Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – WINTER • 2013

Subject code: 1724502 **Date: 27-12-2013**

Subject Name: Power Electronics-II

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 operation of parallel resonant inverter.	**07**
	(b)	What is the main function of resonant switch converter? Explain ZCS resonant converter.	**07**
Q.2	**(a)**	Explain 7-level multilevel inverter with all necessary circuit diagrams and waveforms.	**07**
	(b)	The full bridge series resonant inverter with unidirectional switches has L = 35 μH, C = 7 μF, and R = 3 Ω. The frequency of output voltage is 4.5 kHz and DC input is 200 Volt. SCR turn off time is 15 μSec. Calculate: (a) Circuit turn off time and (b) Maximum possible output frequency.	**07**
		OR	
	(b)	Draw and compare ZCS and ZVS switches used in resonant switch converter.	**07**
Q.3	**(a)**	What is power factor? Derive its formula for Linear load.	**07**
	(b)	Discuss the selection factor for the magnetic component.	**07**
		OR	
Q.3	**(a)**	List the advantages of Multilevel inverter and draw the power circuit connection diagrams for 5 level (1) diode clamped, (2) flying capacitor and (3) H- bridge multi level inverter.	**07**
	(b)	Explain boost converter based power factor control topology.	**07**
Q.4	**(a)**	Discus the steps to design inductor for boost dc-dc converter.	**07**
	(b)	Explain matrix converter in detail.	**07**
		OR	
Q.4	**(a)**	Explain why power factor of semiconverter is better than semi converter.	**07**
	(b)	With the help of block diagram explain the principle of active power filter.	**07**
Q.5	**(a)**	Discuss the steps to design high frequency transformer.	**07**
	(b)	Explain AC voltage PWM controller with waveforms.	**07**
		OR	
Q.5	**(a)**	What is the meaning of multipulse converter? Give its advantages and explain working of six pulse converter.	**07**
	(b)	The single phase full control converter is operated with symmetric angle control. The load current of average value of Ia is continuous, where ripple content is negligible. Express input current of convertr in in fourier series, and determine the HF of input current, DF, and input PF.(b) if the conduction angle is $\beta = \Pi / 3$ and the peak input voltage Vm=169.83 V calculate Vdc, Vrms, HF, DF,and PF	**07**

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