



(Pages : 2)

A – 2348

Reg. No. :

Name :

Eighth Semester B.Tech. Degree Examination, April 2016

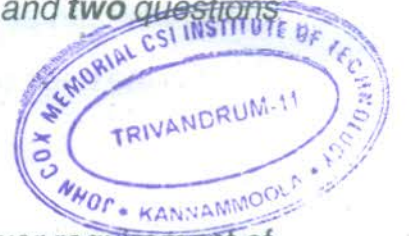
(2008 Scheme)

08.805 Elective – IV (e) HVDC and FACTS (E)

Time: 3 Hours

Max. Marks : 100

Instruction: Answer **all** questions from Part – A and **two** questions from **each** Module in Part – B.



PART – A

1. "A compensator can be designed to provide the reactive power requirement of the load rather than an ideal voltage regulator". Justify the statement.
2. Compare the effect of series capacitor with that of shunt capacitor in sub synchronous resonance.
3. List different types of FACTS devices and their control variables.
4. What are the objectives of SVC ?
5. Draw the configuration and associated waveforms of a TSC.
6. Explain the basic operating principle of a STATCOM.
7. Discuss the principle of a phase shifting transformer.
8. Compare AC and DC transmission on the basis of technical performance.
9. What are the problems associated with metallic return in monopolar operation ?
10. Write the basic concepts of DC circuit interruption. **(10×4=40 Marks)**

P.T.O.



PART – B

Module – I

11. Consider a supply system at 11KV (L – L) volt with $R_S = 0.08\Omega$ and $X_S = 0.4\Omega$ supplying a star connected inductive load whose mean power is 25 mW and whose reactive power varies from 0 to 50 MVAR. All quantities are expressed per phase. Determine the improvement in voltage regulation when the load is compensated for unity power factor. 10
12. Explain how a shunt capacitor connected at the midpoint of a line can affect the voltage regulation. What is the expression for modified power flow in the line ? 10
13. Draw the equivalent circuit of a line with SSSC at the midpoint and show how the power flow can be varied ? 10
14. Explain the need of reactive power flow control in load and transmission lines. 10

Module – II

15. Explain the operation and control of a TCR with neat sketches. What is its drawback and how it can be rectified ? 10
16. Describe the various operating configurations of a TCSC. 10
17. Derive expressions for voltage and power in an SVC. 10
18. Explain the basic operating principle of a UPFC. How this can be implemented using two back-to-back converters ? 10

Module – III

19. a) Explain different types of DC link. 4
b) Draw the circuit of a 12 pulse converter unit at the converter station. 6
20. Explain the grid control scheme to maintain constant power in the DC link with reason. Draw the converter control characteristics also. 10
21. Derive the expression for the average DC output voltage of a Graetz circuit without overlap. 10
22. Explain the reactive power requirement at the converter station in detail. Which are the reactive power sources available for the system ? 10