

**B.E. DEGREE END SEMESTER EXAMINATIONS, SEPTEMBER 2012**  
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**  
**VI SEMESTER (REGULATIONS 2008)**  
**EE 9353 POWER SYSTEM OPERATION AND CONTROL**

Time: 3 hours

Max. Marks: 100

Answer ALL QuestionsPART-A (10 X 2 = 20 Marks)

1. What is the need for load forecasting?
2. A 100 MW unit with 0.05 p.u. regulation operates in parallel with a 600 MW unit of 0.03 p.u. For a specific amount of power demand increase find the ratio of sharing of the load by the units. System frequency is 50 Hz.
3. Frequency regulation is better in a two area interconnected system than a single area system against step load variation. Justify this statement.
4. What are the limitations of OLTC's in voltage control?
5. Explain the use of switchable shunt capacitor for voltage control.
6. What is participation factor and what is its significance?
7. The AVR loop has the time constants of  $T_{do} = 3s$ ,  $T_A = 0.05s$  and  $T_e = 0.4s$  find out the value of open loop gain, K such that the AVR loop is stable.
8. What is spinning reserve and what is its need in power system operation?
9. What are plant level and system level controls
10. Why the frequency and voltage should be maintained constant?

PART-B (5 X 16 = 80 Marks)

11.(i). Explain the following terms:

Installed reserve, cold reserve and hot reserve. (6)

(ii). Define diversity factor. Discuss the practical ways to improve the diversity factor. (4)

(iii). A power station has to meet the following demand

Group A: 250 kW between 8 A.M. and 6 P.M.

Group B: 120 kW between 6 A.M. and 10 A.M.

Group C: 60 kW between 6 A.M. and 10 A.M.

Group D: 110 kW between 10 A.M. and 6 P.M. and then between 6 P.M. and 6 A.M.

Plot the daily load curve and determine diversity factor, units generated per day and load factor. (6)

12(a). 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 load change. (16)

(Or)

12(b) Two identical synchronous generators each rated 250 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively.