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Question Paper Code : Q 2761

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Seventh Semester

Electrical and Electronics Engineering

EE 1401 — POWER SYSTEM OPERATION AND CONTROL

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between load curve and load duration curve?
2. What is meant by system voltage control?
3. Define stiffness of the interconnected system.
4. Draw the dynamic response of change in frequency for a step load change.
5. Compare shunt and series capacitors.
6. Draw the root loci for zero compensated loops.
7. Define participation factor.
8. What is meant by priority list method?
9. What are the EMS functions?
10. What is emergency state?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the main functions of security control. (8)
(ii) Differentiate cold reserve from hot reserve. (4)
(iii) Explain the term economic dispatch control (EDC). (4)

Or

(b) A generating station supplies the following louds :

15000 KW, 12000 KW, 8500 KW, 6000 KW and 450 KW.

The station has a maximum demand of 22000 KW. The annual load factor of the station is 48%. Calculate

(i) the number of units supplied
(ii) the diversity factor
(iii) the demand factor. (16)

12. (a) Two 1000 KW alternators operate in parallel. The speed regulation of first alternator is 100% to 103% from full load to no load and that of other 100% to 105%. How will the two alternators share a load of 1200 KW and at what load will one machine cease to supply any portion of the load?(16)

Or

(b) Draw the block diagram of two area load frequency control system and explain the uncontrolled static analysis. (16)

13. (a) (i) Explain the transfer function of modeling of exciter system with neat diagram. (8)

(ii) Discuss the static and dynamic analysis of AVR. (8)

Or

(b) (i) What are the methods of voltage control? Explain any two methods in detail. (8)

(ii) The load at the receiving end of a three phase overhead line is 225 MW, 0.8 lagging PF, at a line voltage of 33 KV. A synchronous compensator is situated at the receiving end and the voltage at both ends of the line is maintained at 33 KV. Calculate the MVAR of the compensator. The line has 5 ohm resistance per phase and 20 ohm inductive reactance per phase. (8)

14. (a) State the unit commitment problem. With the help of a flowchart explain forward dynamic programming solution method of unit commitment problem. (16)

Or

(b) (i) Develop an iterative algorithm for solving the optimum dispatch equation of an 'n' bus power system taking into account the effects of system losses. (8)

(ii) Construct the priority list for the units given below: (8)

Unit	Heat rate (MBtu/hr)	Pmin (MW)	Pmax (MW)	Fuel cost (Rs/MBtu)
1	510 + 7.85 P_1 + 0.00142 P_1^2	150	600	1.1
2	310 + 7.85 P_2 + 0.00194 P_2^2	100	400	1.0
3	78 + 7.97 P_3 + 0.00482 P_3^2	50	200	1.2

15. (a) (i) Briefly discuss the various functions of energy control centre. (8)

(ii) With a neat block diagram explain the SCADA hardware configuration. (8)

Or

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