BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

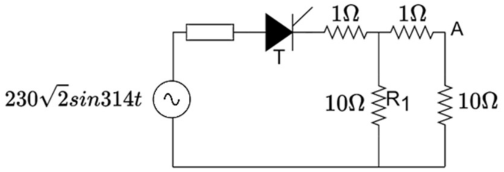
CLASS: B.TECH **SEMESTER : V/ADD**
BRANCH: EEE **SESSION : MO/2025**

SUBJECT: EE353 POWER ELECTRONICS
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	List various applications of power electronics.	[2]	1	1
Q.1(b)	Explain the static *V-I* and transfer characteristics of the IGBT with the help of a circuit diagram and suitable waveform.	[3]	1	2
Q.2(a)	List the differences between Power MOSFET and IGBT.	[2]	1	1
Q.2(b)	Explain the switching characteristics of power MOSFET with the help of a suitable waveform.	[3]	1	2
Q.3(a)	Discuss any four anode voltage ratings for a thyristor.	[2]	2	2
Q.3(b)	Explain the two-transistor model of a thyristor and describe how the anode current is related to the current gains of the two transistors.	[3]	2	2
Q.4(a)	Explain di/dt and dv/dt protection of a thyristor.	[2]	2	3
Q.4(b)	Thyristor shown in Fig.1 has I^2t rating of $20A^2s$. If terminal A gets short-circuited to ground, calculate the fault clearance time so that SCR is not damaged.	[3]	2	3

Fig. 1



Q.5(a)	Explain the term string efficiency and the derating factor.	[2]	2	2
Q.5(b)	SCR with a rating of 2000 V and 400 A, are available to be used in a string to handle 12 kV and 2 kA. Calculate the number of series and parallel units required in case the derating factor is 0.4.	[3]	2	3

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