

B.TECH. SEM -V ELECTRONICS ENGG.) 2014 COURSE
(CBCS) : SUMMER - 2018
SUBJECT : POWER DEVICES AND MACHINES

Day : **Thursday**
Date : **24/05/2018**

S-2018-2355

Time : **10.00 AM TO 01.00 PM**
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labelled diagram **WHEREVER** necessary.
- 4) Use of non-programmable calculator is **ALLOWED**.
- 5) Assume suitable data, if necessary.

Q. 1 Describe the different modes of operation of an SCR with the help of its static V-I characteristic. **(10)**

OR

Describe the construction, types and switching characteristics of power diodes. **(10)**

Q. 2 A single phase fully controlled bridge converter supplies an inductive load. **(10)** Assuming that the output current is virtually constant equal to I_0 , determine the following if supply voltage is 230V and firing angle is 30° .

- | | |
|---------------------------------|-------------------------|
| i) Average output voltage | iv) Displacement factor |
| ii) Supply rms current | v) Supply power factor |
| iii) Supply fundamental current | vi) Harmonic factor |

OR

Describe the operation of single phase half controlled converter with resistive load. Sketch the associated waveforms also. **(10)**

Q. 3 With the help of waveforms describe the working of three phase semi converter with resistive load. **(10)**

OR

A three phase half wave converter is operated from a three phase star connected 208V, 60 Hz supply and load resistance is 10Ω . If it is required to obtain an average output voltage of 50% of the maximum possible output voltage, calculate i) Delay angle ii) rms and average output currents iii) rms and average thyristor currents iv) rectification efficiency v) TUF vi) input power factor **(10)**

Q. 4 a) Describe with circuit diagram and waveforms operation of single phase current source inverter. **(05)**

b) Describe Sinusoidal Pulse width modulation with necessary waveforms. **(05)**

OR

With the help of circuit diagram and relevant waveforms describe the working of single phase half bridge inverter. **(10)**

P. T. O.

- Q. 5** a) Describe with circuit diagram and waveforms step up chopper. (05)
b) Enlist different control strategies used in chopper. (05)

OR

- a) What is time ratio control in DC choppers? Write the use of TRC for controlling the output voltage in choppers. (05)
b) For Type A chopper the supply voltage is 230 V, load resistance being 10Ω for the duty cycle of 40%. Find the average and rms values of the output voltage and chopper efficiency by taking voltage drop of 2 V across the chopper during ON condition. (05)

- Q. 6** a) With suitable circuitry describe working of Universal Motor. (05)
b) Give the comparison of online and off-line UPS. (05)

OR

- a) With suitable circuit diagram write down the working principle of DC Motor. (05)
b) Give the advantages and disadvantages of Electronic Ballast. (05)

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