Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

MEPE-102

M.E./M.Tech., I Semester

Examination, December 2016

Power Electronics Devices and Phase Control

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Explain constructional details of MOSFET. 7
   b) Draw circuit diagram and explain how you can put LGBT in conduction using optical isolation. 4
   c) Explain class B commutation of SCR. 3

2. a) A single phase full converter is connected to RLE load. For discontinuous load current, draw the source voltage, output voltage, load current and source current waveforms as a function of time when 7
      i) Extinction angle $\beta > \pi$
      ii) Extinction angle $\beta < \pi$ with $V_m \sin\beta < E$

      Explain how various waveform are, and discuss their nature.
   b) A single phase semiconverter is connected to RLE load with free wheel diode. Draw the output voltage waveform when firing angle $\alpha = 60°$. 4
   c) Draw the semi converter output voltage an a function of firing angle. 3

3. a) Draw and explain with the help of output waveform three phase full converter when firing angle $\alpha = 90°$. Draw the waveform for output voltage and current when the load connected a cross it is resistive. 7
   b) Derive expression for average output voltage for three phase semiconverter for firing angle α. 7

4. Design chopper circuit to run, separately excited d.c. motor of 3 H.P. 14

5. a) A three phase full wave controller is connected across resistive load. Draw output phase voltage waveform for firing angle $\alpha = 30°$. 7
   b) A single phase fullwave a.c. controller uses on-off control for heating a resistive load of $R = 6\Omega$ and the input voltage $V_s = 200V$ (rms), 50Hz. If the desired output power $P_o = 3kW$ determine 7
      i) The duty cycle k
      ii) The input P.F.

6. Explain with the help of waveform three phase to single phase cycloconverter. 14

7. a) Explain basic principle of operation and working of single phase line commuted inverter. 7
   b) Write converter reactions on 7
      i) Source side
      ii) Load side

8. Write short notes on any two of the following: 14
   a) Multiphase chopper
   b) Protection circuit for SCR
   c) Margine angle
   d) Three phase dual converter in circulating current mode

******