

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014****Subject code: 734501****Date: 25-11-2014****Subject Name: Application of Power Electronics to Power System****Time: 02:30 pm - 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) Classify FACTS devices and mention their advantages & disadvantages. **07**
(b) Derive an expression for mid-point voltage of a symmetrical lossless transmission line as a function of power flow on it. **07**
- Q.2** (a) Explain the FC-TCR configuration. Explain operating characteristic without step down transformer and losses in FC-TCR **07**
(b) Explain Thyristor Controlled Transformer. **07**
- OR**
- (b) Explain the principle of operation of a TSC-TCR static var generator. **07**
- Q.3** (a) Explain Multilevel VSC-Based STATCOM and state its salient features. **07**
(b) Explain three phase six pulse STATCOM. Also draw and explain the waveforms of capacitor voltage and current. **07**
- OR**
- Q.3** (a) Explain with the help of suitable diagram working principle of STATCOM and its VI characteristic. **07**
(b) Explain the application of STATCOM for improving transient stability of a power system. **07**
- Q.4** (a) Draw and explain the block diagram of a typical TCSC power control structure. **07**
(b) Explain any one application of TCSC in power system. **07**
- OR**
- Q.4** (a) Explain the V-I and X-I capability characteristics of the single module TCSC for continuous time application, short duration implementation and 1-10s. **07**
(b) Discuss the role of SVC as a voltage controller. **07**
- Q.5** (a) Discuss the importance of having slope in the dynamic characteristic of SVC. **07**
(b) Discuss the influence of SVC on the system voltage to which it is connected through coupling transformer. **07**
- OR**
- Q.5** (a) Discuss the operating principle of a Unified Power Flow Controller (UPFC). How can it be implemented using two back to back voltage source converters? **07**
(b) Explain the principle of operation of Static Synchronous Series Capacitor (SSSC) scheme. **07**
