

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER – IV • EXAMINATION – WINTER 2012**

**Subject code: X40902****Date: 27/12/2012****Subject Name: Power Electronics - I****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

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

- Q.1** (a) Explain the construction and working of SCR. Explain two transistor analogy. **07**  
(b) Explain working and construction of UJT. Explain its equivalent circuit. **07**

- Q.2** (a) Explain UJT relaxation oscillator with necessary waveform. Derive its equation of time constant. **07**  
(b) Explain the working and construction of TRIAC. Explain its 1<sup>st</sup> and 3<sup>rd</sup> mode of operation. **07**

**OR**

- (b) Explain triggering circuit of TRIAC using DIAC. **07**

- Q.3** (a) Explain different triggering method of SCR. **07**  
(b) Explain series and parallel connection of SCR. What is the necessity of its operation? **07**

**OR**

- Q.3** (a) Explain single phase half wave rectifier with purely inductive load with wave form. **07**  
(b) Explain bridge rectifier using thyristor with necessary wave form. **07**

- Q.4** (a) What do you mean by turn off of SCR. List out the different method for turning off for SCR. Explain one of them. **07**  
(b) What are the different methods to control the output voltage of chopper? **07**

**OR**

- Q.4** (a) Explain the Zone's Chopper with necessary wave-form. **07**  
(b) Explain four quadrant mode of operation of chopper. **07**

- Q.5** (a) Explain how you can control speed of separately excited D.C. motor. Explain its one of method of speed control using thyristor. **07**  
(b) Explain the three phase half wave rectifier with resistive load with necessary output wave-form. **07**

**OR**

- Q.5** (a) Explain multi-phase chopper circuit. **07**  
(b) Explain working Of IGBT. How it is better than SCR. **07**

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