Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3172413 Date: 28/06/2023

Subject Name: Advanced Power Electronics Devices and Interface Circuits

Time: 10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain the concept of WBG Power Semiconductor Devices.	**03**
	(b)	State the advantages and applications of WBG devices.	**04**
	(c)	Compare SiC devices with Si devices.	**07**
Q.2	**(a)**	Discuss role of driver circuit in Power electronics.	**03**
	(b)	Draw the pin diagram of IR2110 and explain briefly its pins.	**04**
	(c)	Explain requirement & importance of Isolation in power electronics.	**07**
		OR	
	(c)	Draw the schematic of relay driver ULN 2803 for driving a motor load using a microcontroller. Explain its working.	**07**
Q.3	**(a)**	Enlist isolated and non-isolated driver ICs.	**03**
	(b)	Write short note on Current Transformer.	**04**
	(c)	Explain Hall effect current sensors in detail.	**07**
		OR	
Q.3	**(a)**	Draw pin diagram of single switch driver IC (e.g. TLP250).	**03**
	(b)	Explain the Galvanic Isolation & its importance.	**04**
	(c)	Discuss Voltage Measurement using LEM LV 25-P.	**07**
Q.4	**(a)**	Draw schematic diagram of isolated linear amplifier.	**03**
	(b)	Explain in brief voltage measurement using Op-amp.	**04**
	(c)	Discuss F to V Converter.	**07**
		OR	
Q.4	**(a)**	Explain the Power Scope.	**03**
	(b)	State applications of Logic Analyzer.	**04**
	(c)	Discuss high frequency design of Inductor for DC-DC converter circuit with appropriate example.	**07**
Q.5	**(a)**	Which type of core is required for high frequency switching applications? State different types of cores used in practice.	**03**
	(b)	Explain Transformer Design for Forward converter.	**04**
	(c)	Explain the Natural Cooling & forced Cooling of Heat Sinks.	**07**
		OR	
Q.5	**(a)**	What is energy equation of inductor?	**03**
	(b)	Compare active and passive heat sink.	**04**
	(c)	Give the concept of thermal resistance. Describe the analogy between thermal and Electrical quantities.	**07**

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