BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO-2022)

CLASS: B.TECH **SEMESTER : VII**
BRANCH: EEE **SESSION : MO/2022**

SUBJECT: EE507 ADVANCED POWER ELECTRONICS

TIME: 03 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. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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Q.1(a)	Draw static and dynamic characteristics of IGBT.	[2]
Q.1(b)	Explain the reverse recovery phenomenon of thyristors.	[3]
Q.1(c)	What are the four types of heat transfer mechanisms? Explain them briefly.	[5]
Q.2(a)	What are the categories of isolated converters?	[2]
Q.2(b)	What are the advantages of the dual switch forward converter and explain its functioning?	[3]
Q.2(c)	Design full bridge converter topology and discuss the operation of the full-bridge topology.	**[5]**
Q.3(a)	What is the basic concept of multilevel converters?	[2]
Q.3(b)	What are the advantages of cascaded multilevel inverters?	[3]
Q.3(c)	Design the flying capacitor multilevel inverter and discuss the operational features.	[5]
Q.4(a)	What is the dead zone of a resonant inverter?	[2]
Q.4(b)	A series resonant inverter with series loaded delivers a power of 1 kW at resonance. The load resistance is R = 10ohm and resonant frequency is 20 kHz. Determine (a) DC input voltage Vs, (b) quality factor, it is required the load power to 250 w by frequency control so that u=0.8 (c) the inductor L and (d) the capacitor C.	[3]
Q.4(c)	Explain the step by step operational behaviour of a zero voltage switching resonant converter.	[5]
Q.5(a)	What are the requirements for industrial gate driver circuit?	[2]
Q.5(b)	Design industrial gate driver circuit using TLP 250.	[3]
Q.5(c)	Compare the three basic types of the multilevel inverter topologies.	[5]

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