APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER M.TECH DEGREE EXAMINATION, DECEMBER 2018
Branch: Electrical and Electronics Engineering
Stream(s):

1. *Power Systems*
2. *Power System and Control*
3. *Power Control and Drives*
4. *Electrical Machines*

01EE7411 EHV AC & 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. Give a typical configuration of an EHC AC transmission line and explain the various parts. (6marks)

    b. State the merits of HVDC as compared to EHVAC for bulk power transmission (3marks)

2. a. A bipolar two terminal HVDC link is delivering 1000MW at $\pm$ 500 kV at the receiving end. Total losses in the DC circuit are 60MW. Calculate the following. (i) Sending end power. (ii) Power in the middle of the line. (iii) Sending end voltage (iv) voltage at middle of line(v)Total resistance of the DC Circuit (5marks)

    b. What are the different types of links used in HVDC transmission system (4marks)

3. a. What are the advantages of system interconnections? (3 marks)

    b. Explain the technical advantages of using HVDC for system interconnections over EHV-AC interconnections (6 marks)

PART B

4. a. What are the problems associated with injection of harmonics in the AC System by HVDC Converters. (4 marks)

    b. Sketch a single line diagram of an HVDC substation indicating DC smoothing reactor, damping circuit, DC shunt filter and DC surge capacitors. Explain the function of these equipment (5 marks)

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5. a. The inverter of a DC convertor station has no load ideal DC voltage 275.53kV and DC current of 1.5kA. The actual DC voltage is 246.25 kV. Compute the reactive power requirement of the inverter (4.5 marks)

b. Explain the significance of SCR for planning and stability considerations of HVDC links based on SCR (4.5 marks)

6. a. What are the factors to be considered in selecting site of earth electrode (2 marks)

b. Explain the problems of earth return currents during monopolar earth return operation of a two terminal HVDC system. What are solutions to this problem? (7 marks)

PART C

7. a. What is meant by bundling of conductors and explain the purpose of bundling for EHV AC and HVDC transmission (6 marks)

b. Explain the term Insulation coordination and its objective in EHV AC and HVDC transmission systems (6 marks)

8. A three phase overhead line has conductor spacing of 5.5m and conductor diameter of 3 cm. Atmospheric pressure is 740mm of Hg and temperature is 10°C. Conductor surface irregularity factor is 0.9. Line is operated at 420kV at 50Hz. Calculate the fair weather corona loss per phase by Peeks Formula. (12 marks)

9. Explain the biological effects of strong electric field on human beings standing on earth with bare foot. (12 marks)