

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 150903****Date: 21-05-2013****Subject Name: Power Electronics-I****Time: 10.30 am - 01.00 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) Explain the construction, working and characteristics of IGBT. Give the advantage of it on power BJT. **07**

(b) What do you mean by freewheeling action? How diode can provide freewheeling action? **07**

Q.2 (a) Why we are connecting SCRs in series? What problem arises with series connection of SCRs. Derive the equation for resistor R_s for static equalizing? **07**

(b) Explain the two transistor analogy for SCRs. Also explain with this that once SCR is triggered, current is rises to full load value. **07**

OR

(b) List out the different protection is provided to SCR. Explain Crowbar protection circuit for SCR. **07**

Q.3 (a) What is the need of isolation between power circuit and control circuit? Explain the different method of isolation in details. **07**

(b) Explain the resistance triggering and R-C triggering method. What is advantage of RC triggering over resistance triggering? **07**

OR

Q.3 (a) Explain a.c phase control of TRIAC using Diac. **07**

(b) Explain the operation of single phase full-wave bridge rectifier using SCR. Derive its output voltage equation. **07**

Q.4 (a) Explain the three phase Half wave controlled rectifier with resistive load. **07**

(b) Explain the basic principle of dual converter. **07**

OR

Q.4 (a) Explain three phase Half wave semi-converters. **07**

(b) What do you mean by pulse width modulation? What are the advantages of pulse width modulation techniques? Explain sinusoidal pulse width modulation techniques. **07**

Q.5 (a) Explain the working of step-down and step up chopper. Give the comparison between two. **07**

(b) Explain working of type - D chopper. **07**

OR

Q.5 (a) Explain working of current commutated chopper circuit with its wave form. **07**

(b) What is the difference between Linear voltage regulator and Switch mode power supply? Explain the working of both regulators. **07**