Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. – SEMESTER – IV EXAMINATION – OCTOBER 2012

Subject code: 742901 Date: 25-10-2012

Subject Name: Harmonics and Filtration Methods

Time: 2:30 pm – 5:00 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)	Describe and compare non linear and linear load with suitable examples of each.	07
	(b)	Define following terms: 1. Total Demand Distortion 2. Displacement, Distortion and Total power factor. 3. Telephone Influence Factor	07
Q.2	(a)	With neat schematic diagram, describe three phase three wire shunt active filter.	07
	(b)	Describe three phase three wire shunt active filter using sinusoidal current control method.	07
		OR	
	(b)	Write a short note on active filter for Harmonic propagation.	07
Q.3	(a)	Describe digital controller with necessary sketch for active filter.	07
	(b)	Give a comparison of hybrid and pure active filter.	07
		OR	
Q.3	(a)	Describe the basic configuration of UPQC with necessary block diagram.	07
	(b)	Discuss harmonics distortion limit for voltage and current in conformance with IEC limits.	07
Q.4	(a)	Write a short note on UPFC.	07
	(b)	Explain how increase of Short Circuit Ratio helps to reduce harmonics in power system.	07
		OR	
Q.4	(a)	Discuss the types harmonics generated in six pulse converter also discuss the conditions which are responsible to generate the non-linear characteristic harmonics in power converter.	07
	(b)	Discuss how harmonics affect the performance of rotating machines.	07
Q.5	(a)	Explain working and design aspects of single tuned passive filter and discuss its quality factors.	07
	(b)	Explain how network reconfiguration helps to reduce harmonics in power systems.	07
		OR	
Q.5	(a)	Describe various conditions of harmonics which are responsible for neutral conductor overloading with suitable example.	07
	(b)	Describe basic configuration of shunt active filter with necessary block diagram.	07

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