

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023**

**Subject Code:3172413**

**Date:14-12-2023**

**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
<b>Q.1</b>	(a) Explain important of band gap in semiconductors.	<b>03</b>
	(b) State the advantages and applications of WBG devices.	<b>04</b>
	(c) Give the comparison of WBG (SiC, GaN) and Si devices.	<b>07</b>
<b>Q.2</b>	(a) State functions of driver circuits.	<b>03</b>
	(b) Explain importance of isolation in power electronics.	<b>04</b>
	(c) Draw the pin diagram of Isolated Driver Circuits based on TRIAC Driver IC (e.g. MOC3021) and explain briefly its pins	<b>07</b>
	<b>OR</b>	
	(c) Draw the schematic of relay driver ULN 2803 for driving a motor load using a microcontroller. Explain its working.	<b>07</b>
<b>Q.3</b>	(a) Enlist isolated and non-isolated driver ICs.	<b>03</b>
	(b) Write short note on Current Transformer.	<b>04</b>
	(c) Explain the Hall Effect Current Sensors & Linear Opto coupler.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Draw pin diagram of single switch driver IC (e.g. TLP250).	<b>03</b>
	(b) Discuss Gate Drive Requirements Of High-Side Devices.	<b>04</b>
	(c) Explain the interfacing of signals using Galvanic Isolation.	<b>07</b>
<b>Q.4</b>	(a) Draw schematic diagram of isolated linear amplifier.	<b>03</b>
	(b) Write short note on Measuring and Interfacing Analog Signals.	<b>04</b>
	(c) Explain F to V conversion using LM331.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) List out applications of Logic Analyzer.	<b>03</b>
	(b) Write a short note on current probe and voltage probe.	<b>04</b>
	(c) Discuss design of high frequency Inductor for DC-DC converter circuit with appropriate example.	<b>07</b>
<b>Q.5</b>	(a) Enlist various types of cores used in high frequency magnetic design.	<b>03</b>
	(b) Explain Transformer Design for Flyback converter.	<b>04</b>
	(c) Explain forced and natural cooling of heat sinks.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Discuss considering of grounding for Power Circuits.	<b>03</b>
	(b) Discuss thermal resistance & its Consideration.	<b>04</b>
	(c) Explain heat sink calculations and design in detail.	<b>07</b>

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