

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER V • EXAMINATION – WINTER - 2012****Subject code: 150903****Date: 17-01-2013****Subject Name: Power Electronics-1****Time: 02:30 pm to 05:00 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 Turn-On methods of a Thyristor **07**
(b) Explain voltage rating of SCR **07**
- Q.2** (a) Discuss construction, working & V-I characteristic of UJT. **07**
(b) Explain parallel operation of SCRs **07**
OR
(b) Explain Power Transistor. **07**
- Q.3** (a) Explain three phase full converter connected to RLE load. Draw necessary waveform. **07**
(b) Explain control strategies of chopper using Time Ratio Control (TRC) and Current Limit Control (CLC). **07**
OR
- Q.3** (a) Explain circuit operation of Jones Chopper. **07**
(b) Explain Buck (step –down) converter. **07**
- Q.4** (a) What is snubber circuit ? Why is it needed ? Draw such circuit for a SCR and give guidelines for selecting its components **07**
(b) Discuss constant HP & constant Torque operation of speed control of motors. Specify their field of applications. **07**
OR
- Q.4** (a) Discuss the various techniques of improving power factor in phase controlled converters. Explain PWM techniques in detail with necessary sketch and waveform. **07**
- Q.4** (b) What are the different methods of braking DC motors? Explain regenerative braking scheme with schematic diagram. **07**
- Q.5** (a) State the principle of DC motor speed control. Explain single phase semi-converter DC motor drive. **07**
(b) Using relevant circuit diagram and waveform, explain regenerative braking control in DC machines using chopper circuit. **07**
OR
- Q.5** (a) Explain single phase full wave converter with necessary waveform **07**
(b) A single phase full converter, connected to 230V, 50 Hz source, is feeding a load $R=10\Omega$ in series with a large inductance that makes the load current ripple free. For a firing angle of 45° , calculate the input and output performance of this converter. **07**
