— 176 —

VIII SEMESTER

B.Tech.[EE/ EL]

MID SEMESTER EXAMINATION

March-2019

EE/ EL422   HVDC Transmission

Time : 1.5 hours

Max. Marks: 25

Note: Answer all the questions. Assume suitable missing data, if any. All symbols have usual meanings

Q1 Give reasons for the following briefly: (1x5=5)

(i) Need of smoothing reactors and their function and location

(ii) Cost comparison of HVDC vs EHVac transmission systems

(iii) A number of back to back HVDC stations are presently installed

(iv) Self commutated voltage source converters based HVDC systems are in use today.

(v) Calculation of rating and number of thyristor valves in a converter.

Q2 Show and discuss the following :

(i) Dc link voltage waveforms for converter with ignition delay angles of 45^0 and 135^0.

(ii) Line current waveform and calculate its rms value.   (5)

Q3 Compare a bipolar HVDC link vs. monopolar HVDC link using suitable diagram. Also, compare the power transfer capability of bipolar HVDC system with 3phase ac system when it is assumed that conductor size is same in both the cases and insulation level is also same. Show the effect when power factor is 0.9 and 0.96.   (5)

Q4 A three phase fully controlled bridge converter is connected to a 110kV(L-L), 50 Hz supply with a source reactance of 2.5Ω/ ph. The converter is operating as a rectifier at a firing angle of (i) $30°$ and (ii) 60^0, Determine the average load voltage and overlap angle in both the cases when the converter is supplying a steady current of 1000A. Give the equations used.   (5)

Q5 The ac line voltage of a three phase bridge rectifier is 150kV (L-L)when delivering a DC power of 300MW. Assuming a delay angle of 30^0 and commutating reactance of 10 Ω, find the value of DC current in the circuit and the reactive power demand of the converter. (5)

END