Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION – SUMMER 2013

Subject Code: 740701 **Date: 14-05-2013**

Subject Name: Harmonics Measurements and Filtration Techniques

Time: 10.30 am - 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.**

Q.1	**(a)**	Distinguish between linear and non-linear load. Give their examples.	**07**
	(b)	Discuss effects of harmonics on rotating machines and on capacitors.	**07**
Q.2	**(a)**	In which conditions, harmonics are responsible for neutral conductor over loading? Justify your answer by giving example.	**07**
	(b)	Justify harmonics and power factor are closely related to each other.	**07**
		OR	
	(b)	Define following terms: 1. Total Harmonic Distortion (THD) 2. Total Demand Distortion (TDD) 3. Telephone influence factor (TIF)	**07**
Q.3	**(a)**	Explain working and design aspects of Band pass passive filters. Also discuss its quality factor.	**07**
	(b)	How does harmonic content reduce in synchronous machine by using distributed winding.	**07**
		OR	
Q.3	**(a)**	Why rotor of 3-phase induction motor is run at 1/7th times normal synchronous speed due to presence of 7th order harmonic.	**07**
	(b)	Why it is necessary to measure waveform distortions and also state how to carryouts its measurements.	**07**
Q.4	**(a)**	Compare Active filter with Passive filters.	**07**
	(b)	Write a short note on Dynamic response of shunt active filter.	**07**
		OR	
Q.4	**(a)**	Explain working of shunt active filter for constant power compensation. Draw the block diagram for constant instantaneous power control strategy and explain its working.	**07**
	(b)	Discuss various aspects to be considered in the design of passive filters.	**07**
Q.5	**(a)**	Give comparison between Hybrid and pure active filters.	**07**
	(b)	Give definition of harmonics and classify them according to their rotating phase-sequences.	**07**
		OR	
Q.5	**(a)**	Giving block diagram and control algorithm, explain how shunt active filters are used for sinusoidal current control.	**07**
	(b)	Write short note on Second-generation control circuit for series active filter.	**07**

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