

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code:170801****Date: 25-11-2014****Subject Name: Power Electronics and Industrial Drives****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.

- Q.1** (a) Explain about the construction, characteristics and gate drive requirements of SCR. **07**
(b) With neat sketch describe the operation of half wave uncontrolled rectifier with R-L load. **07**

- Q.2** (a) The three phase full wave rectifier has a load of $L=1.5 \text{ mHz}$, $R=2.5\Omega$ and $E=10 \text{ V}$. **07**
The input voltage is $V_{in}=208\text{V}$, 60 Hz . Determine
1. The steady state load current I_o at $\omega = \pi/3$
2. The average diode current I_o
3. The rms diode current I_r
4. The rms output current I_{rms} .
(b) Explain Turn-off mechanism in Thyristor. Explain commutation methods of Thyristors briefly. **07**

OR

- (b) What is VSI? Describe the operation of single phase half bridge VSI. Also state the switching state table for the same. **07**
- Q.3** (a) Explain the following PWM methods for control of single phase inverter **07**
• Single pulse width modulation.
• Sinusoidal pulse width modulation.
(b) Briefly discuss the 120 degree operation of inverter circuit with appropriate waveforms. **07**

OR

- Q.3** (a) Discuss the class B operation of Chopper Circuit. **07**
(b) What is DC drive? Discuss basic characteristics of DC motors. **07**
- Q.4** (a) Discuss the role of snubber circuit from protection aspect. **07**
(b) A single phase half wave AC voltage controller has a resistive load of 10Ω and the input voltage is 120 V , 60 Hz . The delay angle of thyristor is 90° . Determine (a) RMS value of the output voltage (b) the input Power Factor (c) the average input current. **07**

OR

- Q.4** (a) Discuss about choice of AC and DC drive in detail. **07**
(b) Discuss operation of 3-phase ac to ac converter with star connected resistive load. **07**
- Q.5** (a) Briefly discuss the operation of current source inverter with necessary waveform. **07**
(b) Briefly discuss the operation of single phase semi converter d.c. drives. **07**

OR

- Q.5** (a) Explain three phase cycloconverter and sinusoidal harmonic reduction techniques for cycloconverter. **07**
(b) Classify synchronous motor drives. Explain brushless DC and AC motor. **07**
