

B.TECH SEM – V (2007 COURSE) (ELECTRICAL ENGG.) :
SUMMER - 2018
SUBJECT: POWER ELECTRONICS

Day : **Tuesday**
Date : **22/05/2018**

S-2018-2665

Time : **10.00 AM TO 01.00 PM**
Max. Marks : 80

N.B.:

- 1) **Q.No.1 and Q.No.5 are COMPULSORY.** Out of the remaining questions attempt **ANY TWO** questions from each section.
 - 2) Answers to both the sections should be written in **SEPARATE** answer books.
 - 3) Figures to the right indicate **FULL** marks.
 - 4) Assume suitable data if necessary.
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SECTION – I

- Q.1**
- a) Explain in detail the Turn-Off mechanism of an SCR. (05)
 - b) Explain the effect of battery load on the performance of single phase fully controlled bridge converter. (04)
 - c) Explain in detail how DIAC is used as a triggering agent for a TRIAC (04)
- Q.2**
- a) What are the different methods of turning on for an SCR? Explain any one method in details. (07)
 - b) What are the dv/dt and di/dt ratings of an SCR? What will happen if these ratings are exceeded? (06)
- Q.3**
- a) Explain the effect of free-wheeling diode in details. (06)
 - b) Derive the expression for i) average load voltage ii) average load current (07)
For single phase half controlled converter with R load.
- Q.4**
- a) Draw and explain the AC phase controller circuit using TRIAC and DIAC. Which mode is used here? (07)
 - b) If an SCR and TRIAC of the same ratings are available. Which is to be preferred as a controlled device? Give reason? (06)

SECTION – II

- Q.5**
- a) Explain in brief the gate drive design considerations of IGBT. (05)
 - b) With a neat sketch explain the working of a class D chopper. (04)
 - c) Explain why the voltage control is needed in the inverter circuit? (04)
- Q.6**
- a) Draw and explain the IGBT driver circuit with over current protection. (06)
 - b) What is significance of the safe operating areas of MOSFET? State the other operating limitation of MOSFET. (07)
- Q.7**
- a) Derive the expression for the commutating components of L&C for voltage commutated chopper. (07)
 - b) Mention the advantages of Jones Chopper circuit over the other chopper circuit. Also mention the applications of Jones chopper. (06)
- Q.8**
- a) Compare 180 degree and 120 degree conduction mode of 3phase transistorized bridge converter. (07)
 - b) Compare between voltage source inverter and current source inverter. (06)

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