

- 15/05/19
- i) DC Link Voltage profile (4)
- ii) Rectifier ignition angle α and inverter advance angle γ and commutation overlap angle μ . (4)

12a) i) Derive the DC link voltage with, without delay in firing angle. Also consider the drop due to effect of source inductance with relevant equations and plots. How is it modeled in the equivalent circuit of HVDC link. (16)

(OR)

12b) Sketch the valve currents during commutation in relation to commutating voltage. What are the factors influencing the overlap angle μ .

13 a) What are the different modes of operation of HVDC link. Explain the mode shift logic. Illustrate the operating point for both the quadrants in VI plain. (16)

(OR)

13 b) i) Explain Voltage Dependent Current Order Limiter Operation. (8)

ii) Illustrate methods of avoiding mode ambiguity. (8)

14 a) i) Derive expressions for AC side characteristic harmonics in case of 12 pulse bipolar link operation. (16)

(OR)

14. b) i) Draw the schematic diagram of SVC and illustrate how its connected to AC/DC transmission system. Explain basic operation of SVC with VI plots. Enumerate how it is employed in HVDC link operation.

15a) Derive the basic mismatch equations for a bipolar DC link. Explain the formation of Jacobian matrix for unified solution of ac dc equations. Illustrate the algorithm using a flow chart. (16)

(OR)

15b) Write down the state variables of your choice for a given power system. Assume any constraints, Write the mismatch equations and formulate the Jacobian matrix for unified load flow studies.

Given Rectifier : Under Constant Current (CC) control mode

Inverter: Constant Extinction Angle (CEA) mode

