Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 710701N **Date: 01-12-2014**

Subject Name: Power System Modeling and Simulation

Time: 10:30 am - 01:00 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 basic incidence matrix (A) and primitive admittance matrix (y). Also derive bus admittance matrix equation. i.e. Ybus = A [y] A^T	**07**
	(b)	How Zbus algorithm is used to add Link element in to the existing partial network. Derive all the equations used in algorithm. The added element may be mutual coupled and may be connected to a reference node.	**07**
Q.2	**(a)**	What is State Estimation? State applications of it in Power System.	**07**
	(b)	Write short note on Maximum Likehood Weighted Least Squares Estimation.	**07**
		OR	
	(b)	Explain Network Observability and Pseudo measurements.	**07**
Q.3	**(a)**	Draw the flowchart for Gauss Seidal load flow method for 'n' bus power system having both PV and PQ buses. State all the assumption made to derive equations and justify the same.	**07**
	(b)	Explain importance of 3-phase load flow analysis. Explain algorithm of Load flow to solve 3-phase power system having unbalanced load.	
		OR	
Q.3	**(a)**	Draw the flow chart for sequential single-phase AC-DC load flow program. Explain all step of program.	**07**
	(b)	What are the various methods to get solution of optimal load flow? Explain optimal load flow program algorithm steps using any one method.	**07**
Q.4	**(a)**	Giving example, explain optimal dispatch and secure dispatch.	**07**
	(b)	Explain performance index (PI). How it is useful for contingency selection?	**07**
		OR	
Q.4	**(a)**	What are the factors, which affects security of Power System?	**07**
	(b)	Explain Linear Sensitivity factors, Generation shift factor and line outage distribution factor for Power System Security.	**07**
Q.5	**(a)**	Define Ybus. Develop algorithm or flowchart to form a Ybus matrix of given 'n' bus power system using direct inspection method.	**07**
	(b)	Explain any one Numerical integration algorithm used to solve differential equations. Compare their relative performance.	**07**
		OR	
Q.5	**(a)**	Give comparison between various load flow methods.	**07**
	(b)	Explain sparsity techniques and its advantages. Give any one method to store sparse matrix in computer.	**07**

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