Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 151703 Date: 20-05-2013

Subject Name: Electronics in Industries

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 fast recovery diode with its transient response. Describe schottky diode with its characteristic. **07**

(b) What are the different methods to turn on the SCR? Explain each in detail. **07**

Q.2 **(a)** Describe three-phase double-star rectifier with waveforms. **07**

(b) Explain six phase half wave uncontrolled rectifier with waveforms. Find ripple factor of the circuit. **07**

OR

(b) Explain three-phase fully-controlled bridge controlled rectifier with help of waveforms. Derive its average output voltage equation. **07**

Q.3 **(a)** Give the difference between power MOSFET and power BJT. Classify the power MOSFET. Explain depletion type MOSFET with output and transfer characteristics. **07**

(b) Explain dynamic and static characteristics of IGBT with its construction. **07**

OR

Q.3 **(a)** Explain dynamic turn-on and off characteristics of SCR. **07**

(b) What are the difference between SCR and TRIAC? Explain TRIAC construction and working in details. **07**

Q.4 **(a)** Give the difference between UJT and PUT. Explain UJT synchronized firing circuit for SCR. **07**

(b) What is the commutation circuit? Explain voltage and current commutation circuit in detail. **07**

OR

Q.4 **(a)** Explain gate characteristic of SCR. **07**

Q.4 **(b)** Explain the protection circuit of power semiconductor devices for overvoltage and gate. **07**

Q.5 **(a)** Draw and explain the waveforms of half-wave controlled rectifier with inductive load and flywheel diode. Derive the average dc output for it. **07**

(b) A 60V, 50 Hz AC supply with 1:3 transformer ratio applied to the single phase bridge uncontrolled rectifier having resistive load of 1KÝ. Calculate the dc output voltage, dc current, rms output voltage, ripple factor, PIV rating of the diode and dc output power. **07**

OR

Q.5 **(a)** What are the advantages and disadvantages of dual converter? Explain dual converter in detail with waveforms. **07**

(b) A three phase half-wave controlled rectifier is connected to a 220 V, 50 Hz as supply with a 200 Ý load resistance. If the firing angle Ŭ = 60^0 calculate the average output voltage, current and power. **07**

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