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Question Paper Code: 80383

B.E/B.Tech. DEGREE EXAMINATION, NOVEMBER/ DECEMBER 2016

Sixth Semester

Electrical and Electronics Engineering

EE 6603- POWER SYTEM OPERATION AND CONTROL

(Regulation 2013)

Time: Three Hours Maximum: 100 Marks

PART-A **(10*2 = 20 Marks)**

1. What is the need for frequency regulation in power system?
2. Define load duration-curve.
3. Define control area.
4. Specify the use of static and dynamic response of the ALFC
5. What are the various functions of an excitation system?
6. Mention the purposes of series compensation.
7. Write the coordination equation taking the effect of transmission losses.
8. Write about the term incremental operating cost of a power system.
9. What are the function of SCADA?
10. What are the major functions that are carried out in an operational control center?

PART-B **(5*16=80 Marks)**

11 a) (i) A generating station has following daily load cycle (8)

0-6 hrs 4500 KW; 6-8 hrs 3500 Kw; 8-12 hrs. 7500 KW 12-14 hrs. 2000 KW 14-18 hrs 8000 hrs; 18-20 hrs 2500 KW; 20-24 hrs 5000kw. Sketch the load duration curve and determine the load factor and plant capacity factor, if the capacity of the plant is 12 MW

(ii) Discuss the importance of load forecasting with a suitable example. (8)

(Or)

b) (i) A Power system has a peak demand of 90 MW, Load factor of 0.6, plant capacity factor 0.5 respectively. Find (i) daily energy produced (ii) Installed capacity (iii) reserve capacity (iv) utilization factor (10)

(ii) What is the significance of load factor and diversity factor (6)

12. a) (i) Derive the block diagram of state variable model for ALFC (8)

(ii) A power system has a total load of 1250 MW at 50 Hz. The load varies 1.5% for every 1% change in frequency. Find the steady state frequency deviation when a 50 MW load is suddenly tripped, if

1) There is no speed control

2) The system has 250 MW of spinning reserve evenly spread among 500 MW of generating capacity with 5% regulation based on this capacity. Assume that the effect of governor dead bands is such that only 80% of the governor respond to the reduction in system load. (8)

(Or)

b) Derive the transfer function model and draw the block diagram for a single control area provided with governor system. From the transfer function derive the expression for steady state frequency error for a step change. (16)

13. a) The load at the receiving end of a three-phase overhead line is 25 MW at 0. 8 power factor lagging at a line voltage of 33 KV. The line has a resistance 5 ohm per phase and an inductive reactance at 20 ohm per phase. Calculate the sending and voltage. Asynchronous compensator is connected at the receiving end and the voltage at both end of the line is
maintained at 33 KV. Calculate

(i) the MVAR of the compensator

(ii) transmission losses and efficiency with and without compensator and

(iii) The maximum load that can be transmitted with the compensator (16)

(Or)

b) Develop the block diagram of AVR and obtain its transfer function and explain its static and dynamic response (16)

14. a) A two bus system shown in Fig. 14 (a). If 100 MW is transmitted from plant 1 to the load, a transmission loss of 10 MW is incurred. Find the required generation for ouch plant and power received by load when the system incremental coat in Rs 25 MW-hr. The cost equations of the two plants are given below. (16)

$F1 = 0.01P^2_1 + 16p1 = 180$ Rs./hr. $F2 = 0.02p2^2 + 20p2 + 160$ Rs./hr.

(Or)

b) (i) Give λ- iteration algorithm for solving economic scheduling problem, without transmission loss? (8)

(ii) What are the constraints in solving the unit commitment problem? (8)

15. a) Draw the state transition diagram of a power system and explain the different control strategies (16)

(Or)

b) Explain briefly the typical function of the ECC. What are the main function of all SCADA system and the main tasks of control center at different levels? (16)