Total No. of Questions : 10]

SEAT No. :

P3369

[Total No. of Pages : 3

[5353] - 563

TE. (Electrical)

POWER ELECTRONICS

(2015 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q8, Q.9 or Q.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) Explain the triggering of SCR using UJT relaxation oscillator. **[5]**

b) Draw neat circuit diagram and explain working of single phase fully controlled bridge converter feeding RL load with freewheeling diode. **[5]**

OR

Q2) a) Draw the circuit symbol and VI characteristics of GTO **[4]**

b) Draw neat circuit diagram of a 1 phase semi controlled converter feeding R-L load at $\alpha = 90°$. Draw output voltage waveform showing devices conducting during one cycle of input ac voltage **[6]**

Q3) a) Describe the principle of step up chopper. Derive an expression for the average output voltage in terms of input voltage and duty cycle. State the assumptions made. **[6]**

b) Compare between MOSFET and BJT. **[4]**

OR

Q4) a) A step up chopper with a pulse width of 100 µs is operating from 230 V DC Supply. Compute the average value of load voltage for a chopping frequency of 2000 Hz. **[4]**

P.T.O.

b) For a single phase fully controlled bridge converter with R load

i) Draw circuit diagram **[2]**

ii) Draw output voltage waveform at firing angle 60 ° **[3]**

iii) Write formula for average DC voltage **[1]**

Q5) a) For a 3 phase fully controlled bridge converter feeding resistive load

i) Draw neat circuit diagram **[2]**

ii) Draw output voltage and current waveforms at $\alpha = 30°$ **[4]**

iii) Write the switching sequence of SCRS clearly **[2]**

iv) Derive expression for average output voltage **[2]**

b) Explain triggering of TRAIC using DIAC with neat circuit diagram **[6]**

OR

Q6) a) For a 3 phase fully controlled bridge converter feeding RL load

i) Draw neat circuit diagram **[2]**

ii) Draw output voltage waveform at $\alpha=90°$ **[4]**

iii) Write the switching sequence of SCRS clearly **[2]**

b) Explain working of single phase AC voltage regulator with R Load . Draw output voltage and current waveforms. **[8]**

Q7) a) Explain with neat circuit diagram and waveforms single phase full bridge voltage source inverter with R load. **[8]**

b) Compare Current Source Inverter and Voltage Source Inverter. **[8]**

OR

Q8) a) Explain sinusoidal pulse PWM technique with waveforms **[8]**

b) Explain working of Current source inverter with ideal switches **[8]**

Q9) a) Explain working of three phase inverter in 180° mode of operation. For star connected load, draw output line and phase voltage waveforms. Show devices conducting in each step. **[10]**

b) Draw neat diagram for Diode Clamped multilevel converter and explain its working with the help of Switching states of devices. Draw Output Phase voltage waveform. **[8]**

OR

Q10)a) State the methods for voltage control of inverters and explain any one method in detail. **[8]**

b) Draw circuit diagram for three level Flying capacitor Converter and explain its principal of operation. Comment on voltage balancing of capacitors. **[10]**