Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (EE) (Separate Supple)/SEM-7/EE-702/2011

2011
POWER SYSTEM III

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) Which of the following water turbine is of impulse type ?

a) Pelton turbine b) Francis turbine

c) Kaplan turbine d) Deriaz turbine.

ii) A 10 MW generating is connected to load through a transmission line. If the incremental cost of production is $\frac{dF}{dP} = 0 \cdot 1P + 3$ Rs./MWh and loss in transmission line is 1 MW, the incremental cost in Rs/MWh is

a) $5 \cdot 44$ b) 5

c) $4 \cdot 44$ d) 4.

iii) Spinning reserve is

a) A part of the UCP

b) The difference between all unit productions to present load with losses.

c) The difference between all unit productions to present load

d) None of these.

iv) The solution of co-ordination equation takes into account

a) All the system constraints

b) All the system and operation

c) All the operational constraints

d) None of the above.

v) The optimal allocation of generators at each generating station is called

a) Unit Commitment b) Load scheduling

c) Load dispatch d) Load consuming.

vi) If the Penalty factor of a plant is unity, its incremental transmission loss is

a) 1 b) 0

c) –1 d) None of these.

vii) The unit of ARFC (area frequency response characteristics) is

a) Pu MW/Hz b) Pu Hz/MW

c) Pu/Hz d) Hz/Pu MW.

viii) What is the condition for uncontrolled case in a two area system ?

a) $\Delta P_{C1} = 0$ b) $\Delta P_{C2} = 0$

c) $\Delta P_{C1} = \Delta P_{C2} = 0$ d) None of these.

ix) The deficit in reactive power can be encountered by

a) Local reactive power support

b) Generator terminal voltage increase

c) Series Capacitor installation

d) Any of the above method.

x) Which of the following compensation is not used in distribution in line compensation ?

a) SVC

b) Shunt capacitor banks

c) Stability and voltage compensation

d) Static VAR.

xi) Highest a.c. transmission voltage in India

a) 400 Kv b) 450 Kv

c) 500 Kv d) 750 Kv.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Physical interpretation of co-ordination equations. Explain.
3. Why we consider active power for loss calculation in transmission line in practice instead of reactive power ?

4. Draw the characteristics curve of thermal units :
   i) Cost ii) Input-output iii) incremental fuel cost.
5. State what is meant by base-load and peak load stations. Discuss the combined Hydro-electric and thermal station operation.
6. Write short notes on :
   i) Pool Operation
   ii) AGC (automatic generation control)
7. "Synchronous condenser is one type of shunt compensator" – Explain.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. What is load compensation ? Compare between SVC and STATCOM. Explain operation of facts converter. What is UPFC ?
9. What is hydrothermal scheduling ? What is long term and short term scheduling ? What is thermal plant load scheduling ?
10. With neat diagram and sketches explain the protection of a system against surges.
11. With proper figure explain telegraphers' equation.