Total No. of Questions : 10]

SEAT No. :

P1487

[Total No. of Pages : 2

[5460]-163
T.E. (Electrical)
POWER ELECTRONICS
(2012 Course) (Semester - I) (End Semester)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to candidates:

1) ***Solve questions Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8 and Q9 or Q10.***
2) ***Assume suitable data, if necessary.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Explain gate characteristics of SCR. **[5]**

b) Describe the working of single phase half controlled converter with RLE load. Draw neat circuit diagram, and waveforms for **[5]**

i) Output voltage.

ii) Output current.

OR

Q2) a) What are different methods of triggering of SCR? Explain UJT triggering method. **[5]**

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

Q3) a) Draw V-I characteristics of TRIAC & explain how it can be used as voltage regulator with suitable example. **[5]**

b) 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]**

OR

Q4) a) What is a dual converter? Explain working of Single phase dual converter with suitable diagram to give 4 quadrant operation of a motor. **[5]**

b) A single phase supply of 230 V, 50 Hz is to deliver power to a load of R = 10Ω through a half wave controlled rectifier. For a firing angle of 60°, determine : **[5]**

i) The rectification efficiency.

ii) Form Factor.

iii) Ripple Factor.

P.T.O.

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

b) Explain the control strategies used in dc choppers to control output voltage. What are the drawbacks of FM control? **[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 100 μsec, compute the pulse width of output voltage. If the output voltage pulse width is halved for constant frequency operation, find the average value of new output voltage. **[6]**

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

b) Explain multiple pulse width modulation technique for inverter control. Explain modulation indices and effect on harmonic control. **[8]**

OR

Q8) a) How inverters are classified? What are the external and internal voltage control methods in inverter? **[8]**

b) Explain sinusoidal pulse width modulation with necessary waveforms. **[8]**

Q9) a) Draw the circuit diagram of three phase inverter feeding resistive load (star connected) using 180^{o} conduction mode. Draw the switching sequence of the devices and waveforms of output phase and line voltages. **[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]**

OR

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

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