

# VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

[Central Technological Institute, Maharashtra State]

Matunga, Mumbai -- 400 019.

SEMESTER EXAMINATION      May 2012      DATE OF EXAM **16/5/12**  
SEMESTER & PROGRAM      IV      S.Y.B. Tech. (Electrical)      TIME      3 Hrs  
COURSE ( Course Code)      Semiconductor Power Devices (EE0208)      MARKS      100

**Time: 1:30 TO 4:30**

**Instructions:**

1. All questions carry equal marks.
2. **Figures to the right indicate Full Marks.**
3. Assume suitable **additional data**, if required.
4. Illustrate your answer with neat sketches whenever necessary.

- 1 a) Plot the characteristics of Thyristor (SCR) in detail, specify forward conduction region, holding current region, forward blocking region, reverse resistance region, reverse breakdown region and reverse zener region and explain latching current, holding current and rate of change ratings of SCR. 15
- b) Find the value of series inductance required to limit the circuit  $(di/dt)$  to a safe value for an SCR in a 230volts mains phase control application with a 75A/ $\mu$ sec maximum rating. 5
- 2 a) Explain in details the working of Basic Crowbar Circuit with the help of neat circuit diagram. 10
- b) Explain in details the working of Crowbar Thyristor Overcurrent Protection Circuit with the help of neat circuit diagram. 10
- 3 Explain in details with the help of neat circuit diagram and waveforms, the working of SCR Phase Control using synchronized UJT circuit triggering two SCRs in a full-wave center tapped transformer rectifier with a dc load. 20
- 4 a) Plot the characteristics of Triac in detail, and specify four modes of triggering a Triac. 10
- b) Explain in details the working of Triac / Diac light dimmer control circuit with the help of neat circuit diagram and waveforms. 10
- 5 Write short notes on any three:- 20
- a) Series and Parallel connection of SCRs.
  - b) Zero Voltage Switching.
  - c) Gate turn-off Thyristor.
  - d) Three phase AC switches.
  - e) AC solid-state relay.

-----XXX-----