

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

CLASS: B.TECH.
BRANCH: EEE

SEMESTER : 5TH
SESSION : MO/2023

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
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Q.1(a)	How power electronics-based topologies can be used for domestic and industrial applications?	[2]	CO1	BL1
Q.1(b)	List at least six differences between Power MOSFET and IGBT.	[3]	CO1	BL1
Q.2(a)	Show On-region, Off-region, breakover voltage, latching current, and holding current on the static output characteristics of a thyristor.	[2]	CO2	BL2
Q.2(b)	Explain working principle of thyristor using two transistor analogy.	[3]	CO2	BL2
Q.3(a)	Apply static voltage equalization in string series connected N number of thyristors in order to obtain the value of resistance needed to be connected in parallel with each thyristors.	[2]	CO3	BL3
Q.3(b)	Thyristors with the rating of 1000V and 200 Ampere are available to handle 6kV an 1kAmp. Compute the series and parallel units that are needed in case if derating factor is 0.1 .	[3]	CO3	BL3
Q.4(a)	Analyze the gate characteristics in order to obtain minimum resistance needed to be connected in series with gate of a thyristor for safe operation.	[2]	CO4	BL4
Q.4(b)	Analyze thyristor gate characteristics in order to obtain relation between peak instantaneous gate power dissipation (P_{gm}) and average gate power dissipation (P_{gav})	[3]	CO4	BL4
Q.5(a)	Suggest type of commutation that is most suitable for single phase halfwave controlled rectifier for resistive load in terms of cost effectiveness. Justify your answer.	[2]	CO5	BL5, BL6
Q.5(b)	Design a single phase half wave controlled rectifier for highly inductive load. Draw its load voltage and load current waveform along with gate triggering pulses.	[3]	CO5	BL5, BL6

:::22/09/2023 M:::