

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Remedial Examination January/ February 2011

Subject code: 710701

Subject Name: Power system Modelling and Simulation

Date: 31 /01 /2011

Time: 02.30 pm – 05.00 pm

Total Marks: 60

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Define the following network matrix : **02**
 [1] Basic Cut-set matrix
 [2] Branch Path incidence Matrix.
- (b)** Derive the following relation : $Z_{loop} = B[z] B^T$ **04**
 Where Z_{loop} = Loop impedance matrix.
 B = Basic loop incidence matrix.
- (c)** For the network shown in the Figure 1.0, Draw the tree, co-tree and find out Z_{BUS} **06**

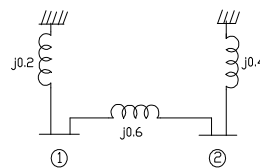


FIGURE 1.0

- Q.2 (a)** Derive the equation to find out fault current, fault voltage in a n-bus power system with fault at the bus 'r' with fault impedance Z_r . **06**
- (b)** Draw the flow chart for Newton –Raphson method for 'n' bus power system having both PV and PQ buses. **06**

OR

- (b)** Explain the Algorithm for Load- flow solution only for PQ bus using Gauss-Seidel method. **06**
- Q.3 (a)** Compare the following Load flow method : **06**
 (1) N-R method versus G-S method
 (2) Fast – Decoupled method versus N-R method
- (b)** Explain : **06**
 (1) Optimal dispatch and (2) Security dispatch with suitable example.

OR

- Q.3 (a)** Draw the flow –chart of contingency analysis procedure. **06**
- (b)** Explain the following with respect to power system security **06**
 (1) Generation shift factor
 (2) Line outage distribution factor

- Q.4 (a)** What are various methods of contingency selection . Explain any one method in detail. **06**
(b) What is state estimation ? Explain the development of method for state estimation of an AC Network. **06**

OR

- Q.4 (a)** Explain the maximum likelihood concept using a suitable example. **06**
(b) Explain Sparsity technique . Give any one method to store sparse matrix in computer . **06**

- Q.5 (a)** What is travelling wave ? How it is generated ? **06**
(b) Discuss the effect of travelling wave on short-circuited transmission line. And Explain Bewleys Lattice diagram with neat sketch . What informations are obtained from bewleys lattice diagram.? **06**

OR

- Q.5 (a)** Explain the following numerical integration method. **06**
(1) Forward Euler's method .
(2) Runga - Kutta mehod.
(b) Write a short note on Step-Size selection with respect to Numerical integration technique **06**
