Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– III • EXAMINATION – SUMMER 2015

Subject Code: 734501 **Date: 30/04/2015**

Subject Name: Application of Power Electronics To Power System

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 load compensation and system compensation.	**07**
	(b)	Derive the ratio of change in active power transfer to incremental rating of the series capacitor compensation for short symmetrical transmission line with necessary phasor diagram.	**07**
Q.2	**(a)**	Derive the ratio of change in active power transfer to incremental rating of the shunt capacitor midpoint compensation for short symmetrical transmission line with necessary phasor diagram.	**07**
	(b)	State the names of various shunt, series and hybrid type FACTS devices and write function of each in brief.	**07**
		OR	
	(b)	Explain steady-state operation of TCSC in capacitive region along with relevant waveforms of Capacitor voltage and current; and TCR voltage and current.	**07**
Q.3	**(a)**	Explain basic construction, working and operating characteristics of Fixed Capacitor ï Thyristor Controlled Reactor (FC-TCR).	**07**
	(b)	Explain various arrangement of a Thyristor Controlled Transformer (TCT).	**07**
		OR	
Q.3	**(a)**	Explain basic construction, working and operating characteristics of TSC-TCR.	**07**
	(b)	Explain basic construction, working and operating characteristic of Thyristor Control Reactor (TCR).	**07**
Q.4	**(a)**	Explain construction, working principle and V-I characteristics of STATCOM.	**07**
	(b)	Draw and explain compensating voltage Vs line current characteristics of TCSC in voltage control mode and reactance control mode.	**07**
		OR	
Q.4	**(a)**	Explain three phase six pulse VSC - STATCOM with circuit diagram and waveform.	**07**
	(b)	Explain the principle of operation of basic Thyristor-Controlled Series Capacitor (TCSC) scheme.	**07**
Q.5	**(a)**	Explain the principle of operation of Static Synchronous Series Capacitor (SSSC) scheme.	**07**
	(b)	Draw the dynamic V-I characteristics for reduction in the SVC reactive-power rating by the current slope and explain it.	**07**
		OR	
Q.5	**(a)**	Explain principle of operation of UPFC with relevant phasor diagram and describe its implementation using back to back VSCs with schematic diagram.	**07**
	(b)	Explain load sharing between parallel connected SVCs with diagram.	**07**

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