

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-IV Remedial Examination Nov/ Dec. 2010

Subject code: 142402

Subject Name: Fundamental of Power Electronics

Date: 08 / 12 / 2010

Time: 03.00 pm – 05.30 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) Enlist Thyristor turn-on methods and explain any three in brief. 07
(b) Describe different region of operation of an SCR with the help of V-I characteristics. 07

Q.2 (a) What do you mean by “Power Electronic System”? Draw the block diagram of PES and explain function of each block. Also, enumerate the advantages of PES. 07

(b) Describe the construction and working of SCR using two transistor analogy. 07

OR

(b) Explain di/dt and dv/dt protection of SCR. 07

Q.3 (a) Discuss the construction and working of Power-MOSFET. 07

(b) Explain UJT characteristics. How UJT works as a relaxation oscillator? 07

OR

Q.3 (a) Explain four-mode operation of TRIAC. In which mode TRIAC is more sensitive and Why? 07

(b) Explain working of IGBT with neat and clean diagram. 07

Q.4 (a) Explain the operation of single phase half wave controlled converter circuit with R-L load and free-wheeling diode. Enlist the advantages of free-wheeling diode. 07

(b) Draw single phase full converter bridge circuit and explain operation assuming continuous current. Also, draw various waveforms for $\alpha = 30^\circ$. 07

OR

Q.4 (a) Describe voltage commutated chopper with the help of various waveforms. 07

(b) Write the principle of inverter. Enlist the various types of inverter circuits. Explain the operation of 1- $\emptyset$ bridge inverter. 07

Q.5 (a) Draw single phase full wave mid-point converter circuit and explain its operation with the help of various waveforms for V_s , I_g , V_o , i_o and V_{T1} . 07

(b) Give comparative statement for semi-converter bridge circuit and full-converter bridge circuit with all technical aspects. 07

OR

Q.5 (a) Explain the basic principle and working of single-phase step down cyclo-converter. 07

(b) Discuss principle and working of SMPS with the help of block diagram. 07
