Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER III (OLD) – EXAMINATION – WINTER-2016

Subject Code: 734501 Date:25/10/2016

Subject Name: Application of Power Electronics to Power System

Time:02:30 pm to 05:00 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 significance of reactive power control. Also compare Series and Shunt capacitor compensators.	**07**
	(b)	Classify FACTS devices and mention their advantages & disadvantages.	**07**
Q.2	**(a)**	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**
	(b)	Explain basic construction, working and operating characteristics of TCR.	**07**
		OR	
	(b)	Write a short note on Saturated reactor.	**07**
Q.3	**(a)**	Explain V–I characteristic of TSC – TCR with and without voltage control	**07**
	(b)	Explain basic construction, working and operating characteristics of Fixed Capacitor – Thyristor Controlled Reactor (FC-TCR).	**07**
		OR	
Q.3	**(a)**	Briefly describe the working of a Thyristor Controlled Transformer (TCT).	**07**
	(b)	Discuss design of the SVC Voltage Regulator.	**07**
Q.4	**(a)**	Explain construction, working principle and V-I characteristics of STATCOM.	**07**
	(b)	Discuss the influence of SVC on the system voltage to which it is connected through coupling transformer.	**07**
		OR	
Q.4	**(a)**	Discuss the importance of having slope in the dynamic characteristic of SVC.	**07**
	(b)	Explain Multilevel VSC-Based STATCOM and state its salient features.	**07**
Q.5	**(a)**	Discus the operating principle of a Unified Power Flow Controller (UPFC) with its phasor diagram.	**07**
	(b)	Explain the principle of operation of basic Thyristor-Controlled Series Capacitor (TCSC) scheme.	**07**
		OR	
Q.5	**(a)**	Draw and explain reactance (X_{TCSC}) Vs thyristor firing delay angle (α) characteristics of TCSC.	**07**
	(b)	Explain the operation of Static Synchronous Series Capacitor (SSSC).	**07**

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