

FACULTY OF ENGINEERING

B.E. 4/4 (E&EE) I Semester (Main) Examination, December 2011

HVDC TRANSMISSION (Elective – I)

Time: 3 Hours]

[Max. Marks: 75

Note : Answer all questions from Part A, Answer any five questions from Part B.

PART – A

(25 Marks)



1. Compare AC and DC transmission systems. 3
2. Mention the applications of HVDC transmission system. 2
3. Draw the equivalent circuit of the rectifier circuit. 2
4. What are the desired features of HVDC control system ? 3
5. What are the properties of converter circuit ? 3
6. What is meant by minimum extinction angle control ? 2
7. Draw the schematic diagram of HVDC circuit breaker. 2
8. Define :
 - i) Characteristic harmonics
 - ii) Non-characteristic harmonics. 2
9. List out the applications of MTDC systems. 3
10. Explain the power reversal in MTDC systems. 3

PART – B

(50 Marks)



11. a) With neat diagrams explain different types of HVDC links. 5
- b) Draw the schematic diagram of typical HVDC converter station and explain. 5
12. a) Draw the schematic circuit diagram of a 3-phase bridge rectifier and explain its principle of operation without overlap. 5
- b) From fundamentals obtain the equivalent circuit of an inverter circuit. 5

13. a) Explain the combined characteristics of rectifier and inverter. 5
- b) Explain :
- i) Constant current control
 - ii) Constant minimum ignition angle control. 5
14. a) Derive an expression for reactance of DC reactor to prevent commutation failure. 5
- b) Describe the causes of over voltages in a converter station and the protection against them. 5
15. a) Explain the operation of a DC circuit breaker with current and voltage waveforms. 5
- b) Explain the phenomenon of commutation failure. 5
16. a) Compare series and parallel MTDC systems. 5
- b) Explain :
- i) Current margin method
 - ii) Decentralized current reference balancing method of control of MTDC systems. 5
17. Write short notes on : 10
- i) Planning for HVDC transmission
 - ii) Bypass valves
 - iii) Corona loss in AC and DC systems.