

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: X71102****Date: 01-12-2014****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) Explain working principle of SCR with its characteristics and two transistor model. **07**
- (b) What is GTO? Draw and Explain GTO structure. Also explain GTO Turn off mechanism with desired equation and figures. **07**
- Q.2** (a) Draw and explain the structure of power MOSFET. Also explain principle of operation and I-V characteristics of power MOSFET. **07**
- (b) Briefly explain the series operation of thyristors with necessary equations. **07**
- OR**
- (b) What are the different methods for turning off an SCR? Explain all methods in detail. **07**
- Q.3** (a) Describe the operation of single phase full dual converter with the help of voltage and current waveform. **07**
- (b) For a single phase half converter with purely resistive load and delay angle $\pi/2$, determine (i) the rectification efficiency, (ii) the form factor (FF), (iii) the ripple factor (RF), (iv) the TUF, and (v) the PIV of thyristor. **07**
- OR**
- Q.3** (a) Draw the circuit arrangements for the single phase full converter with resistive load. Derive expression for the average output voltage and RMS output voltage. Sketch the voltage and current waveforms. **07**
- (b) Classify the chopper. List all type of chopper and explain any two in detail. **07**
- Q.4** (a) Discuss the principle of operation of DC-DC step down chopper with suitable waveform. **07**
- (b) Describe three phase bridge inverter with 180° mode of conduction. **07**
- OR**
- Q.4** (a) Describe the working of a 1 ϕ full bridge inverter with relevant circuit and waveforms. **07**
- (b) With the help of neat circuit diagrams and associated waveforms, discuss the operation of Buck regulators. **07**
- Q.5** (a) List types of Heating mechanism available and explain any one of them in detail. **07**
- (b) Describe Switched Mode Power Supply with necessary diagram in detail. **07**
- OR**
- Q.5** (a) Describe Uninterruptible power supply with necessary diagrams in detail. **07**
- (b) Write a note on battery charger. **07**
