

ONE TIME EXIT SCHEME

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10EE751

Seventh Semester B.E. Degree Examination, April 2018

HVDC Transmission

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the constitution of EHV AC and DC lines with relevant diagrams. (10 Marks)
b. Summarize the advantages, disadvantages and applications of HVDC transmission system. (10 Marks)
- 2 a. Compare the HVAC and HVDC transmission for economics of operation, stabilities limit, voltage control and reliabilities. (10 Marks)
b. Discuss the HVDC links used in HVDC transmission system with relevant schematic diagrams. (10 Marks)
- 3 a. Describe the single phase full wave rectifier with wave forms and schematic diagram and obtain : i) average direct voltage ii) peak inverse voltage iii) volt–ampere rating of valves and transformer primary and secondary winding. (12 Marks)
b. Explain the criteria for the choice of best converter circuit used for HVDC system. (08 Marks)
- 4 a. Deduce the expressions for average DC voltage, PIV and VA rating of valves and transformer for a three phase one was rectifier circuit. (12 Marks)
b. Explain the following :
i) Six–phase diametrical connection
ii) Parallel connections with interphase transformer. (08 Marks)

PART – B

- 5 a. Analyze the Greatz circuit without overlap and prove that $\cos\phi = \cos\alpha$, where $\cos\phi$ is input supply power factor and α is the firing angle delay, with assumptions made. (10 Marks)
b. Derive the expression for average DC voltage in a six pulse converter circuit with a delay angle of α and overlap angle of less than 60° . (10 Marks)
- 6 a. Draw the electrical equivalent circuit of a HVDC link and explain the basic principles of controlling the voltage at any point on the line and current. Also explain the power reversal. (10 Marks)
b. Describe combined characteristics of rectifier and inverter. What is current margin? (10 Marks)
- 7 a. Enumerate the desired features of constant current control for a HVDC converter station. (10 Marks)
b. Explain stabilities of control by considering a damping circuit. (10 Marks)
- 8 a. List the functions of DC smoothing reactors. (06 Marks)
b. What are the causes of oscillations in DC line? Explain. (04 Marks)
c. Explain how current oscillations are minimized using anode dampers. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.