



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)**

08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours

Max. Marks : 100

**Instruction : Answer all questions from Part – A and one full
question from each Modules of Part – B.**



PART – A

1. Explain the term quasi static operation in power system. Also mention the situations where SLFA become a prerequisite.
2. Explain the need of slack bus in LFA. Why it is termed as reference bus ?
3. What do you mean by bus switching in LFA ?
4. Explain the principle of DC load flow ? Why this method is termed as DC ?
5. What are the main controls provided for generator ?
6. Explain the difference between steady state and transient stability problems in power system.
7. What are the basic types of FACTS devices in power system ? Explain briefly.
8. What is the need of speed time curve in analysis of electric fraction ? Draw typical speed time curve for main line service.
9. What are the advantages of HVDC transmission system ?
10. What are the functions of an ideal surge arrester. **(10×4=40 Marks)**

PART – B

Module – I

11. a) With the help of neat flow chart explain how load flow is done using NR method **10**
- b) Derive FDLF power flow equations starting from classical NR method. **6**
- c) Explain the need of acceleration factor in G-S method. **4**

OR



12. a) Explain different constraints on unit commitment. 6
- b) Derive the expression for penalty factor ? What is its significant in load dispatch problem. 6
- c) Find the optimal dispatch of the given units. The total load to be supplied is 850 MW.
- $$H_1 = 510 + 7.2 P_1 + 0.001 P_1^2$$
- $$H_2 = 310 + 7.85 P_2 + 0.00194 P_2^2$$
- $$H_3 = 78 + 7.97 P_3 + 0.00482 P_3^2$$
- Fuel costs are 1.1, 1 and 1 respectively
- $$P_{\text{loss}} = 0.00003 P_1^2 + 0.00009 P_2^2 + 0.00012 P_3^2$$
- 8

Module – II

13. a) Derive the block diagram of AGC of a two area system connected by a tie-line. 15
- b) Explain the objectives of FACTS devices in power system operation and control. 5

OR

14. a) A synchronous motor is receiving 30% of the power that it is capable of receiving from an infinite bus. If the load on motor is doubled, calculate maximum value of δ (torque angle) during the swing of motor around its new equilibrium position. 10
- b) Explain the principle and operation of SSSC with neat sketch. 10

Module – III

15. a) An electric train is to have a retardation of 3.2 kmphps. If the ratio of maximum speed to average speed is 1.3, the time of stop is 26 sec and acceleration is 0.8 kmphps. Find its scheduled speed for a run of 1.5 km. Also draw the simplified speed time curve. 8
- b) Explain briefly about different types of HVDC links. 6
- c) Compare the HVDC and HVAC transmission with reference to following factors. 6
- i) Economics ii) Technical performance iii) Reliability

OR

16. a) Explain the theory of lightning phenomenon. 8
- b) Explain the advantages of ZnO arrester over other types of arresters. 4
- c) What you meant by insulation co-ordination in power systems ? With neat sketch explain how insulation co-ordination is carried out in 110 kV substation. 8