10EE82

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Power System Operation and Control

Time: 3 hrs.   Max. Marks:100

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

PART – A

1. a. Explain with a neat diagram monitoring the SCADA system with the help of digital computer configuration. **(07 Marks)**
   b. Develop an expression for the equivalent regulation when two generating units are operated in parallel having different ratings and regulation characteristics. **(07 Marks)**
   c. Describe with a neat sketch, the area lumped dynamic model of a power system and explain its operation. **(06 Marks)**

2. a. Illustrate with a schematic diagram, the Load frequency control and automatic voltage regulator loop of a generator. **(10 Marks)**
   b. Explain static and dynamic performance of AVR loop. **(10 Marks)**

3. a. Develop with a neat block diagram the linear model of two area system connected by a tie line. **(10 Marks)**
   b. Explain the Tie line bias control of two area system and interpret on static system response. **(04 Marks)**
   c. A 100 MVA alteration operates on full load at a 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. **(06 Marks)**

4. a. At a node of a power system, develop relationships between voltage, power and reactive power and draw the conclusions. **(06 Marks)**
   b. Examine the different methods of injecting reactive power into the power system and state the relative merits. **(08 Marks)**
   c. Analyze voltage instability for a power system and test for voltage stability using PV and QV curves. **(06 Marks)**

PART – B

5. a. Explain unit commitment problem including thermal constraints and hence discuss the role of spinning reserve involved in it. **(10 Marks)**
   b. List the different solution methods available to solve unit commitment problem. Explain briefly any one method. **(10 Marks)**

6. a. Discuss the factors affecting power system security. **(06 Marks)**
   b. Illustrate with an example the security constrained optimal power flow (SCOPF) function of power system security. **(06 Marks)**
   c. Describe with a suitable flow chart the contingency analysis for detection of network problems in power system. **(08 Marks)**

7. a. Discuss the methods involved in power system state estimation (PSSE). **(12 Marks)**
   b. Explain the following with respect to PSSE :
   (i) Suppression of bad data.   (ii) Identification of bad data. **(08 Marks)**

8. a. Compute with usual notations an expression for availability and unavailability in terms of failure and repair rate with respect to power system reliability. **(08 Marks)**
   b. Illustrate with a neat sketch the three modes of failure of a system and hence explain:
   (i) Early failure   (ii) Wear out failure   (iii) Chance failure. **(12 Marks)**

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