

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (OLD) EXAMINATION – WINTER 2020****Subject Code:171002****Date:21/01/2021****Subject Name:Power Electronics****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the principle of operation of SCR with (i) Device structure (ii) Characteristics. **07**
(b) Explain the construction and characteristics of IGBT. **07**
- Q.2** (a) What is the need of commutation in SCR circuits? Explain the class-B commutation in detail. **07**
(b) Draw and explain the structure of power MOSFET. Also explain principle of operation and I-V characteristics of power MOSFET **07**
- Q.3** (a) What are the various thyristor ratings? **07**
(b) What is GTO ? Draw and Explain GTO structures . Also explain GTO Turn off mechanism with desired equation and figures. **07**
- Q.4** (a) Discuss the two transistor model of a Thyristor. Derive an expression for the anode current and henceforth discuss the turn ON mechanism of a Thyristor. **07**
(b) Explain series and parallel operations of thyristor? **07**
- Q.5** (a) What is chopper? Describe the working of Type C chopper. **07**
(b) Explain R and RC firing circuit of SCR. **07**
- Q.6** (a) Explain principle of operation of step-down DC chopper. **07**
(b) Write short note on three phase inverter. **07**
- Q.7** (a) Write short note on RF heating. **07**
(b) Write short note on Uninterruptible Power Supply. **07**
- Q.8** (a) Explain the circuit diagram and working of single phase semi converter with freewheeling diode. **07**
(b) Write short notes on dielectric heating and induction heating **07**
