

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. I<sup>ST</sup> Semester–Remedial Examination – July- 2011****Subject code: 712902N****Subject Name: Power Processing Circuits****Date:08/07/2011****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.
4. Notations used have usual meaning.

- Q.1** (a) Discuss ideal and practical characteristics of switch. **07**  
(b) Explain safe operating area of bipolar junction transistor **07**

- Q.2** (a) Explain single phase full bridge controlled converter with R-L load. **07**  
(b) A full wave controlled rectifier with an R-L load is connected to 120 V **07**  
source. The value of  $R=10$  ohm. If the delay angle  $\alpha$  is  $30^\circ$ , find  
(i) the average load voltage  
(ii) the average load current  
(iii) the maximum load current  
(iv) the average current in each SCR.  
(v) power supplied to the load  
Assume large inductance is present in load.

**OR**

- (b) A single phase ac controller is supplying power to 10 ohm is fed through 110 **07**  
V AC source. If  $\alpha$  is  $30^\circ$ , find  
(i) the maximum output current  
(ii) output power  
(iii) PIV of an SCR  
(iv) rms value of input current

- Q.3** (a) Explain single pulse width modulation technique for inverter circuit. **07**  
(b) Explain integral cycle control and compare it with phase control of ac **07**  
controller.

**OR**

- Q.3** (a) Explain buck converter circuit with neat diagram. **07**  
(b) Discuss sequence control of AC controller with neat diagram. **07**

- Q.4 (a)** Explain basic operation of single phase inverter circuit with different types of load. **07**
- (b)** Explain the construction and working of MOSFET. **07**
- OR**
- Q.4 (a)** Explain dual converter with circulating current control mode. **07**
- (b)** A step up converter operates at a frequency of 1 kHz. The source voltage is 100 V DC and the load resistance is 2 ohm. If the average value of the load current is 100 A, find **07**
- (i) the power dissipated in resistor
- (ii) the duty cycle
- (iii) the average value of source current
- (iv) the average value of switch current
- Q.5 (a)** Discuss the effect of source inductance on controlled converter operation. **07**
- (b)** Explain three phase to single phase Cyclo-converter. **07**
- OR**
- Q.5 (a)** Discuss driver circuit for MOSFET. **07**
- (b)** Write a short note on reduction of harmonics in output of the inverters. **07**

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