

Total No. of Questions : 12]

SEAT No. :

P1082

[Total No. of Pages : 2

[4163] - 254

May - June 2012

T.E. (Electrical)

POWER ELECTRONICS

(2008 Pattern) (Sem. - I)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:-

- 1) Answer any 3 questions from each section.
- 2) Answers to the two sections should be written in separate books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.
- 5) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 6) Assume suitable data, if necessary.

SECTION - I

- Q1) a) Define and explain importance of following ratings of SCR. [8]
- i) Holding current and Latching current.
 - ii) Forward and reverse blocking voltages.
 - iii) $\frac{dv}{dt}$ and $\frac{di}{dt}$ Rating.
 - iv) I^2t rating.
- b) Draw and explain static V-I characteristics of SCR. [8]

OR

- Q2) a) Explain in detail Two transistor analogy of SCR. [8]
- b) Explain and compare R & RC firing circuit of SCR. [8]
- Q3) a) With a neat circuit diagram and necessary waveforms explain working of single phase fully controlled bridge converter feeding RLE load. [8]
- b) With a neat diagram and necessary waveforms explain working of single phase semi-controlled bridge converter feeding RLE load. [8]

OR

P.T.O.

Q4) a) With neat circuit diagram and all necessary waveforms explain the working of three phase fully controlled bridge converter feeding RLE load. [10]

b) Write a note on selection of transformers and semiconductor devices for converters. [6]

Q5) a) Explain four mode operation of TRIAC. [10]

b) Draw neat circuit diagram and explain how TRIAC can be used as light dimmer switch. [8]

OR

Q6) a) Explain static on load tap changing of transformer using a.c. regulators. Draw output voltage waveform using two stages. [9]

b) Explain step by step procedure of design of snubber circuit. [9]

SECTION - II

Q7) a) With a neat diagram explain switching action of Power MOSFET. [8]

b) Compare BJT, MOSFET and IGBT. [8]

OR

Q8) a) Draw and explain transfer characteristics and output characteristic of IGBT. What is SOA? [8]

b) Explain switching characteristic of MCT. [8]

Q9) a) Explain principle of operation of step down chopper. with neat diagrams explain TRC and CLC techniques. [10]

b) A step up chopper has input voltage 220V and output voltage 660V. If the off time of chopper is $100\mu s$, compute pulse width of output voltage. In case pulse width is halved for constant frequency operation, find the new output voltage. [6]

OR

Q10) a) Explain four quadrant chopper feeding RLE load. [8]

b) Derive expression for output voltage of step-up chopper. [8]

Q11) a) Explain sinusoidal pulse width modulation used in inverters. Show four pulses per half cycle of O/P voltage. [10]

b) Explain operation of single phase CSI. [8]

OR

Q12) a) Explain working of 3-phase VSI in 180° mode. Draw all waveforms and equivalent ckts. [10]

b) Explain working of single phase full bridge inverter. Draw all waveforms. [8]

