QP Code: RJ23MTECH069 | Reg. No | | | | | | | | | | | AY 23

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester) Examinations, January – 2024

MPEPE1043– Power Semiconductor Devices and Modeling

(Power Electronics)

Time: 3 hrs | Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

		CO#	Blooms Level
Q1.	Answer all the Questions		
a.	List the applications of SCR.	CO1	K1
b.	What is the difference between a power diode and a signal diode?	CO1	K2
c.	What is meant by delay angle?	CO1	K2
d.	In a BJT, if the emitter current is 12 mA and the emitter current is 1.02 times the collector current, calculate the base current.	CO2	K1
e.	Define the different operating regions of a transistor.	CO3	K2
f.	Why is a power BJT considered a current-controlled device?	CO2	K1
g.	Why is an IGBT considered a voltage-controlled device?	CO1	K3
h.	What is the relationship between the gate signal and forward break-over voltage (Vbo)?	CO4	K1
i.	Give some applications of BJT.	CO3	K3
j.	Define "Safe Operating Area."	CO4	K1

PART – B **(10 x 5=50 Marks)**

Answer ***ANY FIVE*** questions

		Marks	CO#	Blooms Level
2. a.	Write short notes on the necessity of heat sinks and its sizing considerations.	5	CO1	K2
b.	What considerations should be kept in mind while paralleling MOSFETs?	5	CO1	K3
3.a.	Sketch the switching characteristics of a power diode and explain.	5	CO2	K2
b.	Explain the various triggering methods of SCR.	5	CO2	K4
4. a.	Write short notes on Schottky diode, emphasizing the ohmic contacts present in it.	5	CO3	K2
b.	Explain the switching characteristics of BJT.	5	CO3	K2
5.a.	Explain the structure of a power BJT with a neat diagram.	5	CO4	K1
b.	Explain the construction and switching characteristics of GTO.	5	CO4	K2
6. a.	Explain second breakdown and forward-biased safe operation area (FBSOA).	5	CO2	K3
b.	Explain in detail the Snubber requirement for diodes.	5	CO3	K2

7.a.	Draw the Eber-Moll's transistor model and write short notes on the elements used in the model.	5	CO2	K4
b.	Discuss the turn-on process of a MOSFET with a suitable example.	5	CO2	K2
8. a.	Draw the V-I characteristics of an IGBT and write short notes on it.	5	CO1	K3
b.	Explain the uniqueness of a thyristor using its VI characteristics.	5	CO2	K2

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