Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 710702N **Date: 17-06-2014**

Subject Name: Advanced Power Electronics

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain single quadrant, two quadrant and bidirectional operation of switches. Suggest power semiconductor devices capable to realize it.	**07**
	(b)	Discuss steps illustrating design of inductor.	**07**
Q.2	**(a)**	Discuss static and dynamic characteristics of power MOSFET and IGBT.	**07**
	(b)	Distinguish isolated and non isolated converters. Discuss PUSH-PULL converter.	**07**
		OR	
	(b)	Write short note on SMPS design criterion.	**07**
Q.3	**(a)**	Explain full bridge dc-dc converter.	**07**
	(b)	Discuss selected harmonic elimination technique to eliminate 5th and 7th harmonics from output voltage of the inverter.	**07**
		OR	
Q.3	**(a)**	Compare operation of 3-phase bridge inverter with 150^0, 120^0 and 180^0 conduction mode.	**07**
	(b)	Discuss space vector pulse width modulation (SVPWM) technique in brief.	**07**
Q.4	**(a)**	Discuss importance of isolation in driver circuit. Discuss various electrically isolated driver circuits.	**07**
	(b)	Discuss circulating current operation of 3-phase cyclo-converter.	**07**
		OR	
Q.4	**(a)**	Discuss cascade connected drive circuits. Explain driver circuit protection in brief.	**07**
Q.4	**(b)**	Explain difference in inverter and cyclo-converter circuit.	**07**
Q.5	**(a)**	Explain operation of current source inverter with neat diagram. Differentiate it from voltage source inverter.	**07**
	(b)	What is the difference in design of power transformer and high frequency transformer?	**07**
		OR	
Q.5	**(a)**	Discuss Côuk converter with suitable diagram and waveforms.	**07**
	(b)	Explain operation 3-phase full wave controllers with resistive loads.	**07**

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