Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 742901 **Date: 04-06-2014**

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.**
4. **Notations used have usual meaning.**

Q.1	**(a)**	Explain generation of harmonics with suitable example. Also discuss about representation of harmonics source.	**07**
	(b)	Write a brief note on methods for the detection of voltage events.	**07**
Q.2	**(a)**	Define and explain following terms, (i) K factor (ii) Distortion Factor (iii)Displacement Power Factor	**07**
	(b)	Obtain Total Harmonics Distortion (THD) in percentage for square waveform.	**07**
		OR	
	(b)	A single phase half wave controlled rectifier is supplying power to resistive load. If firing angle is Ŭ, find the input current harmonics.	**07**
Q.3	**(a)**	Explain passive tuned harmonics filter for reduction of harmonics.	**07**
	(b)	Write a brief note on harmonic propagation facts.	**07**
		OR	
Q.3	**(a)**	Explain Voltage-Quality Factor & Power-Quality Factor for electrical network.	**07**
	(b)	Discuss harmonics distortion limit for voltage and current in conformance with IEC limits.	**07**
Q.4	**(a)**	Describe the basic configuration of UPQC with necessary block diagram.	**07**
	(b)	Write short note on power quality standard.	**07**
		OR	
Q.4	**(a)**	Explain discuss hybrid active power filter circuit with merits and demerits.	**07**
	(b)	Discuss interrelation between AC system and load parameters.	**07**
Q.5	**(a)**	Discuss the effect of harmonics on followings, (i) Rotating electrical machines. (ii) Cables for power supply system	**07**
	(b)	Write brief note on voltage events and its adverse effects.	**07**
		OR	
Q.5	**(a)**	Describe basic configuration of series active filter with necessary block diagram.	**07**
	(b)	Explain the sinusoidal current control strategy for three phase Three Wire Shunt Active Filter with necessary Block Diagram.	**07**

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