

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1724502****Date: 18-06-2014****Subject Name: Power Electronics-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 concept and importance of High Frequency Transformer. Also write steps for the designing of the same. **07**
- (b)** For the Basic Series Resonant Inverter having $L_1 = L_2 = L = 50 \mu\text{H}$, $C = 6 \mu\text{F}$, $R = 2\Omega$, the DC input voltage is 220 V and frequency of output voltage is 7 KHz. The turn off time of the switch is 10 μs . Determine: **07**
- (i) The available turn off time
 - (ii) The maximum permissible frequency
 - (iii) The peak-to-peak capacitor voltage
- Support answer with necessary circuit and waveforms.
- Q.2 (a)** List disadvantages of Single-Phase Line-Commutated Rectifiers. Suggest necessary circuit, waveforms and control system diagram of Single Phase Boost Rectifier. **07**
- (b)** Explain the working of the PFC circuit shown in fig.1. Also draw the waveforms for switch 'S, Input Current $i_1(t)$ and Input V-I Characteristics. **07**
- OR**
- (b)** Explain the working of the PFC circuit shown in fig.2. Also draw the waveforms for switch 'S, Input Current $i_1(t)$ and Input V-I Characteristics. **07**
- Q.3 (a)** With necessary circuit and waveforms explain operation of High Frequency Link Integral Half Cycle Converter. **07**
- (b)** Explain Two Quadrant ZVS Resonant Converter. Support the answer with necessary circuits and waveforms. **07**
- OR**
- Q.3 (a)** Explain 3- ϕ Resonant DC link Inverter. Also explain Active Clamp Circuit for the same. **07**
- (b)** Explain L-type ZCS Resonant Converter. Support the answer with necessary circuits and waveforms. **07**
- Q.4 (a)** Compare various Multilevel carrier-based PWM techniques for Multilevel inverter. Draw necessary diagram to support the answer. **07**
- (b)** Explain Single Phase structure of a Multilevel Cascaded H-Bridge Inverter with five separate DC sources. Support the answer with necessary circuit and waveforms. **07**
- OR**
- Q.4 (a)** Explain concept of Multilevel Converter. Compare the same with respect to Conventional Converter. **07**
- (b)** Compare Five Level Diode Clamped and Capacitor Clamped Inverter in all respect. Draw necessary circuits in support. **07**
- Q.5 (a)** Explain significance of Multi-Pulse Converters. Also explain Twelve Pulse Converter with Application. **07**

- (b) Explain Power Factor in Electrical Power Systems with Linear and Non-Linear Loads. Derive necessary equations to support the answer. **07**

OR

- Q.5** (a) Explain working Principle of Matrix Converter. Also discuss Practical issues related to same. **07**
- (b) Explain importance of EMI filters. Also write steps involves in designing of the same. **07**

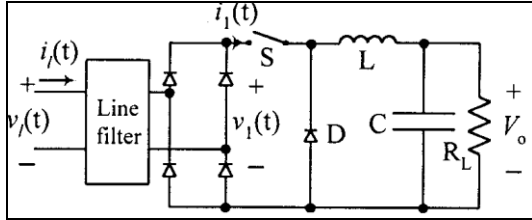


Fig.1 Q.2 (b)

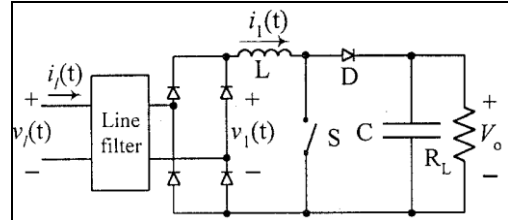


Fig.2 Q.2 (b) (OR)
