Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 712902N **Date: 17-06-2014**

Subject Name: Power Processing Circuits

Time: 02:30 pm - 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)**	What is safe operating area? Discuss SOA for bipolar junction transistor.	**07**
	(b)	Write a brief note on effect of source inductance on AC-DC converter.	**07**
Q.2	**(a)**	Explain working of single phase full bridge controlled converter with R-L load. Draw necessary waveforms.	**07**
	(b)	A single phase full wave AC to AC controller has an input voltage of 150 V supplying an energy to resistive load of R_L=8 ohm. The firing angle of thyristors is 60.↔Find (1) average output voltage over half cycle. (2) RMS output voltage. (3) Power output.	**07**
		OR	
	(b)	A half controlled bridge converter is supplied with single phase 240V, 50 Hz source, feeds a load with ripple free current. The load resistance is R_L=10 ohm. Find (1) average load voltage (2) RMS input current for a firing angle Ŭ=60.↔	**07**
Q.3	**(a)**	Explain three phase half wave controlled AC-DC converter circuit with waveforms.	**07**
	(b)	Discuss working operation of 1 phase to 1 phase cyclo-converter circuit with appropriate waveforms.	**07**
		OR	
Q.3	**(a)**	Explain construction and working principle of IGBT with its static characteristics.	**07**
	(b)	Discuss the driver circuit for Bipolar Junction transistor.	**07**
Q.4	**(a)**	Write a brief note on ring connected cyclo-converter circuit.	**07**
	(b)	Explain operation of dual converter with circulating mode. Draw appropriate waveforms.	**07**
		OR	
Q.4	**(a)**	Explain the operation of full bridge DC-DC converter with neat diagram and waveforms.	**07**
	(b)	Discuss, how lower order selected harmonics can be eliminated in output of I phase inverter circuit.	**07**
Q.5	**(a)**	Explain the operation of integral cycle control of AC-AC converter with neat diagram and waveforms.	**07**
	(b)	Discuss working operation of buck-boost DC-DC converter circuit with appropriate waveforms.	**07**
		OR	
Q.5	**(a)**	Explain sinusoidal pulsed width modulation technique for inverter.	**07**
	(b)	Explain working of three phase inverter circuit with 120↔conduction mode. Draw line voltage and phase voltage waveform.	**07**

****