Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)
08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. What is the need of conducting load flow studies ?
2. What will be the load sharing of a plant if its penalty factor is less than one ?
3. Differentiate between economic dispatch and unit commitment.
4. Differentiate between shunt capacitor and synchronous condenser.
5. Derive swing equation.
6. Draw the configuration and operating waveforms of a TCR.
7. Explain the speed-time graph of a main line service.
8. Describe different types of DC link.
9. What is meant by insulation coordination ?
10. A surge of 100 KV travels along an overhead line towards its junction with a cable. The surge impedance for the over head line and cable are (400) ohms and (500) ohms respectively. Find the magnitude of the surge transmitted through the cable. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** module.

Module – I

11. Explain the algorithm for solving power flow equations using Newton-Raphson method. What are the changes adopted in FDLF method ? **20**

12. a) Derive the equation for transmission loss in terms of B coefficients. **10**

    b) A system has two generating plants whose incremental costs in Rs/MWh are $I_{c1} = 0.2P1 + 40$; $I_{C2} = 0.3P2 + 45$ where P_1 and P_2 are in MW. Economic dispatch occurs when $P_1 = P_2 = 100$ MW and $\frac{dp_L}{dp_Z} = 0.2$ Determine the penalty factor of plant 1. **10**

Module – II

13. a) Explain the working principle of an AVR. 10

    b) Explain the working principle of a thyristor controlled series compensator. 10

14. a) A generator operating at 50 Hz delivers 1.0 p.u. power to an infinite bus when a fault occurs which reduces the maximum power transferable to 0.4 p.u. whereas the maximum power transferable before fault was 1.75 p.u. and is 1.25 p.u, after the fault is cleared. Determine the critical clearing angle. 12

    b) Explain the working principle of a STATCOM. 8

Module – III

15. a) A scheduled speed of 45 km/h is required between two stops 1.5 Km apart. Find the maximum speed over the run if the stop is 20 s duration. The values of acceleration and retardation are 2.4 Km/h/s and 3.2 Km/h/s respectively. Assume a simplified trapezoidal speed time curve. 10

    b) Draw the schematic diagram of a converter station and explain the major components. 10

16. Write notes on :

    a) Ground return in DC systems. 8

    b) HVDC developments in India. 5

    c) Surge diverters. 7
