

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: **07**
Dwell Time, Modulation Index, Cyclo-converter, UPS, THD, MTTR, MTBF.
- (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**
