

Roll No. 

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Pow Engg.) (Sem.-2)

**H.V.D.C. TRANSMISSION**

Subject Code : PEE-508

Paper ID : [E0488]

Time : 3 Hrs.

Max. Marks : 100

**INSTRUCTION TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1. State the merits of HVDC as compared to EHV AC for (a) Long high power lines (b) Interconnection.
- Q2. A bipolar two terminal HVDC link is delivering 1000 MW at  $\pm 500$  Kv at the receiving end. Total losses in the DC circuit are 50 MW. Calculate the following :
- (a) Sending end power
  - (b) Power at the middle of line
  - (c) Sending end voltage
  - (d) Voltage at middle of line
  - (e) Total resistance of DC circuit.
- Q3. Derive the mathematical expression of average output voltage, RMS voltage and input power factor of 3-phase (6 pulses) bridge converter and draw the waveform of load current, voltage across the load and voltage across the thyristor for firing angle  $60^\circ$ .
- Q4. On what factor is the reactive power requirement of a converter station depend? The Rihand Delhi HVDC system is being operated in monopolar mode with actual DC voltage at the sending end terminal is  $U_{d1} = 500$  kV and DC current  $I_d = 1000$  A. The no load ideal DC voltage is 550 kV. Calculate the reactive power compensation required for the terminal station. What is the power factor on AC side?
- Q5. Give a single line schematic of AC Harmonic filter in atypical HVDC substation. State the order of the harmonics of the filter branches.

- Q6. Explain by means of a schematic and equations, how power flow through an HVDC link is controlled.
- Q7. Explain the configuration of a typical parallel converter multi-terminal HVDC system. State its advantage as compared with conventional AC interconnected system.
- Q8. Write short notes on the following :
- (a) Protective system in HVDC substations.
  - (b) Stability aspect of asynchronous link.

www.FirstRanker.com