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**Question Paper Code : 82170**

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Second Semester

Power System Engineering

PS 9223/PS 9323/PS 923/10233 PS 203 — FLEXIBLE AC TRANSMISSION  
SYSTEMS

(Common to M.E. Electrical Drives and Embedded Control and  
M.E. Power Electronics and Drives, M.E. Power Management and M.E. High  
Voltage Engineering)

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the types of FACTS controllers.
2. State the purpose of series compensation of a transmission line.
3. Write down the applications of a Static Var Compensator.
4. Compare the SVC and Synchronous condenser.
5. Write the significance of two different modes of operation of TCSC.
6. Draw the variable reactance model of TCSC.
7. What is a static synchronous series compensator?
8. Draw the schematic diagram of STATCOM.
9. Draw the general schematic of genetic algorithm.
10. How can the controller interactions be minimized?

PART B — (5 × 16 = 80 marks)

11. (a) With neat diagram explain the operation of a Unified Power flow controller with different control modes. (16)

Or

- (b) Discuss in detail the effect of ideal mid-point compensation of a two machine system. (16)

12. (a) (i) Briefly explain the application of SVC for preventing voltage instability. (8)  
(ii) Write short notes on enhancement of transient stability using SVC. (8)

Or

- (b) (i) Describe in detail the working of static var compensator along with its functional control scheme. (10)  
(ii) Explain the influence of SVC on system voltage. (6)
13. (a) With necessary equations, explain the modeling of Thyristor Controlled Series Capacitor for power flow studies. (16)

Or

- (b) (i) Discuss the working of TCSC in terms of its operating ranges with neat diagrams. (8)  
(ii) Write a note on SSR mitigation. (8)
14. (a) Illustrate the working of SSSC with neat diagram and also discuss their control of power flow application. (16)

Or

- (b) Draw and explain the V-I characteristics of STATCOM. And also discuss its application on steady state power transfer and transient stability Enhancement. (16)
15. (a) Briefly discuss the different control techniques used for the co-ordination of multiple FACTS controllers. (16)

Or

- (b) Describe the SVC-SVC controller interaction with network resonance in a power system with necessary equations. (16)