Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 710701N Date: 16/05/2016

Subject Name: Power System Modeling & Simulation

Time:02:30 pm to 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)**	Write a short note on concept of 'optimal Power flow'. Explain 'Gradient method' OR 'Linear programming method' for optimal power flow.	**07**
	(b)	Explain 'Generation shift factor' and 'line outage distribution factor' for security of power system.	**07**
Q.2	**(a)**	Define following network matrices: (A) Basic incidence matrix, (B) Basic Loop matrix, (C) Basic cutest matrix and Branch Path Incidence matrix (K).	**07**
	(b)	What is 'State Estimation'? State application of state estimation in power system.	**07**
		OR	
	(b)	What are the factors, which affects security of Power System?	**07**
Q.3	**(a)**	Draw the flowchart for Fast Decoupled load flow (FDLF) 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)	How Z_{bus} algorithm is used to add Link in to the existing partial network. Derive all the equations used in the algorithm. The added element may be mutual coupled and may be connected to a reference node.	**07**
		OR	
Q.3	**(a)**	List all the assumptions made in short circuit (fault) analysis. And justify each of them. Also state applications of short circuit analysis.	**07**
	(b)	Giving example, explain optimal dispatch and secure dispatch.	**07**
Q.4	**(a)**	Explain any one Numerical integration algorithm used to solve differential equations. Compare their relative performance.	**07**
	(b)	Explain Network Observability and Pseudo measurements.	**07**
		OR	
Q.4	**(a)**	Give comparison between various load flow analysis methods.	**07**
	(b)	Write a short note on Maximum Likelihood Weighted Least Squares Estimation.	**07**
Q.5	**(a)**	Explain performance index (PI). How it is useful for contingency selection?	**07**
	(b)	What is the significance of following terms in power system state estimation. a) Weighing factor b) Least square error c) Chi-square distribution factor d) Probability Density factor (PDF).	**07**
		OR	
Q.5	**(a)**	Compare backward Euler's method and trapezoidal method in context to application of these methods to the large scale power systems.	**07**
	(b)	Explain Runge-Kutta method for numerical integration with suitable example.	**07**

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