CODE NO : RR 310204

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER REGULAR EXAMINATIONS

POWER ELECTRONICS

(ELECTRICAL ELECTRONICS ENGINEERING)

NOVEMBER 2005

TIME: 3 HOUR
MARK: 80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS

1. (a) Explain the necessity of series and parallel connection of SCRs.

(b) What is String efficiency in series and parallel connections.

(c) What are the problems arising in series and parallel connections.

2. A single phase fully controlled bridge converter is operated from a single phase 220V, 50Hz supply. The load current is continuous and has negligible ripple. The average load current is Idc= 50A and commutating inductance per phase is LC = 0.5mH. Determine the overlap angle if
(a) = 300
(b) = 600

3. A three phase, six pulse fully controlled converter is connected to three phase ac supply of 440V and 50Hz and operates with a firing angle of /5 radians. The load current is maintained constant at 5 Amps and load voltage is 440V. Calculate load resistance, source inductance and overlap angle.

4. An a.c. voltage controller supplies power to a resistive load of 20 ohms. The rms of input voltage is 220V at 50Hz. The thyristors are switched ON for 30 cycles and OFF for 70 cycles. Calculate the values of

(a) the rms output voltage

(b) input power factor

(c) the average and rms values of thyristor currents

5. (a) What is a cyclo converter?

(b) What are the varieties of single phase cyclo converters.

(c) What are the salient features of cyclo converters.

(d) What are the major limitations of cyclo converters

6. (a) A step-up chopper with a pulse width of 150 μs operating on 220V, dc supply. Compute the load voltage if the blocking period of the device is 40 μs.

(b) What is the necessity of step-up chopper where do you use.

7. Draw and explain the simple SCR series inverter circuit employing class A type commutation. With the help of important waveforms. State the limitations of this inverter.

8. A single phase full bridge inverter uses a uniform PWM with two pulses per half cycle for voltage control. Plot the distortion factor, fundamental component, and lower order harmonics against modulation index.