

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII EXAMINATION – WINTER 2015

Subject Code: 170801**Date: 12/12/2015****Subject Name: Power Electronics and Industrial Drives****Time: 10:30am to 1:00pm****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) Draw the I-V characteristics of the following: **07**
1. Power diode 2. MOSFET 3. BJT 4. IGBT 5. MCT 6. GTO 7. SIT
(b) Explain about the construction, characteristics and gate drive requirements of SCR. **07**
- Q.2** (a) Discuss operation of three phase AC to AC converter with star connected resistive load. **07**
(b) What is VSI? Describe the operation of single phase half bridge VSI. Also state the switching state table for the same. **07**
- OR**
- (b) Briefly state and discuss the various schematics of single phase AC to AC voltage controller. **07**
- Q.3** (a) Explain the selective harmonic elimination technique for VSI. **07**
(b) What is cycloconverter? State the area of its application. Briefly discuss the operation of single phase cycloconverter along with its voltage and current waveform for resistive load. **07**
- OR**
- Q.3** (a) Classify power factor improvement methods for phase controlled rectifiers. Explain Any one. **07**
(b) Briefly explain the voltage protection by selenium diode and metal oxide varistors. **07**
- Q.4** (a) Explain the operation of closed loop speed control of DC shunt motor with inner current loop and field weakening. **07**
(b) Briefly discuss the excitation angle control method for power factor improvement with neat sketch and necessary waveforms. **07**
- OR**
- Q.4** (a) Explain control mode of DC-DC converter drives. **07**
(b) Briefly discuss the operation of single phase semi converter DC drives. **07**
- Q.5** (a) Classify synchronous motor drives. Explain brushless DC and AC motor. **07**
(b) Briefly discuss the performance characteristics of Induction Motor. **07**
- OR**
- Q.5** (a) Explain variable voltage and variable frequency control of induction motor **07**
(b) Discuss the rotor voltage control for slip ring induction motor. **07**
