## Code: 9A02504

## R09

## B.Tech III Year I Semester (R09) Supplementary Examinations June 2016

> POWER ELECTRONICS
> (Common to EEE \& E.Con.E)

Time: 3 hours
Max Marks: 70
Answer any FIVE questions
All questions carry equal marks
*****
1 (a) Explain the turn-on methods of power MOSFETs.
(b) Give the comparison between thyristor and transistor.

2 Draw the R-triggering circuit and explain with proper waveforms.
3 (a) Draw and explain the operation of 1-phase half controlled bridge converter with R -load with circuit diagram and necessary waveforms.
(b) Derive the load voltage and load current for $\alpha=30 \mathrm{deg}$ for 1-phase half controlled bridge converter.

4 A 1-phase converter with RLE load has the following parameters, supply voltage is $230 \mathrm{~V}, 50 \mathrm{~Hz}$, $\mathrm{R}=20 \mathrm{ohm}, \mathrm{L}=1 \mathrm{mh}, \mathrm{E}=120 \mathrm{~V}$.
Determine: (i) The voltage across thyristor at the instant it is triggered.
(ii) The voltage that appears across SCR when current decays to zero.
(iii) PIV for the SCR.

Extinction angle $\beta=220 \mathrm{deg}$. and firing angle $\alpha=25 \mathrm{deg}$.
5 (a) Explain the principle of operation for a three phase dual converter with associate waveforms.
(b) A 3-phase fully controlled rectifier is supplied at $230 \mathrm{~V} /$ phase, 50 Hz , the source inductance 5 mH and load current on dc side is constant at 12 A . If the load consists of a dc source voltage of 230 V having an internal resistance of 0.9 ohms, find the following: (i) Firing angle. (ii) Overlap angle.

6 (a) Explain with the help of layer diagram the construction of Triac.
(b) Compare the construction views of Triac over Diac.

7 (a) Draw the schematic of type E chopper and explain the working of the same.
(b) Enumerate the advantages of the type-A chopper over the other choppers.

The full bridge inverter has a source voltage $E_{d c}=220 \mathrm{~V}$. The inverter supplies an RLC load with $R=10 \Omega, L=10 \mathrm{mH}$ and $C=52 \mu \mathrm{~F}$. The inverter frequency is 400 Hz .
Determine: (i) The RMS load current at fundamental frequency.
(ii) The RMS value of load current.
(iii) The power O/p.
(iv) The average supply current.

