

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V • EXAMINATION – WINTER • 2014

Subject Code: 152401

Date: 26-11-2014

Subject Name: Power Electronics Devices and Components

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.**
- 4. Notations/ symbols used have usual meanings.**

- Q.1 (a)** Compare for various aspects in tabular form. **08**
(i) Rectifier diode with Power diode
(ii) Converter grade thyristor with inverter grade thyristor.
- (b)** Discuss switch specifications in detail. **06**
- Q.2 (a)** Explain cooling, heat sink and mounting requirements for a power device. **07**
(b) Derive an equation for oscillating frequency for an UJT relaxation oscillator. **07**
- OR**
- (b)** Explain (i) pulse transformer (ii) Opto-coupler. **07**
- Q.3 (a)** Enlist various power diodes. State its applications. Describe the principle of operation of a power diode. **07**
(b) Discuss the switching characteristic of a Power BJT with relevant waveforms. **07**
- OR**
- Q.3 (a)** Discuss working of a Power Darlington circuit. **07**
(b) Describe reverse recovery characteristics of a diode with necessary diagram(s). **07**
- Q.4 (a)** Describe Turn-on mechanism for a Thyristor with necessary waveforms. **07**
(b) Draw and explain two transistor model of an SCR. **07**
- OR**
- Q.4 (a)** State requirements for successful commutation. Explain Class A commutation method for thyristor. **07**
(b) List thyristor protections required for reliable operation . Discuss any two of them in detail. **07**
- Q.5 (a)** Discuss switching characteristic of IGBT. **07**
(b) Write notes on :- TRIAC **07**
- OR**
- Q.5 (a)** Write notes on :- GTO **07**
(b) Sketch symbol and equivalent circuit of depletion type Power MOSFET. Describe its operation. **07**
