

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII • EXAMINATION – WINTER 2013

Subject Code: 171002**Date: 05-12-2013****Subject Name: Power Electronics****Time: 10:30 TO 01:00****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) 1) Explain in brief about reverse recovery characteristics of Power diodes. **04**
2) The reverse recovery time of diode is 4 micro-second and the rate of fall of the diode current is 20A/ micro-second. Determine (i) the storage charge Q_{RR} and (ii) the peak reverse current I_{RR} . **03**
(b) Explain the construction and characteristics of IGBT. **07**
- Q.2** (a) For a single phase half converter with purely resistive load and delay angle $\pi/2$, determine (i) the rectification efficiency, (ii) the form factor (FF), (iii) the ripple factor (RF), (iv) the TUF, and (v) the PIV of thyristor. **07**
(b) Explain the two transistor analogy of a thyristor and derive an expression for the anode current I_A using this analogy. **07**
- OR**
- (b) Explain in brief about the operation of three series-connected thyristors. Derive an expression for the worst case steady state voltage across first thyristor T_1 . **07**
- Q.3** (a) Explain dv/dt protection circuits of thyristor in detail. **07**
(b) Explain with circuit diagram, single phase full converters with inductive Load. **07**
- OR**
- Q.3** (a) Describe the working of a single phase dual converters with inductive load with circuit diagram and waveforms. **07**
(b) Explain with circuit diagram, principal of step-down chopper. **07**
- Q.4** (a) Describe the working of three phase half wave converters with circuit diagram and waveforms. **07**
(b) Write Short note on first quadrant (Type –A) chopper. **07**
- OR**
- Q.4** (a) List and explain performance parameters of inverters. **07**
Q.4 (b) Define and discuss switching mode regulators. Explain Boost regulator with circuit diagram and waveforms. **07**
- Q.5** (a) Describe the working of a single phase half bridge inverter with diagram and waveforms. **07**
(b) Write Short note on Uninterruptible Power Supply. **07**
- OR**
- Q.5** (a) Describe the working of a three phase bridge inverter for 180° conduction with circuit diagram and waveforms. **07**
(b) Write Short note on Switched mode Power Supply. **07**
