Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer all questions. (10x4=40 Marks)

1. Explain the significance of slack bus in load flow analysis.
2. Why is bus admittance matrix a sparse matrix?
3. What are the assumptions that lead to development of FDLF from Newton-Raphson method?
4. Explain the significance of spinning reserve.
5. Explain speed governor characteristics.
6. Differentiate between SVC and STATCOM.
7. Derive the power-angle equation.
8. Explain circuit breaking in HVDC.
10. Explain the use of Bewely Lattice diagram.

PART – B

Answer any one question from each Module.

Module – I

11. a) With the help of a flowchart, explain how load flow analysis can be done using Gauss-Siedel method.
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   b) Explain the significance of penalty factor in economic load dispatch problem. 8

   OR

P.T.O.
   b) A power system is supplied by only two plants, both of which operate on economical dispatch. At the bus of Plant-1, the incremental cost is 55 Rs./MWh and at plant-2, is 50 Rs./MWh. Which plant has the highest penalty factor? What is the penalty factor of Plant-1 if the cost of per hour of increasing the load on system by 1 MW is 75 Rs./hr? 

Module – II

13. a) Explain with block diagram, the automatic load frequency control of an isolated power system. 
   b) Explain the principle of operation of Unified Power Flow Controller (UPFC). 

OR

14. a) Derive the swing equation of a synchronous machine. Explain its significance in stability analysis. 
   b) A 50 Hz generator is delivering 50% of the power that it is capable of delivering through a transmission line to an infinite bus. A fault occurs that increases the reactance between the generator and infinite bus to 500% of the value before the fault. When the fault is isolated, the maximum power that can be delivered is 75% of the original maximum value. Determine the critical clearing angle for the condition described. 

Module – III

15. a) Explain the reactive power requirements in HVDC system. 
   b) 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 seconds and acceleration is 0.8 kmphps. Find its scheduled speed for a run of 1.5 km. Draw the simplified trapezoidal speed-time curve. 

OR

16. Write short notes on: 
   a) Causes of over voltages in Power System. 
   b) Power flow control in HVDC system. 
   c) Insulation co-ordination. 
   d) Reflection coefficients and refraction coefficients.