Total No. of Questions :10]

SEAT No. :

P3513

[Total No. of Pages : 2

[5560]-163
T.E. (Electrical)
POWER ELECTRONICS
(2012 Course) (Semester-I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer any one question from Q1 & Q2, Q3 & Q4, Q5 & Q6, Q7 & Q8, Q9 & Q10.***
2) ***Figures to the right indicate full marks.***

Q1) a) What are different methods of triggering of SCR? Explain RC triggering method. **[5]**

b) Describe the working of single phase half controlled converter with RLE load. Draw neat circuit diagram, and waveforms for

i) Output voltage ii) Output current. **[5]**

OR

Q2) a) Explain gate characteristics of SCR during Turn on. **[5]**

b) Explain working of single phase AC voltage regulator with RL load. **[5]**

Q3) a) Draw V-I characteristics of TRIAC & explain four mode operation of TRIAC. **[5]**

b) What is a dual converter? Explain working of single phase dual converter with suitable diagram to give 4 quadrant operation of a motor. **[5]**

OR

Q4) a) Explain working of a three phase fully controlled bridge rectifier feeding highly inductive load with help of neat circuit diagram. What is the boundary of discontinuous conduction? Write expression of average output voltage. **[5]**

b) A single phase full wave rectifier connected to 230 V, 50 Hz source, is feeding a load of $R = 10\,\Omega$ in series with a large inductance that makes a load current ripple free. For a firing angle of 45°, determine **[5]**

i) Output voltage

ii) Output power

iii) Form Factor

iv) Ripple Factor.

P.T.O.

Q5) a) Draw and explain switching characteristics of MOSFET. **[8]**

b) Explain operation of four quadrant chopper. **[8]**

OR

Q6) a) Explain with neat diagram working of a step up chopper feeding an inductive load. Draw output voltage and current waveforms. Derive average and rms output voltages equations in terms of duty cycle. **[10]**

b) A step-up chopper has input voltage of 220 V and output of 660 V. If the conduction time of chopper is 120 μ sec, compute the pulse width of output voltage. If the output voltage pulse width is increased to there times its previous width for constant frequency operation, find the average output voltage. **[6]**

Q7) a) Explain with neat circuit diagram and waveforms the operation of single phase current source inverter feeding RL load. **[8]**

b) Give comparison between voltage source inverter and current source inverter. **[8]**

OR

Q8) a) Explain multiple pulse width modulation with necessary waveforms.**[8]**

b) How inverters are classified? What are the external and internal voltage control methods in inverter? **[8]**

Q9) a) Draw the circuit diagram of three phase inverter feeding resistive load (star connected) using 120° conduction mode. Draw the switching sequence of the devices and waveforms of output phase and line voltages. **[10]**

b) Compare multilevel inverter with Multi pulse Inverter. **[8]**

OR

Q10) a) What are the types of Multilevel Inverter? Explain cascaded multilevel inverter. **[10]**

b) What is the necessity of controlling the voltage at the output terminals of the inverter? Explain briefly the various methods employed for the control of output voltage of inverters. **[8]**