

Total No. of Questions : 6]

SEAT No. :

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P216

BE/INSEM/APR-545

B.E. (Electrical Engineering)

403149 B : HVDC AND FACTS

(2015 Pattern) (Semester - II) (Elective - III)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) A bipolar two terminal HVDC link is delivering 1000 MW at ± 500 kV at the losses in the DC circuit are 50MW calculate following : [10]

- a) Sending end power.
- b) Sending end voltage.
- c) Power in the middle of the line.
- d) Voltage in the middle of the line.
- e) Total resistance of the DC circuit.

OR

- Q2) a) Explain CIA, CC and CEA control for HVDC converter station. [6]
- b) Explain effect of delay angle and angle of advance commutation. [4]

- Q3) a) State and explain types of HVDC links. Draw a schematic of a homopolar HVDC system. Give brief description of each component. [6]
- b) Explain protection scheme for the valve and bridge group protection of HVDC system. [4]

OR

P.T.O.

Q4) a) Explain types of multi terminal HVDC systems. [5]

b) State advantages and problem of ground return for HVDC system. [5]

Q5) a) How PWM techniques used for voltages & frequency control of load voltage in VSC operation [4]

b) Explain Principle of operation and control of VSC HVDC system. [6]

OR

Q6) a) Explain structure of VSC link and its main components. [6]

b) Explain power transfer characteristics of VSC HVDC system. [4]
