Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION – WINTER • 2014

Subject Code: 744501 **Date: 26-11-2014**

Subject Name: Harmonics Elimination Techniques

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)**	List various issues related to Harmonics. Suitably explain each with example.	**07**
	(b)	Explain various types of Loads with respect to source of Harmonics. Support the answer with suitable Diagram and Waveforms.	**07**
Q.2	**(a)**	Explain basics of Harmonic theory. Write necessary Mathematical Equations and draw Diagrams/ Waveforms in support.	**07**
	(b)	List various abnormal conditions caused by Harmonics on Power System Equipments. Discuss the same.	**07**
		OR	
	(b)	List and justify the negative effects of Harmonics in the system with suitable example.	**07**
Q.3	**(a)**	Explain need of Harmonic Elimination in the system. Draw typical Harmonic Spectrum in support.	**07**
	(b)	Explain the concept of Parallel Resonance with respect to Harmonic Elimination.	**07**
		OR	
Q.3	**(a)**	Explain concept of Modulation based Harmonics Elimination technique for Multi Level Inverter supporting suitable Circuit and Waveforms.	**07**
	(b)	Explain the concept of Series Resonance with respect to Harmonic Elimination.	**07**
Q.4	**(a)**	List classification of Supply System based Active Filters. Explain any one in detail with necessary Circuit and Waveforms.	**07**
	(b)	Draw a neat Schematic of Dynamic Voltage Regulator and working of the same with respect to Harmonic Reduction.	**07**
		OR	
Q.4	**(a)**	List classification of Topology based Active Filters. Explain any one in detail with necessary Circuit and Waveforms.	**07**
	(b)	Explain Single-Tuned Filter with necessary Circuit and Mathematical equations.	**07**
Q.5	**(a)**	State significance of Harmonic Measurement. Explain procedure for the same.	**07**
	(b)	Explain Harmonic sources generated in AC Drives. Draw necessary circuit and waveforms in support.	**07**
		OR	
Q.5	**(a)**	With respect to Harmonic Measurement Explain: (i) Site of conduction (ii) Duration for Measurement	**07**
	(b)	Discuss importance of IEEE Harmonic Standard 512-1992. Also indicate Harmonic levels of traditional sources in the same context.	**07**