Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(Old course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 1720703 **Date: 11/12/2015**

Subject Name: Power System Dynamics & Control

Time:2:30 pm to 5:00 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)**	Explain transmission line modeling by D-Q transformation using Ŭ-ƀ variables.	**07**
	(b)	Explain control characteristics of SVC. Draw block diagram of SVC controller and develop its mathematical model.	**07**
Q.2	**(a)**	What is necessity of Parkôs transformation for modeling a synchronous machine? Derive expression of flux linkages of an ideal synchronous generator in terms of Parkôs variables.	**07**
	(b)	Describe practical significance of reactive power capability curve for design of synchronous generator.	**07**
		OR	
	(b)	Explain load modeling with suitable equations.	**07**
Q.3	**(a)**	Sketch model of speed governing system for hydro-turbines and discuss permanent droop and transient droop.	**07**
	(b)	Sketch and explain the steady state phasor diagram of salient pole synchronous generator.	**07**
		OR	
Q.3	**(a)**	Sketch model of speed governing system for steam-turbines and explain.	**07**
	(b)	Explain the effect of field current on synchronous machine terminal voltage.	**07**
Q.4	**(a)**	A single machine system connected with infinite bus through resistance R_e and reactance X_e. Derive expression for æV_d and æV_q using machine model 1.0 and neglecting armature resistance.	**07**
	(b)	Using rotor mechanical equations of synchronous machine obtain Torque angle loop.	**07**
		OR	
Q.4	**(a)**	Draw functional block diagram of generator excitation system and discuss the following terms in brief: (i) Exciter (ii) Regulator (iii) Power system stabilizer	**07**
	(b)	Write a short-note on Hopf Bifurcation?	**07**
Q.5	**(a)**	Discuss small signal stability analysis of SMIB with the help of state space representation.	**07**
	(b)	Explain Power oscillation damping. How PSS is useful to damp out the oscillations.	**07**
		OR	
Q.5	**(a)**	State assumption made multi machine system and develop simplified system model for the same.	**07**
	(b)	Compare classical method of transient stability analysis with modern methods.	**07**

****