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Eighth Semester B.E. Degree Examination, May / June 08
HVDC Power Transmission

Max. Marks:100

Time: 3 hrs.

Note : Answer any FIVE full questions.

- 1
 - a. Compare AC and DC Transmission on the basis of economics, Technical performance and Reliability. (10 Marks)
 - b. Draw the schematic diagram of a typical HVDC converter station and explain the various components. (10 Marks)

- 2
 - a. Explain the different types of DC links used for HVDC power transmission. (04 Marks)
 - b. Prove that Graetz circuit configuration is the best for 6 pulse converter operation. (08 Marks)
 - c. Analyze the performance of Graetz circuit with overlap condition, when two and three valves are in conduction mode. Draw relevant circuit diagrams and waveforms. (08 Marks)

- 3
 - a. What are the desired features of control in HVDC converter station? (08 Marks)
 - b. Explain the control characteristics of Rectifier and Inverter. (12 Marks)

- 4
 - a. Name three basic types of faults that occur in converters. (03 Marks)
 - b. Explain briefly the commutation failure, Arc through and misfire. (09 Marks)
 - c. Explain the basic principles of over voltage protection in DC systems. (08 Marks)

- 5
 - a. Explain the functions and basic concepts of DC circuit Breakers. (10 Marks)
 - b. Mention four functions of smoothing reactor. (04 Marks)
 - c. A circuit breaker is used to interrupt a DC line. The parameters are as follows : DC current of 25 Amps, for a system voltage of 500 volts, Breaker counter voltage of 1000 volts and DC line inductance of 1 Henry, compute the energy absorbed by the breaker and the required to bring to zero. (06 Marks)

- 6
 - a. List the various types of AC filters used. (03 Marks)
 - b. Explain the generation of harmonics in HVDC systems. (08 Marks)
 - c. What are the types of MTDC systems and explain in brief? (09 Marks)

- 7
 - a. What are the main advantages and disadvantages of digital simulation? (10 Marks)
 - b. Explain parity simulators. (06 Marks)
 - c. What are the applications of DC simulator? (04 Marks)

- 8

Write brief notes on the following :

 - a. Applications of HVDC systems.
 - b. Constant current versus constant voltage
 - c. Protection against over currents in HVDC systems.
 - d. Valve and converter model.

(20 Marks)