

Total No. of Questions : 10]

SEAT No. :

**P3779**

**[5561]-180**

[Total No. of Pages : 2

**B.E. (Electrical Engg.)**  
**POWER SYSTEM OPERATION & CONTROL**  
**(2012 Course) (Semester - I) (403141)**

*Time : 2½ Hour]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat Diagrams must be drawn wherever necessary.*
- 3) *Figure to right indicate full marks.*
- 4) *Use of Non-programmable Scientific Calculators is allowed.*
- 5) *Assume Suitable Data if necessary.*

**Q1) a)** Explain the terms: **[4]**

- i) Steady state stability
- ii) Transient stability

b) Explain the reactive power generation by a synchronous machine. For the same ratings, compare it with static shunt reactors. **[6]**

OR

**Q2) a)** What is Sub synchronous resonance? Explain its causes and effects. **[4]**

b) What is swing curve? State and explain the stability criterion for transient stability using swing curve. **[6]**

**Q3) a)** Define critical clearing angle, critical clearing time in case of power system stability study. **[4]**

b) Explain the TCSC characteristics with connection diagram. **[6]**

OR

**Q4) a)** What is series compensation? Obtain the expression for degree of compensation k. **[6]**

b) Discuss the Problems associated with AC transmission system. **[4]**

*P.T.O.*

**Q5) a)** Sketch and explain the dynamic frequency response for proportional plus integral load frequency control single area case. [12]

b) What is the concept of droop characteristic of governor system? [6]

OR

**Q6) a)** Explain the control Area Concept and Area Control Error used in interconnected power system. [8]

b) Sketch and explain the steady state response of change in frequency as a function of change in load demand for load frequency control two area case. [10]

**Q7) a)** Discuss various constraints in case of Unit Commitment task with respect to thermal and hydro generators. [8]

b) Discuss the effect of transmission losses on economic scheduling of thermal plant. [8]

OR

**Q8) a)** Explain the priority list method of programming used for unit commitment. [6]

b) A power plant has two units with following fuel cost. [10]

$$F_1 = 0.125P_1^2 + 40P_1 + 130 \quad R_s / hr$$

$$F_2 = 0.15P_2^2 + 30P_2 + 100 \quad R_s / hr$$

There minimum and maximum loading of each unit is given by

$20 \text{ MW} \leq P_g \leq 120 \text{ MW}$  The total load on the plant varies

$40 \text{ MW} \leq P_d \leq 240 \text{ MW}$ , assuming that both the units operating all the times find the load sharing between two units over entire range. Also find the range of lamda and corresponding range of plant load.

**Q9) a)** Explain the distribution system reliability evaluation for radial and parallel system. [10]

b) Explain the following: [6]

i) Emergency power interchange

ii) Energy banking

OR

**Q10) a)** Why interchange of power between interconnected utilities is beneficial? Explain economy interchange evaluation between interconnected utilities. [8]

b) Explain the following reliability Indices [8]

i) Loss of load probability (LOLP)

ii) Expected Energy Not Supplied (EENS)

