

Total No. of Questions : 10]

SEAT No. :

P2944

[Total No. of Pages : 2

[5669]-533

T.E. (Electrical)

POWER ELECTRONICS

(2015 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

- Q1)** a) Draw and explain switching characteristics of SCR. [6]
b) Explain operation of step down chopper with input voltage, output voltage and output current waveforms. [4]

OR

- Q2)** a) Describe briefly over voltage, over current and thermal protection of thyristor. [6]
b) Write a short note on class C chopper. [4]

- Q3)** a) Draw and explain output and transfer characteristics of IGBT. [4]
b) Derive the expression for average and RMS output voltage of a single phase semi-converter. [6]

OR

- Q4)** a) Draw and explain output and transfer characteristics of MOSFET. [4]
b) A single phase fully controlled bridge rectifier is operated with resistive load of 15Ω , the input voltage is 230V. For the firing angle $\alpha=45^\circ$, calculate average load voltage.
RMS load voltage, average and RMS load current. Form factor and Ripple factor. [6]

P.T.O.

Q5) a) Explain working of three phase half controlled converter with RL load & firing angle of 60° . Draw output voltage and current waveforms. Derive expression for average output voltage and rms voltage. [8]

b) Write a short note on DIAC. With neat diagram explain triggering of TRIAC using DIAC. [8]

OR

Q6) a) Explain working of three phase full controlled converter with RL load & firing angle of 30° . Draw output voltage and current waveforms. Derive expression for average output voltage and rms voltage. [8]

b) Explain operation of single phase ac voltage regulator with output voltage and current waveforms for RL Load. Write expression for rms output voltage. [8]

Q7) a) Explain various PWM techniques used in inverters. How sinusoidal PWM is used for harmonic elimination? [8]

b) Explain with neat circuit diagram working of single phase full bridge voltage source inverter connected to RL load. Draw output voltage and current waveforms and comment on need of feedback diodes. [8]

OR

Q8) a) i) Compare Single pulse and multiple pulse modulation. [4]

ii) Write a short note on Current Source Inverter. [4]

b) Derive the expression for output voltage and current of a single phase bridge inverter. [8]

Q9) a) Explain cascaded multilevel inverter using 3 H-bridges connected to input supply. [10]

Draw output voltage waveforms. What are its advantages?

b) Explain different harmonic elimination techniques used in inverter. [8]

OR

Q10) a) Explain working of three phase voltage source inverter in 120° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. [10]

b) Write short note on Flying capacitor multilevel inverter. [8]

