



Reg. No. :

Name :

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 Elective – IV (e) HVDC AND FACTS (E)

Time : 3 Hours

Max. Marks : 100

PART – A



Answer **all** questions.

1. What are the objectives of load compensation ?
2. A consumer assumes the responsibility for power factor correction. Justify.
3. What is the approximate SIL for a single circuit 400 KV line ?
4. Briefly explain the phenomenon of sub synchronous resonance.
5. Compare SVC and STATCOM.
6. What is the basic concept of phase angle regulator ?
7. What is the significance of the adjective 'unified' in UPFC ?
8. Compare AC and DC transmission systems.
9. What are the problems associated with monopolar operation ?
10. Explain the basic concepts of DC circuit interruption. **(10×4=40 Marks)**



PART – B

Answer **two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Derive the expressions for midpoint voltage and current of a symmetrical line.
12. A 400 KV, 50 Hz, 600 Km long symmetrical line having an inductance of 1 mH/Km and capacitance of 11.1×10^{-9} F/Km is operated at rated voltage. Find :
 - i) The theoretical maximum power carried by the line.
 - ii) Midpoint voltage corresponding to this condition.
 - iii) The reactance of the series capacitor to be connected at the midpoint of the line to double the power transmitted.
13. Explain different types of FACTS controllers.
14. Draw the equivalent circuit of a line with STATCOM at the midpoint and derive the expressions for the midpoint voltage and power flow in the line.

Module – II

15. Explain the operation and control of FC + TCR with neat sketches.
16. Derive expressions for voltage and power in SVC.
17. Explain the principle of operation of SSSC.
18. Explain the working principle of a UPFC with diagrams.

Module – III

19. a) Explain different types of DC link. 6
 b) Draw the circuit of a 12-pulse converter unit at the converter station. 4
20. Derive the expression for the average DC voltage at the output of a Graetz circuit without overlap.
21. Draw and explain the converter control characteristics of an HVDC system.
22. Why reactive power is required in HVDC systems and how is it controlled ?