

R09**Code: 9A02504**

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 $\alpha = 30^\circ$ for 1-phase half controlled bridge converter.
- 4 A 1-phase converter with RLE load has the following parameters, supply voltage is 230 V, 50 Hz, $R = 20 \text{ ohm}$, $L = 1 \text{ mH}$, $E = 120 \text{ V}$.
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 $\beta = 220^\circ$ and firing angle $\alpha = 25^\circ$.
- 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 230V/phase, 50 Hz, the source inductance 5mH 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.
- 8 The full bridge inverter has a source voltage $E_{dc} = 220 \text{ V}$. The inverter supplies an RLC load with $R = 10 \text{ } \Omega$, $L = 10 \text{ mH}$ and $C = 52 \text{ } \mu\text{F}$. 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.
