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

CLASS: B. Tech. **SEMESTER : VII**
BRANCH: EEE **SESSION : MO/2025**

SUBJECT: EE507 ADVANCED 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)	Discuss the importance of thermal characteristics in power electronic devices	[2]	CO1	BL1
Q.1(b)	Draw and explain the dynamic characteristics of an IGBT	[3]	CO1	BL2
Q.2(a)	Draw the Basic Structure of n-channel Power MOSFET.	[2]	CO1	BL2
Q.2(b)	List the major differences between Thyristor, GTO, and IGBT in terms of: (a) Switching speed (b) Gate control requirements (c) Voltage and current handling capability	[3]	CO1	BL3
Q.3(a)	Why is the safe operating area (SOA) critical in power electronic design?	[2]	CO1	BL2
Q.3(b)	Draw and explain general block diagram of a switched mode power supply.	[3]	CO2	BL3
Q.4	Explain with neat diagrams the operation and waveform of: (a) Forward Converter (2 Marks) (b) Flyback Converter (3 Marks)	[5]	CO2	BL2
Q.5(a)	With a neat sketch, explain the operation of a double-ended forward converter.	[2]	CO2	BL2
Q.5(b)	A flyback converter is designed for 24 V/2 A output from a 230 V AC input (after rectification to 325 V DC). Switching frequency = 50 kHz, Duty cycle = 0.4. Calculate the average primary current and comment on its suitability for low-power applications.	[3]	CO3	BL4

:::::22/09/2025 :::::M