

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. - SEMESTER – VIII EXAMINATION – OCTOBER 2012****Subject code: 180907****Date: 25/10/2012****Subject Name: Advanced Power Electronics-II****Time: 02.30pm - 05.00pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain HVDC Transmission System with single line block diagram. 07
(b) What is Regulating Transformer? Explain with phasor diagram how active and reactive power flow can be controlled through a transmission line. 07
- Q.2** (a) Explain the working of three phase Thyristor Controlled Reactor (TCR) with neat diagrams. How to reduce harmonics introduced by three phase TCR? 07
(b) A three phase fully controlled bridge converter is connected to a 400 V, 50 Hz. Supply having a source reactance of 0.3 ohm/ph. The converter is operating as a rectifier at a firing angle of 60 degree. Determine the average load voltage and the overlap angle when the converter is supplying a steady current of 100 A. 07
- OR**
- (b) Two parallel 230 kV transmission lines carry 600 MW of power from a generator bus 1 to a distant bus 2 whence it is delivered to a city. The line L1 has a reactance of 40 ohms/phase. And line L2 has reactance of 60 ohms/phase. By excitation control of the generators the bus 1 is kept at 230 kV. A variable shunt capacitor at bus 2 delivers reactive power to stabilize $|V_2|$ at 230 kV also. Make use of regulating transformer to equate the power flow through two parallel lines. 07
- Q.3** (a) Explain the working of Thyristor Switched Capacitor (TSC). Show with neat diagrams why we cannot use Thyristor Controlled Capacitor (TCC) 07
(b) Derive equations for active and reactive power flow through long transmission line. Use A B C D parameters. 07
- OR**
- Q.3** (a) Explain the working of FC-TCR. Draw neat diagrams. 07
(b) Explain the working of TSC-TCR. Draw neat diagrams. 07
- Q.4** (a) Explain with neat diagram a constant current control method used for HVDC Transmission Converters. 07
(b) Explain with neat diagram a constant Extinction angle control method used for HVDC Transmission Converters. 07
- OR**
- Q.4** (a) Compare AC and HVDC Transmission systems. 07
Q.4 (b) Explain operation and analysis of VSC Converters used for HVDC Transmission. 07
- Q.5** (a) Derive equation for mid-point voltage of the symmetrical transmission line. 07
(b) A line with 800 km length, with $L=0.932$ mH/km, $C=12.2$ nF/km and transmitting power at 735 kV. Find out the midpoint voltage, unlimited midpoint compensation and reactive power injected by compensator. 07
- OR**
- Q.5** (a) Explain Series Compensation for transmission system. 07
(b) Explain Shunt Compensation for the transmission system. 07
