

(3 Hours)

[Total Marks: 80]

- N.B. : (1) Question No.1 is compulsory  
(2) Attempt any three from the remaining  
(3) Figures to the right indicate full marks  
(4) Assume suitable data if necessary

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| 1   | Solve any four :-  | 20 |
| (a) | List out the advantages of HVDC  |    |
| (b) | What is meant by ground return in HVDC?  |    |
| (c) | Write a short note on Arc back .   |    |
| (d) | Explain effects of harmonics in HVDC system.   |    |
| (e) | Brief converter transformer.   |    |
| 2   | (a) Give the equivalent circuit of a 12 pulse converter, What are the different condition modes? | 10 |
| (b) | Draw and explain the operation of a 6 pulse converter with overlap angle less than $60^\circ$    | 10 |
| 3   | (a) Explain single commutation failure with diagram and waveform                                 | 10 |
| (b) | Explain power reversal in HVDC.  | 10 |
| 4   | (a) Explain over voltage and over currents protection in HVDC                                    | 10 |
| (b) | Explain basic control characteristics of HVDC  | 10 |
| 5   | (a) Explain two methods of Equidistant Pulse Control   | 10 |
| (b) | Explain different types of faults in HVDC link.  | 10 |
| 6   | (a) Explain the DC filters in HVDC.  | 10 |
| (b) | Compare AC transmission and HVDC transmission  | 10 |