Roll No .....

MEPE - 102

M.E./M. Tech., I Semester

Examination, June 2014

Power Electronics Devices And Phase Control

Time : Three Hours

Max. Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if not given.

1. a) Explain the switching characteristics of the IGBT with neat circuit diagram and waveforms.
   b) What are the methods to turn on SCR. Explain it?

2. a) Write short notes on:
      i) Snubber circuit for BJT.
      ii) Commutation circuit of SCR.
   b) Describe the operation of multiphase choppers.

3. a) Explain any four performance parameters of a phase controlled rectifiers.
   b) Describe the effect of source inductance on the performance of a single phase full converter indicating clearly the conduction of various thyristors during one cycle. Derive the expression for its output voltage.

4. a) Explain the principle of operation of single phase dual converter with neat power circuit diagram.
   b) A step-up chopper has input voltage of 220V and output voltage of 660 V. If the non-conducting time of thyristor chopper is 100μs, compute the pulse width of output voltage. Incase pulse width is halved for constant frequency operation, find the new output voltage.

5. a) Difference between symmetrical and asymmetrical control.
   b) Explain the various modes of operation of line converter with necessary waveforms.

6. a) Describe the harmonic analysis of output voltage operation.
   b) Explain the principle of three phase to single phase step-down cyclo converter with power circuit and waveforms.

7. a) Describe the operation of three phase voltage source inverter with 120° mode of operation.
   b) Describe the operation of single phase auto sequential commutated current source inverter with power circuit and waveforms.

8. Write short notes on any two of the following:
   i) Harmonic operations
   ii) Isolated transformer
   iii) HVDC
   iv) Circulating current and non circulating current

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