Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2722601 **Date: 25/05/2016**

Subject Name: ADAVANCED DIGITAL SIGNAL PROCESSING AND APPLICATIONS

Time:10:30 am to 01:00 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)**	Illustrate mean, standard deviation, skewness, and kurtosis in detail.	**07**
	(b)	Explain use of adaptive filter in Echo cancelation in communication.	**07**
Q.2	**(a)**	Explain LMS algorithm.	**07**
	(b)	Find the QR decomposition of the data matrix using Householder reflections. $\mathbf{X} = \begin{bmatrix} 1 & 2 \\ 2 & 3 \\ 6 & 7 \end{bmatrix}$	**07**
		OR	
	(b)	Find the QR decomposition of the data matrix using Givens rotations. $\mathbf{X} = \begin{bmatrix} 1 & 2 \\ 2 & 3 \\ 6 & 7 \end{bmatrix}$	**07**
Q.3	**(a)**	What is random variable? Explain (i) Ergodicity (ii) Random signal variability	**07**
	(b)	Explain linear least square error estimation with derivation of normal equation algebraically.	**07**
		OR	
Q.3	**(a)**	Write short note on RLS algorithm.	**07**
	(b)	Explain principle of least squares and derive the normal equation geometrically.	**07**
Q.4	**(a)**	Write short note on random vectors.	**07**
	(b)	Explain Fast RLS algorithm in detail.	**07**
		OR	
Q.4	**(a)**	Explain Gram-Schmidt Orthogonalization in detail.	**07**
	(b)	Write short note on quadratic performance surface.	**07**
Q.5	**(a)**	Write short note on adaptive linear combiner.	**07**
	(b)	Write short note on noise cancellation using adaptive filter.	**07**
		OR	
Q.5	**(a)**	Write short note on steepest descent method.	**07**
	(b)	Explain linear predictive coding.	**07**

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