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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Eighth Semester, B.E. – Electrical and Electronics Engineering

Semester End Examination; June-2016

Power System Operation and Control

Time: 3 hrs *Max. Marks: 100*

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

PART - A

1 a. Explain digital computer configuration of SCADA with a neat block diagram. 8

b. Two areas A and D are interconnected the generating capacity of Area A is 36000 MW and its regulating characteristics is 1.5% of capacity per 0.1 Hz. Area D has a generating capacity of 400 MW and their regulating characteristic is 1% of capacity per 0.1 Hz. Find each areas share of a + 400 MW disturbance (increase in load) occurring in area D and the resulting tie line flow. 4

c. Derive the expression for tie - line power flow and frequency deviation for a two area system. 8

2 a. With a block diagram representation, explain tie - line bias control of a two - area load frequency control. 10

b. Two system areas connected by a tie line with the following characteristics.

Area 1	Area 2
R = 0.01 P.U.	R = 0.02 P.U.
D = 0.8 P.U.	D = 1.0 P.U.
Base MVA = 500	Base MVA = 500

10

A load change of 100 MW (0.2 PU) occurs in area1. What is the new steady state frequency and what is the change in tie flow? Assume both areas were at normal frequency (60 Hz) to begin.

3 a. Derive a relationship between voltage, real power and reactive power at a node. 10

b. Three supply points A, B and C are connected to a common bus bar at M. as shown in the Fig. 3(b). If at a particular load, the line voltage of M falls below its normal value by 5 kV. Calculate the magnitude of Var injection required at M to re - establish the voltage (original). The PU values are expressed on a 500 MVA base.

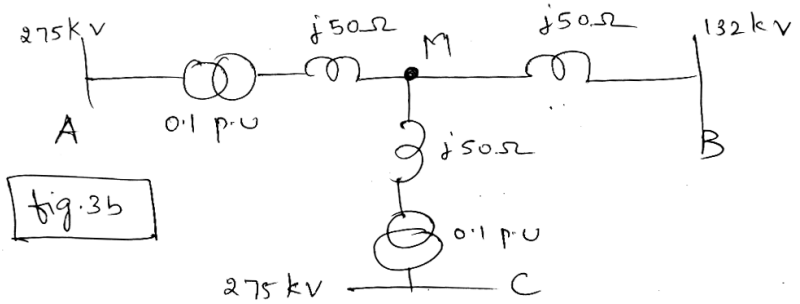

fig. 3b

10

Contd….2

4. Write short notes on the following : 20

   i) Sub synchronous resonance. ii) Voltage collapse

   iii) AVR iv) AGC features.

PART - B

5 a. With a flow chart, explain solution of unit commitment problem using dynamic programming (DP) method. 10

   b. Explain priority list method of unit commitment with an example. 10

6 a. Define: 4

   i) Optimal dispatch ii) Post Contingency

   iii) Secure dispatch iv) Secure post - contingency.

   b. Explain contingency Analysis. 6

   c. Explain contingency Analysis with a flow chart considering linear sensitivity factors. 10

7 a. What is state estimation? Explain state estimation solution algorithm with a flow chart. 10

   b. Explain the development of method of state estimation of an AC network. 10

8. Write short notes on: 20

   i) Constraints in unit commitment ii) Major functions of power system security

   iii) Contingency selection iv) State estimation in power system.

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