

Seat No.	
-------------	--

**B.E. (Electrical) (Semester - VII) Examination, December - 2015****FACTS****Sub. Code : 47939****Day and Date : Tuesday, 15 - 12 - 2015****Total Marks : 100****Time : 10.00 a.m. to 01.00 p.m.**

- Instructions :**
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.
  - 3) Draw neat figures wherever necessary.

**SECTION-I**

- Q1) a)** List various FACTS devices used in power system. Explain importance of use of FACTS in power system. [8]
- b)** Draw a neat diagram and explain ideal mid-point compensator. Explain how transient stability is improved. [9]
- Q2) a)** With the help of neat diagram explain effect of shunt compensator on variation of receiving end voltage for different power factor load. [8]
- b)** Explain effect of shunt compensator on stability margin and power oscillation damping. [9]
- Q3) a)** Give the expression for fundamental TCR current. Explain variation of this current with firing angle  $\alpha$  [8]
- b)** Explain TSC-TCR type static var generator and explain its var demand versus var output characteristics. [8]
- Q4) a)** Explain use of converter as reactive power generator in power systems. [8]
- b)** State various hybrid var generators. Explain any one in details. [8]

**P.T.O.**

**SECTION-II**

- Q5) a)** Compare TCR-FC and TCR-TSC based on following points. [10]
- i) harmonic generation
  - ii) V.I. and V.Q. characteristics
  - iii) maximum theoretical delay
  - iv) Losses versus var output
  - v) Transient behaviour under system voltage disturbance
- b)** Draw and explain V-Q characteristics of STATCOM and SVC. [8]
- Q6) a)** What is series compensation? How it is obtained in transmission line? [8]
- b)** Draw loss versus var output characteristics of [8]
- i) STATCOM
  - ii) STATCOM+TSC
  - iii) TSC
  - iv) TCR+FC and explain it
- Q7) a)** Explain harmonic reduction in GTO controlled series capacitor. [8]
- b)** Draw a block diagram and explain internal control scheme for SSSC employing indirectly controlled converter. [8]
- Q8) a)** Explain the concept of voltage regulator and phase angle regulator in three phase power system. [8]
- b)** Compare UPFC and phase angle regulators. [8]

