

Seventh Semester

Electrical and Electronics Engineering

EE 6004 — FLEXIBLE AC TRANSMISSION SYSTEMS

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between load compensation and system compensation.
2. Write the need for a reactor in basic single phase TSC diagram.
3. List the advantages of slope in dynamic characteristics of SVC.
4. What is PSDC?
5. List the different modes of TCSC operation.
6. Draw the VI capability characteristics for single-module TCSC.
7. Draw the VI characteristics of STATCOM.
8. Define SSSC and list the components in it.
9. List the various possible combinations for the study of controller interactions.
10. What are the frequency ranges for the study of different control interactions?

PART B — (5 × 16 = 80 marks)

11. (a) Draw the single line diagrams of TCSC, STATCOM, SSSC and UPFC. (16)

Or

- (b) What is meant by active and passive compensation? Discuss the effect of various types of passive compensation on power transmission capacity with necessary diagrams and expressions. (16)

12. (a) Explain the voltage-control action by the SVC with necessary diagrams. (16)

Or

(b) Explain the role of SVC in increasing the steady state power-transfer capacity with necessary diagrams and expressions. (16)

13. (a) (i) Discuss the advantages of TCSC in detail. (8)

(ii) Describe the variable reactance model of TCSC with block diagram. (8)

Or

(b) Briefly describe the steps to be followed for SSR mitigation by TCSC.

14. (a) (i) Explain the principle of operation and applications of STATCOM. (8)

(ii) Explain the power exchange process between STATCOM and power system. (8)

Or

(b) Explain the principle of operation of SSSC and series-compensation using SSSC with necessary diagrams and expressions. (16)

15. (a) (i) Explain the coordination features of parallel SVCs and electrically close SVCs. (8)

(ii) Explain the controller coordination using Genetic Algorithms. (8)

Or

(b) Describe the basic procedure for controller design for the coordination of multiple controllers using linear control techniques. (16)