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

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

SUBJECT: EE507 ADVANCED POWER ELECTRONICS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL	Module No.
Q.1(a)	Explain the static and dynamic characteristics of an IGBT. Compare it with a Power MOSFET in terms of switching speed, loss, and drive requirements.	[5]	CO1	BL2, BL3	I
Q.1(b)	Draw and explain a suitable gate driver circuit for MOSFET with protection features.	[5]	CO1	BL3	I
Q.2(a)	Explain the operation of a forward converter with circuit diagram and waveforms.	[5]	CO2	BL2	II
Q.2(b)	Differentiate between Flyback and Forward converters. Discuss their applications in SMPS design.	[5]	CO2	BL2–BL4	II
Q.3(a)	Explain the concept of Space Vector PWM and its advantages over sinusoidal PWM.	[5]	CO2	BL3	III
Q.3(b)	Describe the operating principle and advantages of a cascaded H-Bridge multilevel inverter.	[5]	CO3	BL3	III
Q.4(a)	With neat diagram and waveforms, explain the operation of a Zero Voltage Switching (ZVS) resonant converter. [5] CO3 | BL: L3–L4 | Module IV	[5]	CO3	BL4	IV
Q.4(b)	A series resonant inverter has L = 40 µH, C = 8 µF, and load resistance R = 3 Ω. Determine: (i) Resonant frequency, (ii) RMS current through the load, (iii) Quality factor Q.	[5]	CO2	BL3	IV
Q.5(a)	Draw and explain the internal functional block diagram of UC3825 IC.	[5]	CO1, CO5	BL2	V
Q.5(b)	Write short notes on Intelligent Power Module (IPM) and its role in industrial drives.	[5]	CO5	BL3, BL5	V

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