

Total No. of Questions : 10]

SEAT No. :

P2440

[Total No. of Pages : 2

[5253] - 163
T.E. (Electrical)
POWER ELECTRONICS
(2012 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the 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)** Describe working of single phase semi converter with RL load. Draw waveforms of load voltage, load current. **[5]**
- b) Draw and explain Gate characteristic of SCR. **[5]**

OR

- Q2) a)** Explain single phase ac regulator feeding inductive load. Draw output voltage waveform. **[5]**
- b) A single phase full converter is supplied from 230V, 50Hz source. The load consists of $R=10\Omega$ and a large inductance so as to render the load current constant. For a firing delay of 45° determine- **[5]**
- i) Average output voltage
 - ii) Average output current.

- Q3) a)** Write a short note on rectification and inversion mode of operation of single phase controlled converter. **[5]**
- b) Explain R-C triggering circuit of Thyristor. **[5]**

OR

- Q4) a)** Explain working of three phase half wave converter connected to resistive load with a firing angle of 60° & draw waveforms of phase voltage & phase current **[5]**
- b) With neat constructional diagram explain working of GTO. **[5]**

P.T.O.

- Q5) a)** Draw and explain output and transfer characteristics of MOSFET. [8]
b) For a type A chopper circuit, source voltage $V_s = 220V$, chopping period, $T = 2000 \mu s$, on period = $600 \mu s$, load circuit parameters: $R = 1 \Omega$, $L = 5mH$ and $E = 24V$. [8]
i) Find average output voltage.
ii) Find average output current
iii) Calculate the maximum and minimum values of steady state output current.

OR

- Q6) a)** Explain Class E chopper feeding RLE load in detail. [8]
b) What is time ratio control in dc choppers? Explain the use of TRC for controlling the output voltage in choppers. [8]
- Q7) a)** Explain working of single phase full bridge inverter. Draw all waveforms. [8]
b) Explain Sinusoidal Pulse width modulation with necessary waveforms. How voltage and frequency control is achieved. [8]

OR

- Q8) a)** Explain with circuit diagram and waveforms operation of single phase current source inverter. [8]
b) Explain single pulse width modulation with quasi square wave output & analyze the output with Fourier analysis. How harmonics in the output voltage is controlled by varying the width of pulse. [8]
- Q9) a)** Compare multilevel inverter with multi pulse inverter. [8]
b) Explain working of three phase six step voltage source inverter in 180° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. [10]

OR

- Q10) a)** Explain working of three phase six step voltage source inverter in 180° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. [10]
b) What are the techniques used for control of harmonics in output voltage of inverter? Explain any two techniques in detail. [8]

