GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1(OLD) EXAMINATION – WINTER 2016

Subject Code: 710701N Subject Name: Power System Modeling and Simulation Time:10:30 Am to 1:00 Pm Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- 0.1 (a) Define Tree, Basic loop, Cut-set and Fundamental Cut-set in 07 relation to graph theory
 - (b) Find out the bus admittance matrix (Y_{BUS}) for the system shown in 07 the following figure using graph theoretic approach. Each of the line (L1, L2 and L3) has a series impedance of *j0.1* pu and the shunt admittance of j0.02 pu. Neglect mutual coupling.



- 0.2 (a) Prepare a flow chart for the N-R method for power flow analysis. 07
 - Mention the points of differences between G-S method and N-R 07 **(b)** method of power flow analysis.

OR

- (b) Mention the similarities and differences between Decoupled load 07 flow and Fast Decoupled load flow techniques
- Briefly describe the algorithm for short circuit analysis using bus 07 Q.3 (a) impedance matrix for large power system.
 - (b) List the methods of contingency selection. Discuss any one of 07 them in detail

OR

- 0.3 (a) Explain Generation shift factor and line outage distribution factor 07 in relation to power system security.
 - (b) Discuss the importance of state estimation in power system. 07 Discuss least square method of state estimation in detail

Date:17/11/2016

Total Marks: 70

- Q.4 (a) Mention two practical applications of sparse matrices. Discuss any one method for the efficient storage of a sparse matrix in the computer
 - (b) What do you mean by a transient simulation? Mention familiar 07 simulation tools used for transient simulation of power system.

OR

- Q.4 (a) Briefly explain the Bewley's lattice diagram? How it is useful for 07 the analysis of travelling waves?
- Q.4 (b) Write a short note on approximate load flow (DC load flow). 07
- Q.5 (a) Explain the following in relation to numerical integration: 07 (1) Single step method and multi-step method (2) Implicit method and explicit method
 - (b) Discuss Backward Euler method, its merits and demerits for 07 numerical integration.

OR

- Q.5 (a) Explain Trapezoidal method. Discuss its stability and error 07 analysis.
 - (b) Formulate the differential equation for a series RL circuit 07 connected to a DC supply. Explain how the solution of this equation can be obtained using Forward Euler method.
