

Total No. of Questions : 10]

SEAT No. :

**P3905**

**[5561]-575**

[Total No. of Pages : 3

**B.E. (Electrical Engineering)**  
**POWER SYSTEM OPERATION AND CONTROL**  
**(2015 Course) (Semester - I)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Attempt 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) *Figures to the right indicate full marks.*
- 4) *Use of pocket calculator is allowed.*
- 5) *Assume suitable data if necessary.*

- Q1)** a) Explain transient stability analysis for sudden increase in mechanical input with the help of equal area criterion. [5]
- b) What are different types of compensations used in power system? [5]

OR

- Q2)** a) Why is it necessary to control reactive power? What are the ways of controlling reactive power? [5]
- b) Explain operating principle and working of TCSC with the help of circuit diagram and characteristic. [5]
- Q3)** a) Explain the importance of FACTS controllers in power system. [5]
- b) State and explain the methods to improve transient stability. [5]

OR

- Q4)** a) Explain synchronous motor as a source of reactive power with the help of phasor diagram and compare it with static capacitive compensation. [5]
- b) What is swing curve? What is its significance in stability studies? [5]

*P.T.O.*

**Q5) a)** With the help of neat block diagram and frequency response, explain proportional load frequency control for single area case. Draw frequency response for first order approximation as well as exact system. [10]

b) With the help of schematic diagram, explain the operation of speed governing system. [8]

OR

**Q6) a)** With neat block diagram and frequency as well as tie line power response, explain two area load frequency control. [10]

b) Explain following with respect to load frequency control system. [8]

i) Control area

ii) Area control error

iii) Free governor operation

**Q7) a)** With suitable numerical, explain in detail priority list method of unit commitment. [8]

b) State, explain constraints applied on Thermal power plant during unit commitment task. [8]

OR

**Q8) a)** The fuel cost of three units are [8]

$$F_1 = 500 + 5.3P_1 + 0.004P_1^2 \text{ Rs./hour.}$$

$$F_2 = 400 + 5.5P_2 + 0.006P_2^2 \text{ Rs./hour.}$$

$$F_3 = 200 + 5.8P_3 + 0.009P_3^2 \text{ Rs./hour.}$$

If the total demand is 800 MW, find the economic load scheduling of three units by using coordination equation. State system incremental fuel cost.

b) Explain Lagrange multiplier method used for economic load dispatch without transmission loss and no constraints on generation limit, while meeting load. [8]

- Q9) a)** Write a short note on **[8]**
- i) Energy banking
  - ii) Diversity interchange of power
- b) Define power system reliability. State and explain customer oriented reliability indices. **[8]**

OR

- Q10)a)** What is power pool? State the advantages and problems associated with power pool. **[8]**
- b) Explain hierarchical level of reliability evaluation in power system. What are the reliability indices of generation system. **[8]**

x x x