

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 710701N

Subject Name: Power System Modeling and Simulation

Date: 31 /01 /2011

Time: 02.30 pm – 05.00 pm

Total Marks: 70

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 : $Z_{\text{loop}} = B[z] B^T$ **05**
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} **07**

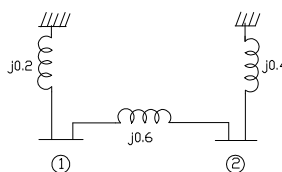


FIGURE 1.0

- 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 . **07**
- (b) Draw the flow chart for Fast-decoupled method for 'n' bus power system having both PV and PQ buses. **07**
- OR**
- (b) Explain the Algorithm for Load-flow solution only for PQ bus using N-R method. **07**
- Q.3** (a) Compare the following Load flow method : **07**
(1) N-R method versus G-S method
(2) Fast – Decoupled method versus N-R method
- (b) Explain Explain DC load flow study stating its conditions **07**
- OR**
- Q.3** (a) Draw the flow –chart of contingency analysis procedure. **07**
- (b) Explain the following with respect to power system security **07**
(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. **07**
- (b)** explain network observability and application of state estimation.. **07**
- OR**
- Q.4 (a)** Explain the maximum likelihood concept using a suitable example. **07**
- (b)** Explain Sparsity technique . Give any one method to store sparse matrix in computer . **07**
- Q.5 (a)** What is travelling wave ? How it is generated? **03**
- (b)** Discuss the effect of travelling wave on short-circuited transmission line. **04**
- (c)** Explain Bewleys Lattice diagram with neat sketch .What informations are obtained from bewleys lattice diagram.? **07**
- OR**
- Q.5 (a)** Explain the following numerical integration method. **07**
- (1) Forward Euler's method .
- (2) Range-Kutta mehod.
- (b)** Write a short note on Step-Size selection with respect to Numerical integration technique. **07**
