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SEAT No. :

P3640

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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]**

$\eta = 0.72$, $I_p = 0.6mA$, $V_p = 18V$, $Vv = 1V$, $Iv = 2.5$ mA, $R_{BB} = 5K\Omega$, leakage current = 4.2mA. If triggering frequency is 2kHz & C = 0.04 μf, 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 Ω. If the firing angle (α) is 60°, 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 Ω. 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]**