



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)**

08.702 : POWER SYSTEM ENGINEERING – III (E)

Time: 3 Hours

Max. Marks: 100

PART – A

Answer **all** questions :

1. Explain the significance of load flow analysis in power system.
2. What is meant by incremental loss and how it affects the penalty factor ?
3. Mention the various constraints on unit commitment.
4. How series capacitors improve the performance of transmission lines ?
5. Derive power-angle equation.
6. Explain briefly any one type of SVC.
7. What is specific energy consumption for a train run ?
8. Mention the problems associated with the use of ground as return conductor in HVDC system.
9. What is meant by insulation coordination ?
10. How surge diverters protect the transmission system ? **(10×4=40 Marks)**





PART – B

Answer **one** question from **each** Module :

Module – I

11. Details of a 3 bus system is shown in table. All impedances are in p.u. on 100 MVA base. The maximum and minimum reactive power limits for bus 3 are 300 and 0 MVAR respectively. Compute the voltage magnitudes and angles at the end of second iteration using Gauss-Seidel method with an acceleration factor of 1.6.

Bus Code	Impedance
1 – 2	$0.02 + j 0.04$
1 – 3	$0.01 + j 0.03$
2 – 3	$0.0125 + j 0.025$

Bus Code	V	Generation		Load	
		PMW	QMVAR	PMW	QMVAR
1	$1.05 + j0$	–	–	0.0	0.0
2	–	0.0	0.0	400	250
3	1.04	200	–	0.0	0.0

20

12. a) State the assumptions and derive the equation for power in DC load flow. 8
- b) Which are the relations to be decoupled in FDLF and why is it faster than other methods ? 5
- c) Differentiate between economic dispatch and unit commitment. 7



Module – II

13. a) Two system areas are connected by a tie line with the following characteristics :

Area 1	Area 2
R = 0.01 p.u.	R = 0.02 p.u.
D = 0.8 p.u.	D = 1.0 p.u.
Base MVA = 500	Base MVA = 500



A load change of 180 MW occurs in area 1. What is the new steady state frequency and what is the change in tie flow ? Assume both areas were at nominal frequency of 50 Hz to begin.

10

b) Explain the operating principle of a UPFC.

10

14. a) Discuss various methods for improving stability limits of power system.

5

b) A 50 Hz generator is delivering 1.0 p.u. power to an infinite bus through a transmission network. The maximum power which can be transferred for pre-fault, during fault and post fault conditions are 1.8 p.u., 0.4 p.u. and 1.3 p.u. Find the critical clearing angle.

15

Module – III

15. a) A train has scheduled speed of 60 km/hr between stops which are 6 km apart. Determine the crest speed over the run, assuming trapezoidal speed time curve. The train accelerates at 2 km/hr /s and retards at 3 km/hr/s. Duration of stop is 60 s.

10

b) Compare AC and DC transmission systems.

5

c) Explain different types of DC links.

5

16. a) Draw and explain the converter control characteristics of HVDC system.

10

b) Explain Bewly lattice diagram.

10

