

**B.Tech. – VIEP – ELECTRICAL ENGINEERING  
(BTELVI)**

**Term-End Examination**

00245

**December, 2014**

**BIEEE-008 : FLEXIBLE AC TRANSMISSION SYSTEM**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Attempt any *seven* questions. All questions carry equal marks. Assume suitable data, if missing.

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1. (a) Explain the various factors limiting the loading capability of a transmission line. 5
- (b) An industrial three-phase load bus draws power of  $(100 + j50)$  kVA. If the bus voltage is 400 V (L – L), find the compensator rating per phase. What is the compensator susceptance? 5
2. (a) Discuss how reactive power control is possible by controlling the magnitude of voltage. 5
- (b) What are the various advantages of FACTS devices? 5

3. (a) Explain the working principle and VI characteristics of a STATCOM. 5
- (b) Discuss the method of voltage control by SVC. 5
4. Explain the working principle of TCR with necessary waveforms and operating characteristics. 10
5. (a) Draw VI characteristics and loss characteristics for (i) TCSC and (ii) SSSC. 5
- (b) Explain the basic concept of voltage regulator with the help of a phasor diagram. 5
6. What is UPFC ? Explain how UPFC is different from a simple voltage source converter. Give the block diagram for a basic UPFC control scheme. 10
7. (a) Give the block diagram of a generalized IPFC. 5
- (b) By means of a block diagram simulate a generalized IPFC which can be operated as a STATCOM, UPFC or IPFC. 5
8. Discuss briefly the following custom power devices :  $4 \times 2 \frac{1}{2} = 10$
- (i) STS
- (ii) SSC
- (iii) SVR
- (iv) UPQC

9. (a) With the help of a diagram, explain the working of a series connected dynamic break and also list its advantages. 5
- (b) Draw the circuit of a thyristor controlled voltage limiter and discuss its functioning. 5

10. Write short notes on any *two* of the following :

$2 \times 5 = 10$

- (i) TCPAR
- (ii) Thyristor controlled current limiter
- (iii) Generalized and multifunctional FACTS controllers
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