

## 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

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- 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  $\alpha$  = 30deg 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 ohm, L = 1mh, E = 120 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  $\beta$  = 220deg. and firing angle  $\alpha$  = 25deg.

- 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  $E_{dc} = 220$  V. The inverter supplies an RLC load with R = 10  $\Omega$ , L = 10mH and C = 52 $\mu$ 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.

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