Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 712902N **Date: 07/07/2012**

Subject Name: Power Processing Circuits

Time: 2:30 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.**
4. **Notations used have usual meaning.**

Q.1	**(a)**	Compare BJT, MOSFET, IGBT, SCR, and MCT electronics switches in all respect.	**07**
	(b)	What is Safe Operating Area (SOA)? Draw and explain SOA of power BJT device.	**07**
Q.2	**(a)**	Explain full wave controlled converter circuit. Also discuss its working as a line commutated inverter.	**07**
	(b)	The single phase AC voltage controller delivers a power of 5 kW to the resistive load of R=5 ohm. If on-off control strategy is used, and the supply voltage is 230 V, 50 Hz, calculate (i) the RMS output voltage and current, (ii) the duty cycle, (iii) the input power factor.	**07**
		OR	
	(b)	A single phase half wave controlled rectifier is operated through single phase AC source 220V, 50Hz. The load on the converter consists of R=15 ohm, emf E=110 V dc. The SCR is triggered with continuous DC signal. Calculate (i) the average value of load current (ii) power supplied to the battery E.	**07**
Q.3	**(a)**	Explain three phase semi-converter circuit with R-L load. Draw appropriate load.	**07**
	(b)	Write a brief note on sequence control of AC controller.	**07**
		OR	
Q.3	**(a)**	Explain dual converter with circulating current mode.	**07**
	(b)	Discuss Class C type commutation circuit for SCR. Draw appropriate waveforms of SCR current and voltage.	**07**
Q.4	**(a)**	Explain single phase integral cycle control for AC voltage controller. Compare it with phase angle control of AC voltage controller.	**07**
	(b)	Discuss center tapped single phase Cyclo-converter. Explain how frequency and voltage can be varied.	**07**
		OR	
Q.4	**(a)**	Explain basic operation of single inverter circuit with different types of load.	**07**
	(b)	Describe three phase to single phase Cyclo-converter circuit.	**07**
Q.5	**(a)**	Discuss buck type DC-DC converter circuit along with relevant waveforms.	**07**
	(b)	Explain push-pull topology for DC-DC converter circuit.	**07**
		OR	
Q.5	**(a)**	Explain sinusoidal pulse width modulation for inverter along with merits and demerits.	**07**
	(b)	Write a brief note on space vector PWM technique for inverter.	**07**

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