Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013

Subject code: 1720707 **Date: 02-01-2014**

Subject Name: Flexible AC Transmission System

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)**	State different conventional voltage control mechanism. Describe one of them mechanism in detail.	**07**
	(b)	Define FACTS and FACTS controller. Give classification of FACTS controller in detail.	**07**
Q.2	**(a)**	Explain Mid-Point shunt compensation. Derive equation of active power and reactive power with the help of phasor diagram.	**07**
	(b)	Explain Thyristor Control Reactor (TCR). Draw waveforms of voltage and current across TCR for firing angle of $\alpha = 90°$, $120°$ and $150°$.	**07**
		OR	
	(b)	Discuss operation of Saturated Reactor (SR).	**07**
Q.3	**(a)**	Why transient free switching of TSC is needed? How it is achieved.	**07**
	(b)	Write technical note on: Synchronous condenser as reactive power controller.	**07**
		OR	
Q.3	**(a)**	Explain operation of FC-TCR with operating characteristic.	**07**
	(b)	What is need of variable series compensation? State advantages of TCSC.	**07**
Q.4	**(a)**	Explain role of phase shifting transformer in FACTS technology.	**07**
	(b)	Explain different modes of TCSC operation.	**07**
		OR	
Q.4	**(a)**	Describe the 6-pulse voltage source converter type STATCOM	**07**
	(b)	Discuss operating principle and characteristic of TCSC.	**07**
Q.5	**(a)**	Briefly explain different application of SVC.	**07**
	(b)	Describe SSSC as Power flow controller.	**07**
		OR	
Q.5	**(a)**	Give comparison of different SVCs.	**07**
	(b)	Describe Unified Power Flow Controller (UPFC) operation and its implementation using back to back VSCs.	**07**

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