

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2018****Subject Code: 171002****Date: 19/11/2018****Subject Name: Power Electronics****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.

- Q.1** (a) List the different members of the thyristor family and draw their characteristics and explain in brief. **07**
(b) Explain single phase half wave rectifier with suitable circuit and waveform. **07**
- Q.2** (a) Explain the operation of the SCR using the Two transistor analogy. Obtain the condition for the breakdown of the device. Derive an expression for the anode current I_A using this analogy. **07**
(b) Sketch switching characteristics of Thyristor during its turn ON and turn OFF processes. Discuss briefly the nature of these curves. **07**
- OR**
- (b) Draw and explain circuit of 3 phase semiconverter with RL load with freewheeling diode for $\alpha = 60^\circ$. **07**
- Q.3** (a) Draw and explain SCR V-I characteristics with required terms. **07**
(b) Explain the DC Chopper's principal of operation. **07**
- OR**
- Q.3** (a) Explain Single phase Full (Bridge) controlled rectifier for R & RL load in detail with relevant waveform. **07**
(b) Write short note on dual converter. **07**
- Q.4** (a) Discuss the pulse width modulated inverter. **07**
(b) What is inverter? List few industrial applications of inverters. Explain basic series inverter. **07**
- OR**
- Q.4** (a) Explain various thyristor turn-on methods. **07**
(b) Write short note on step-up chopper. **07**
- Q.5** (a) Compare dielectric heating with induction heating **07**
(b) What is SMPS? Give classification of SMPS. Also explain any one of the SMPS. **07**
- OR**
- Q.5** (a) Compare SCR, power MOSFET and IGBT. **07**
(b) Explain the operation of UPS system **07**
