

B.TECH SEM - VI (2007 COURSE) (E & TC ENGG.) :

SUMMER - 2018

SUBJECT : POWER ELECTRONICS DEVICES & APPLICATIONS

Day : **Friday**

S-2018-2746

Time : **02.30 PM TO 05.30 PM**

Date : **08/06/2018**

Max. Marks : 80

N. B. :

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

SECTION - I

- Q.1** a) In what respect an IGBT is better than a MOSFET? (05)
b) Explain free wheeling action of a diode. (04)
c) Compare the advantages and disadvantages of half bridge and full bridge inverters. (05)
- Q.2** a) With suitable circuit diagram and waveforms explain operation of protection circuits for SCR. (07)
b) Draw and explain isolated and non isolated driver circuits for IGBT and SCR. (06)
- Q.3** a) With neat circuit diagram explain the working of single phase fully controlled bridge converter. Draw output waveform for
i) Highly load ii) purely resistive load (07)
b) A single phase full controlled bridge is operated with a resistive load $R = 10\Omega$, the input voltage to the bridge is 250V with firing angle $\alpha = 60^\circ$ calculate the following (06)
i) Average load voltage
ii) RMS load voltage
iii) Average and RMS load current
iv) Form factor and ripple factor
- Q.4** a) Compare 180° mode of 3ϕ bridge inverter. (06)
b) Explain the working of half bridge inverter with the help of waveforms and its performance parameters. (07)

SECTION - II

- Q.5** a) Compare step up and step down chopper with respect to circuit diagram, waveform and operation. (05)
b) What do you mean by phase angle control? What is its role in control of power electronic converters? (05)
c) Draw schematic diagram for HVDC and HVAC transmission. (04)
- Q.6** a) With the help of circuit diagram and relevant waveforms, explain the working of two quadrant type C chopper. (07)
b) A step up chopper feeds a DC Motor from 100v DC supply. If the armature resistance is 1Ω and the motor back emf is 50V calculate the range of duty cycle to obtain a no load to full load armature current variation of 2A to 20A. Assume current to be ripple free. (06)
- Q.7** a) Write a short not on TCA 785. (06)
b) What are PWM techniques used in inverters? Explain operation of IC based control circuit for inverter. (07)
- Q.8** a) With the help of respective block diagram explain the difference between online and offline UPS. What are the advantages of online UPS over offline UPS? (07)
b) Draw the block diagram of electronic ballast for fluorescent lighting and explain its advantages and disadvantages. (06)