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10EE82

Eighth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Power System Operation and Control

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. What is a control area in an interconnected power system? Define area control error. **(04 Marks)**

b. Explain the function of a typical dual digital computer control and monitoring of a power system with the help of a block diagram. **(08 Marks)**

c. 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. Assuming that the generators are operating at 50 Hz at no load, how would a load of 600 MW be shared between them? Also find the system frequency at this load. **(08 Marks)**

2 a. What is an interconnected power system? List out its advantages. **(05 Marks)**

b. Obtain the complete block diagram representation of load frequency control (LFC) of an isolated power system, with necessary equations [transfer functions]. **(15 Marks)**

3 a. Explain tie line bias control of a two area load frequency control, with the help of a block diagram and necessary equations. **(14 Marks)**

b. A 100 MVA alternator 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 beings to close after 0.4 seconds. Determine the change in frequency that occurs in this time. **(06 Marks)**

4 a. Show that the real power flow between two nodes is determined by the transmission angle 'δ' and the flow of real time power is determined by the scalar voltage difference between two nodes. **(10 Marks)**

b. Two generators are maintained at 66 KV and 60 KV line at ends of a interconnected system as show in Fig.Q4(b). A load of 20 MW is transferred from 66 KV unit to 60 KV unit. Calculate the necessary condition between the nodes including the power factor of the current transmitted.

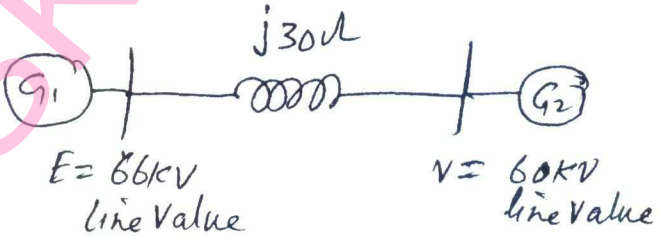

Fig.Q4(b) **(10 Marks)**

PART – B

5 a. Derive the exact co-ordination equation for optimum loading of thermal power plants considering line losses. **(08 Marks)**

b. What is a unit commitment problem? What are the different solution methods available to solve unit commitment problem. **(04 Marks)**

c. Explain the dynamic programming method to solve unit commitment problem. **(08 Marks)**

6 a. What do you understand by a secured power system? Discuss power system black out. **(06 Marks)**

b. Explain security constrained optimal power flow (SCOPF) with the help of typical power system oneline diagram. **(06 Marks)**

c. Explain the contingency analysis for detection of network problems using a suitable flow chart. **(08 Marks)**

7 a. Explain the weighted least square estimation (WLSE) used in power system state estimation (PSSE). **(10 Marks)**

b. Discuss : i) treatment of bad data ii) identification of bad data in PSSE. **(10 Marks)**

8 a. Explain the modes of failures of a system with reference to system reliability. **(10 Marks)**

b. Obtain an expression for i) steady state reliability R, and Q, and ii) general reliability index R(t). **(10 Marks)**

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