

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**
