

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019****Subject Code: 2161006****Date: 09/12/2019****Subject Name: Power Electronics Devices and Circuits****Time: 02:30 PM TO 05:00 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) Draw only the symbols of the following: **03**

- (i) DIAC
- (ii) UJT
- (iii) SCR

(b) Explain the switching characteristics of SCR. **04**

(c) Discuss the advantages and limitations of IGBT. **07**

Q.2 (a) Write the advantages of LASCR. **03**

(b) How SCR can be turned off using natural commutation method? **04**

(c) Explain the UJT as relaxation oscillator with appropriate diagrams. **07**

OR

(c) Discuss the protection circuits of SCR under transient conditions. **07**

Q.3 (a) Why a freewheeling diode is connected in inductive loaded circuit? **03**

(b) Draw the circuit diagram of three phase half wave controlled rectifier with R load. **04**

(c) Explain the construction, operation and characteristics of GTO. **07**

OR

Q.3 (a) Write the applications of dc-dc converters. **03**

(b) Explain the operation of type A chopper. **04**

(c) Explain the single phase full wave controlled rectifier with RL load with proper waveforms. **07**

Q.4 (a) What are the performance measures of inverters? **03**

(b) Explain the basic principle of operation of cycloconverter. **04**

(c) Explain different control strategies for chopper operation. **07**

OR

Q.4 (a) Explain step up dc-dc converter with circuit diagram. **03**

(b) Draw only circuit diagram of three phase to single phase cycloconverter. **04**

(c) Draw and explain the series inverter with proper waveforms. **07**
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- Q.5** (a) Draw the block diagram of microcontroller based control of DC drives. **03**
- (b) Explain the concept of sinusoidal pulse width modulation. **04**
- (c) Draw and explain the circuit of battery charger. **07**

OR

- Q.5** (a) Explain basic principle of dielectric heating. **03**
- (b) Differentiate between online and offline UPS systems. **04**
- (c) Compare various speed control techniques for AC motor drives. **07**

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