Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER 2013

Subject Code: 172403 Date: 28-05-2013

Subject Name: Power Processing Circuits - II

Time: 02.30 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.**

Q.1 **(a)** Explain single-phase full-bridge inverter circuit with resistive load. Draw output waveforms if load is R-L, R-L-C over damped and R-L-C under damped. **07**

(b) Explain active front-end rectifier with block diagram. List disadvantages of controlled rectifier and advantages of active front-end rectifier. **07**

Q.2 **(a)** Explain five-level diode-clamped single-phase multilevel inverter with circuit diagram and waveforms. **07**

(b) Explain single-phase capacitor commutated CSI having resistive load with circuit diagram and waveforms. **07**

OR

(b) Explain the single-phase parallel inverter with circuit diagram and waveforms. **07**

Q.3 **(a)** Explain the three-phase 180° mode VSI with circuit diagram and waveforms. **07**

(b) Explain single-phase ac voltage controller having R-L load with circuit diagram and waveforms. Derive expression for the load current i_0. **07**

OR

Q.3 **(a)** Explain ZVS resonant converter with circuit diagram and waveforms. **07**

(b) Explain the single-phase to single-phase step-down midpoint cycloconverter considering continuous load current with circuit diagram and waveforms. **07**

Q.4 **(a)** Explain external control of dc input voltage and ac output voltage methods for the control of output voltage of inverter. **07**

(b) Explain phase dead banding and triplen injection modulation. Draw necessary waveforms. **07**

OR

Q.4 **(a)** Explain multiple-pulse width modulation technique used for voltage control of single-phase inverters. **07**

(b) Explain switching states and space vector diagram for two-level inverter. **07**

Q.5 **(a)** Explain integral cycle control method used for voltage control in ac voltage controllers. Derive equation for rms value of output voltage and thyristor current. **07**

(b) Draw the block diagram of a typical battery charger and explain each block in brief. Explain trickle charging. **07**

OR

Q.5 **(a)** Explain the modified Mc-Murray half-bridge inverter with circuit diagram and waveforms. **07**

(b) Define UPS. Draw the detailed block diagram of UPS. Give the comparison of off-line and on-line UPS. **07**

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