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**M. Tech.**

**HVDC TRANSMISSION**  
**SUBJECT CODE : ELE - 508**

**Paper ID : [E0528]**

[Note : Please fill subject code and paper ID on OMR]

**Time : 03 Hours**

**Maximum Marks : 100**

**Instruction to Candidates:**

- 1) Attempt any **Five** questions.
- 2) All questions carry equal marks.

- Q1)** (a) Give a comparison between HVDC-systems and EHV AC systems based on economics, technical performance and reliability if bulk power is transmitted over a longer length of lines.
- (b) Detail the areas of HVDC-transmission. Also discuss various types of D.C. Links and show clearly how is one type different from other types.
- Q2)** (a) What is meant by control of HVDC-links-discuss.
- (b) Discuss analysis of 3-phase (six-pulse)-converter with grid control overlap angle,  $\mu \leq 60^\circ$ .
- Q3)** (a) Discuss system control hierarchy for a HVDC-link and explain firing angle control in HVDC-values.
- (b) Explain combined characteristics of a converter.
- Q4)** (a) What is importance of Harmonics in HVDC-operation? How is characteristic harmonics different from non-characteristic harmonics-discuss.
- (b) Discuss criteria of design of a.c. filters. Also mention various types of a.c. filters and show their circuit configuration and impedance characteristics.

- Q5)** Why are converter faults caused? Discuss various types of faults against which protection has to be provided. Discuss protection against over currents in terms of selectivity, reliability and back up.
- Q6)** Discuss parallel operation of AC and DC systems. How is AC operation interfaced with DC system-discuss.
- Q7)** Discuss corona loss in HVDC-link. Also explain R.I.-characteristics of HVDC-system.
- Q8)** Write short notes on:
- (a) Stability aspects of synchronous link.
  - (b) Filters for harmonic elimination in HVDC-system.

