

Total No. of Questions : 6]

SEAT No. :

P3640

[Total No. of Pages : 2

APR. - 15/ENGG. - 125

T.E. (E & TC Engineering) (In Sem - Semester - II)

POWER ELECTRONICS

(2012 Pattern)

Time :1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of nonprogrammable calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) Explain construction & steady state characteristics of SCR. [6]

b) A UJT relaxation oscillator is designed to trigger a SCR, UJT has following data: [4]

$\eta = 0.72$ ,  $I_p = 0.6\text{mA}$ ,  $V_p = 18\text{V}$ ,  $V_v = 1\text{V}$ ,  $I_v = 2.5\text{mA}$ ,  $R_{BB} = 5\text{K}\Omega$ , leakage current =  $4.2\text{mA}$ . If triggering frequency is  $2\text{kHz}$  &  $C = 0.04\ \mu\text{f}$ , calculate R, R1 & R2.

OR

Q2) a) Draw & explain synchronized UJT triggering circuit for SCR with waveforms. [6]

b) Compare power MOSFET with IGBT. [4]

Q3) a) Draw & explain single phase fully controlled bridge converter for R-L load with various o/p voltage waveforms. [6]

b) A single phase semi converter is operated from 230V, 50Hz AC supply. The load is resistive having resistance of  $10\ \Omega$ . If the firing angle ( $\alpha$ ) is  $60^\circ$ , calculate

i) Average o/p voltage      ii) Rms o/p voltage [4]

P.T.O.

OR

- Q4)** a) Draw & explain three phase fully controlled bridge converter for R load with o/p voltage waveforms. [7]
- b) What is commutation? Explain natural commutation with forced commutation for SCR. [3]
- Q5)** a) Draw & explain single phase full bridge inverter for R-L load with o/p voltage & current waveforms. [5]
- b) Single phase full bridge inverter is operated from 48V dc supply, it has a resistive load of  $R = 2.4 \Omega$ . Find its rms o/p voltage at fundamental frequency. [2]
- c) Compare free wheeling diode & feedback diode? [3]

OR

- Q6)** Explain 180° mode in three phase inverters for balanced star R load with circuit diagram in detail. [10]

