

B.TECH SEM – VI (2007 COURSE) (ELECTRONICS) :

SUMMER - 2018

SUBJECT: POWER ELECTRONICS DEVICES & CIRCUITS

Day : **Wednesday**
Date : **06/06/2018**

S-2018-2721

Time : **02.30 PM TO 05.30 PM**
Max. Marks: 80

N. B. :

- 1) **Q. No.1 and Q. No.5 are COMPULSORY.** Out of the remaining attempt **ANY TWO** questions from each Section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the section should be written in **SEPARATE** answer book.
- 4) Use of non-programmable electronic **CALCULATOR** is allowed.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1** a) Describe the different modes of operation of SCR with the help of its V-I characteristics. (06)
b) Describe the function of freewheeling diode in converters. (04)
c) Describe single pulse width modulation technique. (04)
- Q.2** a) Describe working of power MOSFET. (07)
b) Describe 'Latch Up' in IGBT. How can be it avoided? (06)
- Q.3** a) With relevant waveforms derive the expression for the output voltage for single phase half wave converter with inductive load. (07)
b) A three phase half wave converter is operated from three phase star connected 208V, 60Hz supply and load resistance $R = 10 \Omega$. If it is required to obtain an average output voltage, calculate:
i) delay angle ii) rms and average output currents (06)
- Q.4** a) Describe 120 degree mode three phase inverter with the help of waveforms. (07)
b) State the techniques of voltage control in inverters. Describe sinusoidal PWM technique. (06)

SECTION-II

- Q.5** a) Write note on: Control strategies for chopper. (05)
b) Describe the role of phase angle control. (04)
c) What are the advantages of ON-Line UPS over offline UPS. (05)
- Q.6** a) Describe the flyback converter with its circuit diagram and operational waveforms. (06)
b) A first quadrant chopper is operated from 220V D supply and surfacing frequency is 1KHz for duty cycle of 0.7. Find:
i) Average output voltage ii) RMS output voltage
iii) form factor and ripple factor of output voltage (07)
- Q.7** a) Describe the operation of IC 3524 for inverter. (06)
b) Describe the cosine control method for single phase converters. (07)
- Q.8** a) With the help of neat diagram describe the operation of ON-Line UPS. (07)
b) Write note on: HF induction heating. (06)

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