

**B.E. / B.TECH. DEGREE EXAMINATIONS, December 2020**

Seventh Semester

**EE16012 – FLEXIBLE AC TRANSMISSION SYSTEMS****(Regulation 2016)****Time: Three Hours****Maximum : 80 Marks**Answer **ALL** questions**PART A - (8 X 2 = 16 Marks)**

1. To regulate the receiving end voltage at rated value the following is used  
 (a) Real power compensator      (b) Reactive power compensator  
 (c) Phase compensator            (d) All of the above
2. Which one of the following is not the type of SVC?  
 (a) FC- TCR      (b) TSC- TCR      (c) TCSC      (d) MSC- TCR
3. With series capacitors, the reactive power increases as the square of line \_\_\_\_\_  
 (a) Voltage                            (b) Current  
 (c) Resistance                        (d) Reactance
4. Configuration of DVR is similar to  
 (a) STATCOM      (b) SSSC      (c) UPFC      (d) IPFC
5. Why do you need reactive power compensation in transmission lines?
6. How Bang-Bang control is applied in TCSC?
7. Distinguish between UPFC and IPFC.
8. Differentiate various FACTS controller interactions.

**PART B - (4 X16 = 64 Marks)**

9. (a) Analyse in detail about the effects of shunt and series compensation in transmission lines. **(16)**

**(OR)**

- (b) (i) Discuss the possible control actions to maintain the voltage at rated value in transmission lines. **(8)**
- (ii) Differentiate between shunt and series connected FACTS controllers. **(8)**
10. (a) An SVC connected to a 735-kV system has a reactive-power range of 300 MVAR production to 100 MVAR absorption. The droop is set to 5%. The system short- **(16)**

circuit level is specified as follows:

- The maximum short-circuit current: 50 kA.
- The minimum short-circuit current under normal operating conditions: 5 kA.
- The minimum short-circuit current during system restoration after loss of a transmission line: 500 A.

From these specifications,

1. Determine the per-unit regulator gain that ensures stable operation from 5 kA to 50 kA system short-circuit current.
2. Determine the per-unit regulator gain for stable operation in the system short-circuit-level range 500 A to 50 kA.

**(OR)**

- (b) Discuss in detail how SVC can be applied to enhance the power transfer capacity of a transmission line. **(16)**

11. (a) Discuss the modelling of TCSC for various power system studies in detail. **(16)**

**(OR)**

- (b) Describe the capabilities of TCSC in improving the system stability and power system oscillation damping. **(16)**

12. (a) Discuss in detail the operating principle, V-I characteristics and applications of static synchronous series compensator. **(16)**

**(OR)**

- (b) With necessary phasor diagrams analyse the conventional transmission capabilities of UPFC. **(16)**