USN | | | | | | | | | | 10EE751

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020

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. Compare AC and DC transmission on the basic of (i) Economics of transmission and (ii) Stability of the system. **(10 Marks)**

b. With a neat sketch, explain the HDVC links and why the bipolar line is commonly used. **(10 Marks)**

2 a. Draw the schematic diagram of typical HVDC converter station and explain the function of each component. **(10 Marks)**

b. With relevant figures, explain the constitution of EHV-AC and HVDC links. **(10 Marks)**

3 a. Explain three phase two way rectifier circuit with waveform and obtain:
i) Average of direct voltage
ii) Peak-peak ripple
iii) PIV
iv) Aggregate valve rating
v) VI rating of transformer primary and secondary **(14 Marks)**

b. Write any three properties of converter circuits. **(06 Marks)**

4 a. Write brief note on "six pulse rectifier". Mention its performance parameters. **(10 Marks)**

b. Which is the best suited circuit for HVDC transmission? Why? **(04 Marks)**

c. Draw the schematic and waveforms of twelve pulse rectifier. **(06 Marks)**

PART – B

5 a. Derive an expression for average DC voltage in Graetz circuit with an overlap of less than 60 degrees. **(10 Marks)**

b. Draw the equivalent circuits of inverter and write the equations for average of direct current and voltage interms of β and γ. **(10 Marks)**

6 a. Discuss constant current versus constant voltage control in DC transmission line. **(05 Marks)**

b. Enumerate the desired features of control for a HVDC converter station. **(08 Marks)**

c. Explain various forms of grid pulses. **(07 Marks)**

7 a. Explain constant extinction angle control with the help of schematic and necessary equations. **(10 Marks)**

b. Describe combined characteristics of Rectifier and Inverter. **(10 Marks)**

8 a. Explain the functions of Smoothing Reactor. **(06 Marks)**

b. Explain the current oscillations and applications of anode dampers. Why damper is less effective if it is connected to cathode side? Explain. **(10 Marks)**

c. Explain Re-energization of DC line. **(04 Marks)**

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