Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720707 Date: 12/07/2012

Subject Name: Flexible AC Transmission System

Time: 10:30 am – 13:00 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)**	List the FACTS devices. Give a classification of series and shunt FACTS devices. Mention the advantages of FACTS devices.	**07**
	(b)	Prove that the midpoint shunt compensation can almost double the power transfer capability of a transmission line.	**07**
Q.2	**(a)**	Explain the construction and working of a Static Voltage Compensator (SVC)	**07**
	(b)	Briefly describe Sub-Synchronous Resonance. Discuss the application of a TCSC for SSR mitigation.	**07**
		OR	
	(b)	Mention the modes of operation of a TCSC. Describe the Vernier Capacitive mode of operation in detail with steady state waveforms of voltages and currents.	**07**
Q.3	**(a)**	Discuss the application of SSSC as a reactive power controller. Draw and discuss the necessary control circuit.	**07**
	(b)	With neat power circuit diagram, describe the 6-pulse voltage source converter type STATCOM	**07**
		OR	
Q.3	**(a)**	Draw the necessary block diagram and describe the application of an SSSC for power swing damping.	**07**
	(b)	Justify the statement "STATCOM can be used as a midpoint shunt compensator for a transmission line"	**07**
Q.4	**(a)**	Explain the construction and working of a Unified Power Flow Controller (UPFC).	**07**
	(b)	With suitable diagram describe the Thyristor Controlled Reactor (TCR) also discuss its applications in the power system.	**07**
		OR	
Q.4	**(a)**	Mention the methods of passive reactive power compensation. Compare them with compensation using FACTS devices.	**07**
Q.4	**(b)**	Mention the advantages of having slope in the dynamic characteristics of a SVC.	**07**
Q.5	**(a)**	Discuss the role of SVC as a voltage controller.	**07**
	(b)	Draw and discuss the firing delay angle versus the net fundamental reactance characteristic of a TCSC.	**07**
		OR	
Q.5	**(a)**	Explain the operating characteristic of FC-TCR.	**07**
	(b)	Briefly describe the working of a Thyristor Controlled Transformer (TCT).	**07**

****