QPC: RJ20MTECH071 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester – Regular) Examinations, June – 2021

MPEPE1043– POWER SEMICONDUCTOR DEVICES AND MODELING

(Power Electronics)

Time: 2 hrs Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A **(2 x 10 = 20 Marks)**

Q1. Answer **ALL** questions

a. What do you mean by DC Blocking Voltage (VRDC):

b. Draw Forward current and voltage waveforms of a power diode during Turn On operation.

c. What do you mean by Schottky diode?

d. Do you expect a thyristor to turn ON if a positive gate pulse is applied under reverse bias condition.

e. Draw Steady State Output Characteristics of TRIAC.

f. Define I_{FSM} in GTO.

g. Why does the collector current of a BJT in the active region increases with increasing collector voltage for a given base current?

h. What are the main constructional differences between a MOSFET and a BJT?

i. Define Maximum continuous collector current (I_C) in IGBT.

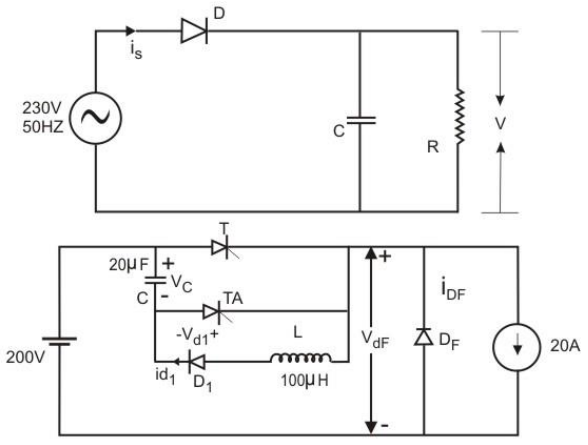
j. Define Maximum total power dissipation (P_{tmax}) in IGBT:

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions **Marks**

2. A power diode have a reverse saturation current of 15μA at 32°C which doubles for every 10° rise in temperature. The dc resistance of the diode is 2.5 mΩ. Find the forward voltage drop and power loss for a forward current of 200 Amps. Assume that the maximum junction temperature is restricted to 102°C. **(6)**

$$V_T = k\,T/q = 26\ mv\ at\ 32°C$$



3. With necessary sketches give a detailed explanation about Dynamic characteristics of the SCR. **(6)**

4. Discuss in detail about modelling and simulation of 6 Pulse GTO Thyristor Converter. **(6)**

5. Draw and explain about v-I characteristics of TRIAC. **(6)**

6. Draw and explain about switching characteristics of a Power Transistor. **(6)**

7. Describe in detail about Safe operating area of a MOSFET **(6)**

8. Discuss in detail about Short-circuit (over current) protection **(6)**

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