Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 1720703 **Date:14/05/2015**

Subject Name: Power system dynamics and control

Time: 02:30 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 Transformer Voltage and Speed Voltage in regard to synchronous generator. Also explain what happens if the armature flux linkage components, w.r.t. a synchronously rotating reference frame, are constants?	**07**
	(b)	Explain Armature reaction in details.	**07**
Q.2	**(a)**	State basic assumptions made in steady state analysis of an alternator and derive open circuit voltage equation of it.	**07**
	(b)	Explain field controlled alternator rectifier excitation system with diagram.	**07**
		OR	
	(b)	State the types of 'SVC and Controllers'. Explain FC-TCR by neat sketch.	**07**
Q.3	**(a)**	Draw the functional block diagram of a typical excitation control system and explain function of each block.	**07**
	(b)	Draw and explain speed-governing system and model of speed-governing system for steam turbines.	**07**
		OR	
Q.3	**(a)**	Classify the Excitation systems as per the type of exciter.	**07**
	(b)	Obtain Dynamic model of transmission line use single phase π equivalent of a transmission line and park transformation.	**07**
Q.4	**(a)**	Classify the load models. Explain the effect of load modeling on stability study	**07**
	(b)	Discuss the static load modeling of the load and explain how the coefficients of V^2, $V^1$and V^0 in the expressions of active power P and reactive power Q are decided	**07**
		OR	
Q.4	**(a)**	Derive the expression of Steady state or transient response of Primary ALFC loop	**07**
	(b)	When a synchronous machine is connected to infinite bus how real and reactive power exchanged with grid? Explain with vector diagram and discuss the working and requirement of AVR with help of vector diagram	**07**
Q.5	**(a)**	Derive the expression of power delivered by generator for (i) Round rotor and (ii) Salient pole rotor	**07**
	(b)	Show that Kron's transformation is power invariant.	**07**
		OR	
Q.5	**(a)**	Draw overall block diagram of SMIB consisting the rotor swing equations, flux decay and excitation system. Neglect the damping term(D) in the swing equations for convenience.	**07**
	(b)	Write short note on Hopf Bifurcation.	**07**

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