Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER-IV • EXAMINATION - SUMMER • 2014

Subject Code: 744501 Date: 04-06-2014 Subject Name: Harmonics Elimination Techniques Time: 02:30 pm - 05:00 pm Instructions: Total Marks: 70			
1110		Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Explain the mechanism of Harmonic Generation. Draw necessary circuit to support the answer.	07
	(b)	List various sources of Harmonics. Explain Rotating Machine Harmonics.	07
Q.2	(a)	Explain effect of Harmonics on Communication system. Draw necessary circuit to support the answer.	07
	(b)	Explain effect of Resonance on system behaviour with suitable example. OR	07
	(b)	Explain effects of Harmonics on operation of any Solid State Device. Draw necessary circuit and waveforms to support the answer.	07
Q.3	(a)	Explain need of Harmonic Elimination. Draw necessary circuit and waveforms to support the answer.	07
	(b)	Explain Modulation based Harmonic Elimination Technique. List advantages of the same on Selective Harmonic Elimination Technique. OR	07
Q.3	(a)	Explain role of Multi-pulse Converter in Harmonic cancellation. Draw necessary circuit and waveforms to support the answer.	07
	(b)	List advantages and disadvantages of Optimal PWM over Sinusoidal PWM. Justify the same.	07
Q.4	(a) (b)	Classify Active Filters. Explain any one Converter based Active Filter. Explain 3-Ø, 3-wire Shunt APF Control based on d-q modelling. Draw necessary block diagram to support the answer. OR	07 07
Q.4	(a)	Explain basic concept of Active Filter as: (i) Harmonic Canceller (ii) Harmonic Damper	07
	(b)	Explain 3-Ø, 3-wire Series APF Control based on p-q theory. Draw necessary block diagram to support the answer.	07
Q.5	(a)	Classify Harmonics according to requirements for measurement instruments. Also explain the same.	07
	(b)	Explain Direct Harmonic Analysis and its importance. OR	07
Q.5	(a)	Explain significance of Harmonic Instrumentation. Draw only block diagram for Digital Instrumentation.	07
	(b)	Discuss significance of IEEE Harmonic Standard 512-1992. Also list Harmonic levels of traditional sources of Harmonics.	07

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