Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEMESTER VIII– EXAMINATION – SUMMER 2017

Subject Code: X80904 **Date: 03/05/2017**

Subject Name: Advance Power System - II

Time: 10.30AM to 01.00PM **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 Indian scenario of power systems and Electricity act, 2003. How it changed Electricity market?	**07**
	(b)	Explain the causes and consequences of deregulated industrial load.	**07**
Q.2	**(a)**	Explain various applications of state estimations in a power system.	**07**
	(b)	What is power system state estimation? Discuss Weighted Least Square Estimation (WLSE) method with usual notations for power system state estimation.	**07**
		OR	
	(b)	Explain χ^2 (chi-square) technique for bad data detection for power system state estimation.	**07**
Q.3	**(a)**	What are the factors that affect voltage stability?	**07**
	(b)	Give detail classification of voltage stability.	**07**
		OR	
Q.3	**(a)**	What is power system security? Explain with the help of an example.	**07**
	(b)	Explain system state classification with relevant figures clearly showing the security levels and transition between different security levels.	**07**
Q.4	**(a)**	Why reactive compensation is required. Explain different methods of reactive compensation.	**07**
	(b)	For a transmission line connected between two buses, derive the expression of voltage regulation and also establish from the phasor diagram and the equations that the Q and V have a strong coupling.	**07**
		OR	
Q.4	**(a)**	Explain load forecasting methodology with estimation of average and trend terms.	**07**
	(b)	Derive the expression of critical voltage and angle at receiving end at voltage stability limit.	**07**
Q.5	**(a)**	Discuss voltage regulation in a transmission system and its relation with reactive power with the help of necessary phasor diagram and expressions.	**07**
	(b)	A lossless three-phase 50 Hz transmission line has an inductive reactance of 0.8 Ω/km while capacitive admittance is 70 μS/km. If the system voltage at the sending is 220 kV (line-to-line) and the line length is 150 km, find (i) electrical line length of the line (ii) surge impedance (iii) receiving end voltage at no-load with sending end voltage as reference (iv) the sending end current at no-load (v) reactive power at the sending end at no-load (vi) surge impedance loading	**07**
		OR	
Q.5	**(a)**	State different methods for heavily loaded and voltage stressed power systems to enhance voltage stability. Very briefly discuss one of them.	**07**
	(b)	What is voltage collapse? State different changes in power system contributing to the voltage collapse.	**07**

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