Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION– WINTER • 2014

Subject Code: 742901 **Date: 26-11-2014**

Subject Name: Harmonics and Filtration Methods

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 Linear and Non-linear type load with illustration. Also discuss about the generation of harmonics.	**07**
	(b)	Define and explain following terms, (i) Telephone Influence Factor (ii)Total Demand Distortion (iii)Displacement Power Factor	**07**
Q.2	**(a)**	Discuss the characteristics of measuring equipment for measurement of harmonics.	**07**
	(b)	A single phase semi controlled converter is supplying power to resistive load. If firing angle is Ŭ, find the input current harmonics.	**07**
		OR	
	(b)	Find the individual harmonics distortion and total harmonic distortion of a voltage waveform with the following harmonic frequency make up: Fundamental V_1 = 120 V, 3rd harmonic V_3 = 5 V, 5th harmonic V_5 = 2 V, 7th harmonic V_7 = 1 V, 9th harmonic V_9 = 0.5 V.	**07**
Q.3	**(a)**	Write a brief note on Transient quality aspects. Discuss its significance.	**07**
	(b)	Discuss the effects of harmonics on power supplying cable with illustration.	**07**
		OR	
Q.3	**(a)**	Explain Band pass filter as a passive filter for harmonics filtration. Also discuss design aspects for Band pass filter.	**07**
	(b)	Discuss interrelation between AC system and load parameters.	**07**
Q.4	**(a)**	Write a short note on Harmonic source representation.	**07**
	(b)	Explain the sinusoidal current control strategy for three phase Three Wire Shunt Active Filter with necessary block diagram.	**07**
		OR	
Q.4	**(a)**	Explain working and design aspects of single tuned passive filter and discuss its quality factors.	**07**
	(b)	Write a short note on series active power filter. Also compare its performance with shunt active filter in all respect.	**07**
Q.5	**(a)**	Explain working of Unified Power Flow Controller with functional block diagram.	**07**
	(b)	Discuss Fourier analysis for detection and evaluation of Voltage events.	**07**
		OR	
Q.5	**(a)**	Explain Power Quality Factor and discuss its significance.	**07**
	(b)	Discuss about Harmonics Analyzer as a power quality measurement devices.	**07**

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