Registration No:

Total Number of Pages : 02   **M.TECH**

M.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018
ADVANCED POWER CONVERTERS
Branch: PE, Subject Code:MPEPC2010
Time: 3 Hours
Max Marks : 70

PART-A   (10 X 2=20 MARKS)

1. Answer the following questions.

   a. a. Give an expression for average voltage of single phase semi converters   CO-1

   b. What are the different methods of firing circuits for line commutated converter? CO-2

   c. What is meant by FM control in a dc chopper   CO-2

   d. What is meant by current commutation   CO-2

   e. What is the condition to be satisfied in the selection of L and C in a series

      Inverter   CO-1

   f. What are the advantages of PWM control?   CO-5

   g. What is meant by unidirectional ac voltage controller?   CO-3

   h. What type of gating signal is used in single phase ac voltage controller with

      RL load?   CO-4

   i. What is meant by high frequency carrier gating?   CO-4

   j. What is meant by negative converter group in a cyclo converter   CO-3

PART-B   (5 X 10=50 MARKS)

Answer any five questions from the following.

2. a. Differentiate natural commutation and forced commutation   [5]CO-2

  b. Explain the operation of three phase semi converter with RLE load. Sketch the associated
    waveforms   [5]CO-1

3. a. Explain the working of single phase dual converter with circuit diagram and
    waveforms   [5]CO-3

  b. Three phase fully controlled rectifier is connected to three phase ac supply of 230V, 60 Hz.
   load current is continuous and has a negligible ripple. If the average load current I_{dc} =150 A
   and the commutating inductance L_c = 0.1mH. Determine the overlap angle when $\alpha = 10°$.

                                                      [5]CO-2

4. a. Prove the output voltage of step down chopper is Vo = D Vs. From the necessary waveforms [5]CO-2

   b. Derive an expression for calculating the Minimum and Maximum Currents of Class A chopper [5]CO-2

5. a. Explain the different methods of voltage control adopted in an inverter with suitable waveforms. [5] CO-4

   b. The single phase half bridge inverter has resistive load of R=10 ohm and dc input voltage is 220v. Determine rms output voltage, average value, rms current and output power [5]CO-3

6. a. Explain the operation of multistage control of AC voltage controllers with neat diagram [5]CO-3

   b. For a 1-phase voltage controller, feeding a resistive load, draw the waveforms of source voltage, gating signals, output voltage and voltage across the SCR. Describe the working with reference to waveforms drawn. [5] CO-1

7.a. what is load commutated cycloconverter. How does it differ from line commutated cycloconverter? [5]CO-2

   b. A 3 phase cycloconverter feeds 1 phase load of 190 Volts, 45 Amps, at a power factor of 0.7 (lagging). Determine:

   i.   The required supply voltage
   ii.   Thyristor rating
   iii. Power factor of supply current.   [5]   CO-3

8.Answer the following .

   a) Sinusoidal PWM   [5]   CO-4
   b) Effect of source inductance on three phase converters [5]   CO-5

==0==