

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– V (New) EXAMINATION – WINTER 2019****Subject Code: 2150903****Date: 29/11/2019****Subject Name: Power Electronics – I****Time: 10:30 AM TO 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.

MARKS

- Q.1** (a) In brief discuss pulse transformer and opto-coupler. **03**
 (b) Discuss about the two-transistor analogy of thyristor. **04**
 (c) Explain series operation of SCR, also derive the expression for static equalizing resistor. **07**
- Q.2** (a) Draw the detail structure and symbol of IGBT. **03**
 (b) Draw and explain the static V-I characteristic of SCR. **04**
 (c) Explain the programmable UJT as an oscillator for SCR triggering. **07**
- OR**
- (c) Draw and explain the triggering circuits for series connected SCRs. **07**
- Q.3** (a) List the applications of AC-DC Converters. **03**
 (b) Discuss about the effect of source and load inductance for ac to dc converter. **04**
 (c) Write a note on single phase semi controlled asymmetrical converter. **07**
- OR**
- Q.3** (a) Draw circuit diagram and waveform for single phase full wave rectifier with bridge configuration. **03**
 (b) Derive the equation of output voltage for single phase full- wave controlled rectifier with RL load. **04**
 (c) Explain full wave fully controlled converter in rectification and inversion mode. **07**
- Q.4** (a) List the application of DC coppers. **03**
 (b) Explain the basic principle of DC Chopper. **04**
 (c) Explain voltage commutated DC Chopper with necessary waveform and circuit diagram. **07**
- OR**
- Q.4** (a) Derive an expression of output voltage for boost chopper. **03**
 (b) Explain the voltage control methods for DC Chopper. **04**
 (c) Explain the principle of Buck-Boost converter in continuous mode of operation. **07**
- Q.5** (a) List the speed control methods for DC motor. **03**
 (b) Draw the circuit diagram and waveform for single phase fully controlled rectifier with RLE load. **04**
 (c) Explain three phase fully controlled converter based dc drive. **07**
- OR**
- Q.5** (a) What is regenerative braking. **03**
 (b) Briefly discuss about the dual converter. **04**
 (c) Explain four quadrant dc-dc converter for DC motor drive. **07**
