



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - NOV 2023**

Semester : Semester V - 2021

Course Code : ECE3016

Course Name : Sem V - ECE3016 - Electronic Controlled Converters

Program : B. TECH

Date : 3-NOV-2023

Time : 11:30AM - 1:00PM

Max Marks : 50

Weightage : 25%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

(5 X 2 = 10M)

1. Two thyristors in the circuit shown in Fig. 1, each rated a continuous current of 100A sharing a load current. Current through T2 is 40A. Determine the current through T1.

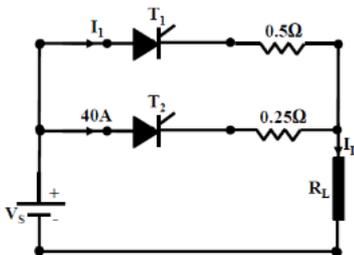


Fig. 1

2. Which device can be used as static switch when the supply is AC and Mention at least one application of such where power semiconductor device is used as static switch?
(CO1) [Knowledge]
3. Name the power semiconductor device that could be turned-on by applying positive gate pulse and could be turned-off by applying negative gate pulse
(CO1) [Knowledge]
4. What is the average output voltage value of Half wave AC to controlled DC converter when the input rms voltage is 220V, firing angle is 30degree, resistive load?
(CO2) [Knowledge]
5. Assume that the output current of fully controlled rectifier is continuous and ripple free. Under what condition the fully controlled rectifier can be operated as rectifier and as inverter?
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(2 X 10 = 20M)

6. Why do you need zero crossing detector in controlled rectifiers? Draw the circuit of zero crossing detector with and without using transformer? Mention the role of each and every component in the circuit?

(CO1) [Comprehension]

7. In a half wave AC to DC controlled converter what if you reverse the polarity of the SCR? Draw the relevant circuit diagram and associated waveforms (output voltage, output current, voltage across SCR and input current) with Resistive and very large inductive load

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION

(1 X 20 = 20M)

8. In single phase fully controlled rectifier what is the condition that needs to be satisfied to operate the converter in rectification mode and in inversion mode. If the converter is operated from 220V AC supply with a firing angle of 30 degree find (a) Average output voltage (b) RMS output voltage (c) Efficiency (d) Form Factor (e) Ripple Factor (f) TUF for resistive and small inductive load? Sketch relevant output voltage waveform?

(CO2) [Application]