Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION – SUMMER 2015

Subject Code: 742901 **Date: 01/05/2015**

Subject Name: Harmonics and Filtration Methods

Time: 2:30 pm to 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)**	Explain about the generation of harmonics due to non-linearity of the load with suitable example.	**07**
	(b)	Define following terms and explain its significance. (1) Distortion factor (2) Total demand distortion	**07**
Q.2	**(a)**	Write a detailed note on monitoring of voltage events.	**07**
	(b)	A single phase fully controlled converter is supplying power to highly inductive load. If firing angle is Ŭ, find the input current harmonics.	**07**
		OR	
	(b)	A single phase AC-AC controller is feeding power to the resistive load. If firing angle is Ŭ, find the load voltage harmonics.	**07**
Q.3	**(a)**	Explain singly tuned filter as a passive filter for harmonics filtration. Also discuss general design aspects of passive filter.	**07**
	(b)	Write detailed note on harmonics propagation facts.	**07**
		OR	
Q.3	**(a)**	Describe voltage event and write a brief note on its detection and evaluation.	**07**
	(b)	Explain three phase four wire shunt active filter for power quality improvement.	**07**
Q.4	**(a)**	Discuss the six pulse power converter as a source of harmonics generation. also discuss about the characteristic harmonics generated due to power converter.	**07**
	(b)	Discuss how harmonics affect the performance of rotating machines.	**07**
		OR	
Q.4	**(a)**	Discuss the effect of harmonics on (1) Transformer (2) Capacitor bank	**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 Unified Power Flow Controller (UPFC) with neat diagram.	**07**
	(b)	Describe hybrid active power filter for power quality enhancement with neat diagram.	**07**
		OR	
Q.5	**(a)**	Describe voltage quality factor and power quality factor. Also discuss about its measurement and usage in brief.	**07**
	(b)	Write a brief note on power quality measuring devices.	**07**

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