explain the importance / need of state estimation in power flow problem. **8**

b) Explain the concept of Phasor Measurement Units and Wide-Area Measurement Systems. **8**

9. a) What is mean by Electric Utility? Explain the major goals of Electric Utility applied to the potential functions of a twenty-first century electric utility. **8**

b) What id demand side management? Explain the different point which considered for improving the same. **8**

OR

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

b) What is Power Exchange? Discuss the key points of power exchange. **8**

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