

**GUJARAT TECHNOLOGICAL UNIVERSITY**

BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

**Subject Code: 2132404****Date: 7/12/2019****Subject Name: Principles of Power Electronics****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) Define Power electronics. Draw the block diagram of typical power electronics system. **03**  
(b) Explain Zener diode and state its applications. **04**  
(c) List and explain ideal and practical switch characteristics. **07**

- Q.2** (a) Describe gate-triggering of a thyristor. **03**  
(b) State merits and demerits of power electronic converters. **04**  
(c) Describe reverse recovery characteristics of diodes. Shows that reverse recovery time and peak inverse time are depending upon storage charge and rate of change of current. **07**

**OR**

- (c) What is p-n junction? Discuss the formation of depletion layer in p-n junction. **07**

- Q.3** (a) What do you understand by Q-point? What is its significance? **03**  
(b) Draw and explain V-I characteristics of SCR. **04**  
(c) Give the classification of turn-on methods of SCR. Explain any one in detail. **07**

**OR**

- Q.3** (a) Differentiate between hard switching and soft switching of transistor. **03**  
(b) Explain I-V characteristics of power transistor. **04**  
(c) Explain switching characteristics of SCR. **07**

- Q.4** (a) What is commutation? Why commutation required in thyristor? **03**  
(b) Explain concept of safe operating area (SOA). **04**  
(c) Enlist different commutation methods of SCR. Explain any one in detail. **07**

**OR**

- Q.4** (a) Describe R-triggering of a thyristor. **03**  
(b) Explain snubber circuit in SCR. **04**  
(c) Explain two transistor analogy in SCR with necessary equations. **07**

- Q.5** (a) Draw the I-V characteristics of TRIAC and state its applications. **03**  
(b) Explain primary and secondary breakdown in BJT. **04**  
(c) Explain construction and working of GTO in detail. **07**

**OR**

- Q.5** (a) Explain construction of enhancement type MOSFET **03**  
(b) Explain Varactor diode. **04**  
(c) Explain series and parallel operation of SCR in detail. **07**

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