MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PE-EE 601B HVDC Transmission

UPID : 006746

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) Mention the Types of filters.

(II) What are the requirements of a good simulation tool?

(III) State the advantages of parity simulator.

(IV) What are the approaches used for transient analysis of electrical network?

(V) List the types of power devices for HVDC transmission.

(VI) What is meant by pulse number of a converter?

(VII) How can the converter configuration defined?

(VIII) How power is reversed in HVDC link?

(IX) What is radio interference?

(X) What are the application of HVDC transmission?

(XI) What is LASCR? How does it differ from a conventional SCR?

(XII) Mention the various modes of operation of inverter characteristics.

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. Draw and explain the circuit of Graetz circuit. [5]
3. Draw and explain the circuit diagram of 12 pulse converter. [5]
4. What are the importance of the firing angle of the converter valve? [5]
5. Mention and explain the various modes of operation of rectifier characteristics. [5]
6. Compare insulation characteristics of DC and AC cable. [5]

Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

7. (a) What is the need for interconnection of systems? Explain the merits of connecting HVAC systems by HVDC tie-lines. [8]

   (b) With the help of a neat schematic diagram of a typical HVDC converter station, explain the functions of various components available. [7]

8. (a) Discuss the effect of pulse number and overlap angle on harmonics generated by HVDC converters. [8]

   (b) Using fourier analysis show that the lowest order voltage harmonic present in Graetz circuit output voltage is six. [7]

9. (a) What is the reason for using star-star and star-delta transformer configurations for 12 pulse converter? Derive an equation for primary current using fourier analysis. [10]

   (b) Clearly explain how harmonics are produced and obtain the expression for rms value of the fundamental component of the current, [5]

10. (a) Explain with neat sketch, constant extinction angle control. [9]

    (b) What is meant by current margin between two stations in a HVDC link? [6]

11. (a) Explain the drawbacks in Individual phase control and equidistant pulse control schemes used in HVDC projects. [7]

    (b) Write short notes on the (a) Constant Alpha control and (b) Inverse cosine control. [8]

*** END OF PAPER ***