Total No. of Questions : 10]

SEAT No. :

P2587

[Total No. of Pages : 2

[5153]-563
T.E. (Electrical)
POWER ELECTRONICS
(2012 Pattern) (Semester-I)(EndSem.)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to candidates:

1) ***Solve Questions 1 or 2, Question 3 or 4, Question 5 or 6, Question 7 or 8, Question 9 or 10.***
2) ***Assume Suitable data, if necessary.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Draw neat circuit diagram and explain working of single phase fully controlled bridge converter feeding RL load with Free Wheeling Diode. Draw waveforms of load voltage, load current. **[6]**

b) Explain the difference between SCR and GTO. **[4]**

OR

Q2) a) Draw neat circuit diagram for a 1 phase semi controlled converter feeding R-L load at α=60º. Draw output voltage waveform showing devices conducting during one cycle of input ac voltage. **[6]**

b) Draw a neat circuit diagram of a simple light dimmer circuit using Triac and draw the waveforms of voltage across the bulb and current passing through it for α=90º. **[4]**

Q3) For a 3 phase fully controlled Bridge converter feeding resistive load. **[10]**

a) Draw neat circuit diagram and explain working

b) Draw output voltage and current waveforms at α=60º

c) Write the switching sequence of SCRS clearly

d) Derive expression for average output voltage.

OR

Q4) a) Describe the RC full wave trigger circuit for one SCR when the load is AC. Draw related voltage waveforms. **[4]**

b) Explain with circuit diagram and waveforms working of 2 stage sequence control of AC regulator. **[6]**

P.T.O.

Q5) a) What is time ratio control in D.C. choppers? Explain the use of TRC for controlling the output voltage in choppers. **[8]**

b) Give comparison between MOSFET and IGBT **[8]**

OR

Q6) a) Explain with a diagram step-up chopper and derive the expression for the output voltage. A step up chopper with a pulse width of 150 μs is operating on 220 V dc supply. Compute the load voltage if the blocking period of the device is 40 μs. **[8]**

b) Explain output and Transfer characteristics of IGBT **[8]**

Q7) a) With a neat circuit diagram and necessary waveforms explain working of single phase full bridge voltage source inverter with inductive load. **[8]**

b) Why voltage control is needed in inverter circuits? State the various methods of voltage control in inverters circuits and explain any two methods. **[8]**

OR

Q8) a) With a neat circuit diagram explain the working of single phase capacitor commutated current source inverter with resistive load. Draw also the related voltage and current waveforms. **[8]**

b) Explain single pulse width modulation with diagrams. Derive an expression for output voltage. **[8]**

Q9) a) Explain working of three phase inverter in 120° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. **[12]**

b) Compare Current Source Inverter and Voltage Source Inverter. **[6]**

OR

Q10)a) State the need of multilevel inverters. Explain the cascaded multilevel inverters with the help of neat circuit diagram and necessary waveform. **[12]**

b) Compare multilevel inverter with multi pulse inverter. **[6]**