Reg. No. : | | | | | | | | | | |

Question Paper Code: 37302

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Seventh Semester

Electrical and Electronics Engineering

01UEE702 - POWER SYSTEM OPERATION AND CONTROL

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State the difference between p-f and q-v control.
2. List any two information's that can be obtained from a daily load curve.
3. How is the real power in a power system controlled?
4. What is area control error?
5. What are the methods of voltage control?
6. Draw the transfer function model of an amplifier involved in AVR loop.
7. Define spinning reserve.
8. Define economic dispatch problem.
9. State the significance of contingency analysis program.
10. Define state estimation.

PART - B (5 x 16 = 80 Marks)

11. (a) What are the information's obtained from load curve and load duration curve. (16)

Or

(b) Illustrate an overview of power system operation and control and explain the role of computers in effective power system operation. (16)

12. (a) Derive the transfer function model and draw the block diagram for a single control area provided with governor system. (16)

Or

(b) Estimate the primary ALFC loop parameters for a control area having the following data.

Total rated area capacity Pr=2000MW.

Normal operating load Pd=1000MW.

Inertia constant H=5.0

Regulation R=2.40 Hz/pu MW (all area generators)

We shall assume that the load frequency dependency as linear meaning that the old load would increase 1% for 1% frequency increase. (16)

13. (a) Discuss in detail, the static and dynamic analysis of AVR loop. (16)

Or

(b) (i) Discuss generation and absorption of reactive power. (8)

(ii) Explain the injection of reactive power by switched capacitors to maintain acceptable voltage profile and to minimize transmission loss in a power system. (8)

14. (a) Explain the unit commitment problem. With the help of a flow chart, explain forward dynamic programming solution method of unit commitment problem. (16)

Or

(b) (i) Describe the forward dynamic programming algorithm for the solution of unit commitment problem in power system. (8)

(ii) The fuel cost of two units are given by : $F_1 = 1.6 + (25\ P_{G1}) + (0.1\ P_{G1})^2$ Rs/ hr; $F_2 = 2.1 + (32\ P_{G2}) + (0.1\ P_{G2})^2$ Rs/hr. If the total demand on the generators is 250 MW, Calculate the economic load scheduling of the two units. (8)

15. (a) Draw the power system state transition diagram and explain the various states of the system and control actions to be taken to make the system secure. (16)

Or

(b) Explain the security monitoring using state estimation with necessary diagrams. (16)

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