

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022

Subject Code:2150903**Date:07/06/2022****Subject Name:Power Electronics – I****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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Differentiate in short, DIAC, TIAC and Thyristor. **03**
 (b) Explain working and construction of GTO. **04**
 (c) Explain two transistor analogy for Thyristor. **07**

- Q.2** (a) List different turn on methods of Thyristor. Explain any one **03**
 (b) Explain UJT triggering of SCR. **04**
 (c) Explain series and parallel connection operation of thyristor with neat diagram. **07**

OR

- (c) Explain over voltage and over current protection SCR. **07**

- Q.3** (a) Describe function of freewheeling diode in converter circuit. **03**
 (b) Explain continues and discontinues modes regarding converter operation. **04**
 (c) Explain the operation of 1- ϕ full wave rectifier with R-L load in detail. **07**

OR

- Q.3** (a) What are the effects of source and load inductance on rectifier performance? **03**
 (b) Explain 3- ϕ half wave rectifier in short. **04**
 (c) Explain BUCK-BOOST converter in details **07**

- Q.4** (a) Give classification of DC choppers. **03**
 (b) Write short note on pulse transformer and opto-coupler. **04**
 (c) Explain principle, operation and analysis buck converter. **07**

OR

- Q.4** (a) Explain different control strategies for choppers. **03**
 (b) Write applications of DC-DC converters also write difference between voltage and current commutated choppers. **04**
 (c) Explain morgan's chopper in detail. **07**

- Q.5** (a) Explain semi convertor application in DC series motor drive. **03**
 (b) Discuss braking operation of separately excited DC drive using fully controlled converter. **04**
 (c) Explain 4 quadrant operations of DC drives using phase controlled converter. **07**

OR

- Q.5** (a) Explain principle of regenerative brake control. **03**
 (b) Discuss how power control can be achieving by DC-DC convertor for series DC motor drive. **04**
 (c) Explain 4 quadrant operation of DC drives using DC-DC chopper. **07**
