Seat No.: _____ Enrolment No._____

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 mHz, R=2.5Ω and E=10 V. The input voltage is Vin =208V,60 Hz. Determine 1. The steady state load current Io at $\omega_t = \pi/3$ 2. The average diode current Io 3. The rms diode current Ir 4. The rms output current Irms.	**07**
	(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 • Single pulse width modulation. • Sinusoidal pulse width modulation.	**07**
	(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 10 + 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**

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