Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 712902N **Date: 04-06-2013**

Subject Name: Power Processing Circuits

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 construction and working of IGBT. Also compare with MOSFET in all respect.	**07**
	(b)	Discuss about driving circuit and protection for MOSFET power switch.	**07**
Q.2	**(a)**	Explain working of m phase controlled converter circuit. And find the expression of an output voltage.	**07**
	(b)	The single phase half bridge inverter supplies a resistive load of 10 ohms. The supply voltage input to the inverter is 200 Vdc. Determine, (1) RMS output voltage at the fundamental frequency (2) Output power (3) Average, RMS and peak currents of power switch.	**07**
		OR	
	(b)	A single phase full wave controlled rectifier is operated through single phase AC source 200V, 50Hz. The load on the converter consists of R=10 ohms, emf E=100 V dc. The SCR is triggered with continuous DC signal. Calculate (1) Average and Peak current of the switch (2) average value of load current.	**07**
Q.3	**(a)**	Explain three phase full bridge converter circuit with R-L load. Draw appropriate load.	**07**
	(b)	Write a brief note on effect of source inductance on controlled converter.	**07**
		OR	
Q.3	**(a)**	Explain operation of single phase integral cycle control for AC voltage controller.	**07**
	(b)	Discuss the boost type DC-DC converter circuit. Derive an expression for output voltage of the boost converter.	**07**
Q.4	**(a)**	Discuss Buck-boost type DC-DC converter circuit along with relevant waveforms.	**07**
	(b)	Describe how single phase variable ac voltage with variable frequency can be obtained from three phase ac supply.	**07**
		OR	
Q.4	**(a)**	Explain operation of three phase inverter circuit with 120 degree conduction for delta type load.	**07**
	(b)	Explain full bridge type topology of DC-DC converter circuit.	**07**
Q.5	**(a)**	Write a brief note on space vector PWM technique for inverter.	**07**
	(b)	Explain dual converter with non-circulating current mode.	**07**
		OR	
Q.5	**(a)**	Explain single pulse width modulation for single phase inverter circuit.	**07**

Also discuss how selected harmonic can be eliminated?

(b) Discuss Class D type commutation circuit for SCR. Draw appropriate waveforms of SCR current and voltage. **07**

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