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Question Paper Code : 57327

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Electrical and Electronics Engineering

EE 6603 – POWER SYSTEM OPERATION AND CONTROL

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Classify the system load.
2. What is spinning reserve ?
3. What is the objective of tie-line bias control ?
4. Define area control error.
5. What is SVC ?
6. How are voltage and reactive power interrelated ?
7. What is meant by priority list method ?
8. Define incremental transmission loss.
9. Define state estimation.
10. What are the functions of SCADA ?

PART – B (5 × 16 = 80 Marks)

11. (a) Consider an inductive load of type Z=R+jX.

(i) By how much percentage the real load drop, if the voltage is reduced by 5% ?

(ii) How would 2% drop in frequency affect the real load, if the load power factor is 0.8. Derive the relations used. **(16)**

OR

(b) A power station has to meet the following load demands :

Load A : 50 kW between 10 AM and 6 PM

Load B : 30 kW between 6 PM and 10 PM

Load C : 20 kW between 4 PM and 10 AM

Plot the daily load curve and determine i) diversity factor, ii) units generated per day, iii) load factor. **(16)**

12. (a) Draw the block diagram of uncontrolled two area ALFC system and explain the salient features under static and dynamic conditions. **(16)**

OR

(b) (i) Determine the steady state frequency in Hz for an isolated control area having the following data. Total rated area capacity, Pr = 300 MW, frequency, f = 50 Hz, inertia constant, H = 5 s, regulation, R= 0.05 pu, turbine time constant = 0.5 sec, governor time constant = 0.2 sec, load change = 60 MW. The load varies by 0.8 percent for a 1 percent in frequency. **(8)**

(ii) Obtain the state variable model of single area ALFC system. **(8)**

13. (a) Develop the block diagram of AVR and obtain its transfer function and explain the static and dynamic response. **(16)**

OR

(b) Explain the role of tap changing transformer in voltage control. **(16)**

14. (a) Write the algorithm for iterative solution of economic dispatch without and with losses co-ordinated. **(16)**

OR

(b) (i) Discuss the various constraints in unit commitment. **(8)**

(ii) Explain dynamic programming solution for unit commitment with flowchart. **(8)**

15. (a) Briefly explain various functions of SCADA with a neat diagram. **(16)**

OR

(b) Draw a state transition diagram of a power system and explain the different control actions. **(16)**