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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,  $P_r = 300$  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)