



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.*

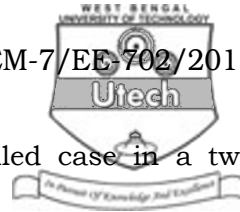
GROUP – A

(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 $\frac{dF}{dP} = 0.1P + 3$ Rs./MWh and loss in transmission line is 1 MW, the incremental cost in Rs/MWh is
 - a) 5.44
 - b) 5
 - c) 4.44
 - 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.