

No. of Pages:

A

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER SEMESTER M.TECH DEGREE EXAMINATION, DECEMBER 2017
Electrical and Electronics Engineering

Power Systems

01EE7411: EHVAC and DC Transmission ✓

Answer any two full questions from each part

Limit answers to the required points.

Max. Marks: 60

Duration: 3 hours

PART A

- | | | | |
|----|----|--|---|
| 1. | a. | Explain the schematic diagram of a typical HVDC converter station and derive the expression for power at rectifier end, inverter end and power loss in the dc circuit. | 6 |
| | b. | Give the economic comparison of HVAC and HVDC transmission system | 3 |
| 2. | a. | With necessary diagrams explain the operation of 12 pulse bridge converter with overlap angle. | 6 |
| | b. | Explain the constant current control method used with HVDC converters with a schematic diagram | 3 |
| 3. | a. | Discuss constant minimum ignition angle control in HVDC converters | 4 |
| | b. | With schematic diagrams, explain different types of HVDC transmission systems and discuss their relative merits and demerits | 5 |

PART B

- | | | | |
|----|----|---|---|
| 4. | a. | Draw and explain configuration of sea electrode. Compare the sea electrode with shore electrode | 6 |
| | b. | Write notes on DC lightning arresters. | 3 |
| 5. | a. | Write short notes on DC harmonic filter. | 3 |
| | b. | Discuss reactive power requirements in HVDC substations | 6 |
| 6. | a. | Explain the significance of Short Circuit Ratio while planning HVDC links. | 5 |
| | b. | Discuss the troubles caused by earth currents in HVDC systems. Also explain remedial measures | 4 |

PART C

7. a. A 3 phase overhead transmission line has equivalent spacing of 5.5m between conductors and conductor diameter is 3 cm. Atmospheric temperature is 10°C and barometric pressure is 740 mm of Hg. Surface irregularity factor for stranded conductors is 0.9. 8
- Calculate the following.
- i) Critical surface stress peak value, for fair weather and visual corona, for both centre conductor and side conductor.
- ii) Critical disruptive phase voltage and phase to phase voltage for visual corona under fair weather condition
- b. Discuss the affecting corona losses in EHV system 4
8. a. Explain the significance of creepage distance for AC insulators and DC insulators in insulation coordination. 6
- b. Explain the biological effects of EHV lines 6
9. a. Explain the surge arrester protection for a typical HVDC converter station. 6
- b. Discuss the importance of insulation co-ordination in power systems 6

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