

Code: EE7T2

**IV B.Tech - I Semester – Regular / Supplementary Examinations
November 2016**

**HIGH VOLTAGE DIRECT CURRENT TRANSMISSION
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1.

- a) Explain the various considerations to be taken into account for the planning of the HVDC system. 7 M
- b) Explain in detail about modern trends in HVDC transmission. 7 M

2.

- a) Give reasons for selecting star-star and star-delta transformer configuration instead of two star-star configurations for a 12 pulse converter. Derive an equation for the primary current. 7 M
- b) The AC line voltage of a three phase bridge inverter is 160 kV, when the extinction angle is 20° with an overlap of 20.342° . Calculate the DC voltage at the inverter. Also calculate the necessary extinction angle to maintain the AC line voltage at 160 kV, when the DC voltage drops to 180 kV. Assume the overlap angle remains unchanged. 7 M

3.

a) Explain about the constant current control characteristics.

7 M

b) Why regulation is required in any HVDC system? Discuss in detail about the inverter side current regulators used in HVDC system.

7 M

4.

a) Explain the various control strategies for control of the reactive power in HVDC system.

7 M

b) Discuss in briefly about the various sources of reactive power in HVDC system.

7 M

5.

a) What is meant by commutation failure and enlist the adverse effects of commutation failure?

7 M

b) Explain how a DC reactor is used for protection in HVDC system against commutation failures and derive the expression for inductance of the reactor to prevent the commutation failure.

7 M

6.

a) Explain in detail the types of MTDC systems. Compare series and parallel MTDC systems.

7 M

b) In case of failure in communication system, how you will control and protect MTDC system?

7 M

7.

a) Explain the various adverse effects caused by the harmonics on the AC power system. 7 M

b) What are characteristic harmonics and derive the expression for DC voltage and AC current harmonics. 7 M

8. Explain about various types of AC filters which will be employed for a HVDC link. 14 M