

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 160902****Date: 27-05-2013****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)** Draw waveforms of line voltage, phase voltage and load current for 120° and 180° conduction mode of 3-phase bridge inverter with Y connected resistive load. Compare them and make comment on output voltage and harmonics present in the load current. **07**
- (b)** Justify the sentence, "Space vector pulse width modulation (SVPWM) technique is better than sine PWM technique". **07**
- Q.2 (a)** Discuss 1-phase current source inverter. Compare VSI with CSI. **07**
- (b)** Discuss parallel inverter in brief. **OR 07**
- (b)** Explain PWM principle. Discuss selected harmonic elimination PWM technique to eliminate 5^{th} and 7^{th} harmonics from the output voltage waveform. **07**
- Q.3 (a)** Discuss 1-phase full wave controller with R-L load. Derive formulae to obtain RMS output voltage, RMS thyristor current and average value of thyristor current. **07**
- (b)** Discuss in brief the matrix converter. **07**
- OR**
- Q.3 (a)** A single phase full wave ac controller has a resistive load of $R=10\ \Omega$ and the input voltage is 120 V (rms), 60 Hz. The delay angle of thyristor T_1 and T_2 are equal: $\alpha_1=\alpha_2=\alpha=\pi/2$. Find (a) rms value of output voltage, (b) the input PF, (c) average current of thyristor and (d) rms current of thyristor. **07**
- (b)** Explain effect of non sinusoidal supply voltage on AC motor operation. Also discuss principle of variable frequency control. **07**
- Q.4 (a)** With appropriate circuit diagram, equivalent circuit and waveform discuss single phase to single phase cycloconverter. **07**
- (b)** Discuss static Scherbius drive. Mention its limitations. **07**
- OR**
- Q.4 (a)** How load commutated cycloconverter is different than line commutated cycloconverter? Explain with suitable load example. **07**
- (b)** Explain self controlled synchronous motor drive. How it can be implemented? **07**
- Q.5 (a)** Discuss role of inverter in HVDC transmission system. Mention various inverter configuration used for the same application. **07**
- (b)** Discuss 3-phase full wave AC voltage controller with Y and Δ connected load. **07**
- OR**
- Q.5 (a)** What do you mean by static VAR compensator? Discuss any one configuration with appropriate circuit diagram and waveforms. **07**
- (b)** Discuss closed loop control of induction motor. **07**
