Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: 172403 **Date: 01/01/2013**

Subject Name: Power Processing Circuits - II

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define Inverter and draw only the power schematic of a three phase full bridge inverter. Also list and explain the performance parameters of it.	**07**
	(b)	List different types of PWM used for the control of inverters. Explain trapezoidal and sine triangle PWM with neat diagrams.	**07**
Q.2	**(a)**	Define the following: Dwell Time, Modulation Index, Cyclo-converter, UPS, THD, MTTR, MTBF.	**07**
	(b)	Draw and explain L-Type ZCS resonant inverter with neat waveforms.	**07**
		OR	
	(b)	Explain 180 degree conduction mode of inverter with line and phase voltage waveforms. State the equations for line and phase voltage.	**07**
Q.3	**(a)**	Classify multilevel inverters. Explain the basic principle of multilevel inverter giving its applications.	**07**
	(b)	Draw the schematic diagram of a UPS indicating all the necessary parts. List the four main parts of an UPS and describe each in brief with neat diagram.	**07**
		OR	
Q.3	**(a)**	A 20 KVA UPS is to be employed for RL load with power factor of 0.8. The backup time required is 30 minutes. Assuming the UPS efficiency to be 85%, select a suitable Pb-Acid battery (find KW/cell capacity) for the same. Take minimum allowable battery voltage as 24 Volts and final V/cell=1.75 V.	**07**
	(b)	List the different types of batteries & explain the battery charging process in detail.	**07**
Q.4	**(a)**	Explain Modified Mc-Murray Bedford Full-bridge inverter with necessary circuit and waveforms.	**07**
	(b)	Differentiate between a static switch and an electro-mechanical switch. Explain the working of a 3-phase static switch with neat diagram.	**07**
		OR	
Q.4	**(a)**	Explain the working of a full bridge square wave inverter with circuit diagram and waveforms.	**07**
Q.4	**(b)**	Explain Integral Cycle Control method for AC voltage controllers.	**07**
Q.5	**(a)**	Explain the Fourier analysis of a square wave inverter and thus derive the THD in the output voltage waveform.	**07**
	(b)	Describe in detail, the working principle of an Active Front-end rectifier with necessary figures.	**07**
		OR	
Q.5	**(a)**	Explain the input side control techniques of an inverter with necessary diagrams.	**07**
	(b)	State the main drawbacks of controlled rectifiers and justify the use of Active Front-end rectifiers giving applications and advantages.	**07**

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