

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-VII • EXAMINATION – SUMMER 2013

Subject Code: X 71102**Date: 14-05-2013****Subject Name: Power Electronics****Time: 10.30 am - 01.00 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) Give classification of thyristor family. Draw & explain TRIAC in detail. **07**
(b) Enlist the triggering circuits & explain any two of them in detail using circuit diagram, waveforms & equations. **07**

- Q.2** (a) Enlist & explain the various current & voltage ratings of SCR. **07**
(b) Describe the construction & working of IGBT. Also enumerate the advantage of IGBT over BJT & MOSFET. **07**

OR

- (b) Define the term commutation. Compare natural commutation & forced commutation & also explain any one commutation method with necessary diagram & waveforms. **07**

- Q.3** (a) Draw & explain single phase full converter with resistive load using required waveforms. **07**
(b) A single phase full converter is supplied from 230 V, 50 Hz source. The load consist of $R = 10 \text{ ohm}$ & a large inductance so as to render the load current constant. For a firing angle of 30° , determine 1) Average output voltage 2) Average output current 3) Average and rms values of thyristor currents 4) The power factor. **07**

OR

- Q.3** (a) Draw & explain three phase half wave converter with inductive load using required waveforms. **07**
(b) Derive an equation of average output voltage & rms value of output voltage for three phase half wave converter. **07**

- Q.4** (a) Define the term DC Chopper. Describe waveforms of step down chopper & derive the expressions for average output voltage & rms output voltage. **07**
(b) Enlist chopper control techniques. Explain each with required waveforms. **07**

OR

- Q.4** (a) Give chopper classification & explain any three types of chopper with necessary diagrams in detail. **07**
(b) Explain battery charger with necessary diagrams. **07**

- Q.5** (a) Define the term inverter. Explain half wave bridge inverter with necessary diagram & waveforms. **07**
(b) What is UPS? Explain types of UPS in brief. **07**

OR

- Q.5** (a) Draw & explain full bridge invertors. Also give the comparison of half bridge & full bridge inverter. **07**
(b) List the heating mechanism available and explain in detail. **07**
