CBCS SCHEME

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18EE821

Eighth Semester B.E. Degree Examination, July/August 2022
FACTs and HVDC Transmission

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define "FACTs controller". Explain the basic types of FACTs controller. **(08 Marks)**
b. Why transmission interconnections are needed? **(05 Marks)**
c. List the possible benefits of FACTs technology. **(07 Marks)**

OR

2 a. Explain the power flow and dynamic stability considerations of a transmission interconnection. **(10 Marks)**
b. Explain the limitations of loading capacities of a transmission network. **(07 Marks)**
c. Describe the importance of different types of controllers. **(03 Marks)**

Module-2

3 a. What are the important objectives of shunt compensation? **(04 Marks)**
b. Discuss the extension of voltage stability of a radial line using reactive shunt compensation. **(08 Marks)**
c. Discuss the comparison between STATCOM and SVC. **(08 Marks)**

OR

4 a. Make use of two machine system to compare the transient stability margin of a two line power system with and without mid-point shunt compensation. **(08 Marks)**
b. Identify the major reasons for the preference of voltage sourced converter for use in FACTs converter. **(04 Marks)**
c. Develop the basic transfer function block diagram of the static compensator and determine its terminal voltage with respect to internal voltage and the reference voltage. **(08 Marks)**

Module-3

5 a. What are the main objectives of series compensation? **(04 Marks)**
b. Explain the concept of series capacitive compensation. **(06 Marks)**
c. Explain thyristor – switched series capacitor operation with neat sketch and wave forms. **(10 Marks)**

OR

6 a. Discuss the voltage and reactance control modes of GCSC. **(06 Marks)**
b. Explain thyristor – controlled series capacitor. **(08 Marks)**
c. Explain the transient stability margin for a simple two machine system. **(06 Marks)**

Module-4

7 a. Identify the application areas of HVDC transmission system. (06 Marks)

b. Discuss the advantages of HVDC system with respect to
   i) Long distance bulk power transmission
   ii) Inter connection by AC or HVDC
   iii) Limitations of fault. (06 Marks)

c. Draw the schematic diagram of a typical bipolar HVDC system and explain the function of each component. (08 Marks)

OR

8 a. Classify different types of HVDC systems. Briefly explain them with neat sketches. (08 Marks)

b. With neat circuit diagram and waveform obtain the relationship for DC load voltage of a 3 phase AC – DC converter. (06 Marks)

c. Discuss commutation overlap for a 3 – ph AC – DC converter with necessary equations and waveforms. (06 Marks)

Module-5

9 a. List the requirements of an ideal control system for the HVDC converter. (06 Marks)

b. Briefly explain the commutation failure in HVDC converter. Discuss commutation failure in 3 – phase ground fault. (08 Marks)

c. Explain the characteristic of conventional HVDC control. (06 Marks)

OR

10 a. Draw the control system block diagram of a conventional HVDC system. (10 Marks)

b. Explain the control of reactive power and voltage stability in HVDC converter system. (10 Marks)

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