Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (OLD) EXAMINATION – SUMMER 2017

Subject Code: 1720709 **Date:12/05/2017**

Subject Name: Advanced Power Converters

Time:10:30 A.M. to 01:00 P.M. **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)**	What is multi pulse converter? What are its disadvantages? With appropriate block diagram explain how a 12 pulse converter can be obtained.	**07**
	(b)	With relevant waveforms and circuit diagram explain operation of parallel loaded resonant half bridge dc to dc converter operating in discontinuous mode.	**07**
Q.2	**(a)**	Explain in brief how switching stress can be reduced on electronics switch using ZCS and ZVS topologies.	**07**
	(b)	Discuss different transformer connections for multi pulse converter.	**07**
		OR	
	(b)	Explain the operation of series loaded resonant (SLR) half-bridge DC-DC converter operating in discontinuous mode.	**07**
Q.3	**(a)**	Write a brief note on 5 level NPC multi level inverter.	**07**
	(b)	Discuss 4 step commutation technique for matrix converter.	**07**
		OR	
Q.3	**(a)**	Write a brief note on electronics switches used in matrix converter. State basic rules to be observed for operating the switches of a matrix converter.	**07**
	(b)	Mention the advantages and disadvantages of matrix converter with respect to other means by which output voltage magnitude and frequency can be controlled.	**07**
Q.4	**(a)**	Write a brief note on cascaded H-bridge multi level inverter operated with carrier based PWM control strategy.	**07**
	(b)	Write a brief note on the control strategy used for transmitting the power through HVDC terminals.	**07**
		OR	
Q.4	**(a)**	Explain the switching sequence to get minimal neutral point voltage deviation for NPC multilevel inverter.	**07**
	(b)	Write a brief note on STATCOM and explain how it differs from SVC.	**07**
Q.5	**(a)**	What is MPPT when referred to solar photo voltaic system? How is it achieved with DC-DC converter feeding a DC load?	**07**
	(b)	With suitable block diagram discuss the control scheme for Doubly Fed Induction Generator based wind energy generation system.	**07**
		OR	
Q.5	**(a)**	Explain with block diagram scheme for instantaneous VAR compensation. How does this method differ from that of fixed capacitor thyristor controlled reactors?	**07**
	(b)	Draw the space vector diagram for diode-clamped 3-level inverter. Hence, derive the dwell time equations for the space vectors for any one region.	**07**

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