Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2714107 **Date:14/05/2015**

Subject Name: Signal Analysis and Transform

Time: 10:30 am to 1:00 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)	Determine the following systems are Time Variant or Time Invariant. [1] Y[n] = Cos[X(n)] [2] Y[n] = X[-n+2]	07
	(b)	[1] State and Prove: ñTime Shifting Propertyò of Z-Transform. [2] List the Properties of DFT and explain any one.	07
Q.2	(a)	Compute Discrete Fourier Transform(DFT) of sequence: X[n] = {0, 1, 2, 3} ŷ	07
	(b)	Find the Inverse Z-Transform of the following using Partial Fraction Expansion (PEF) Method.	07

$$X[z] = \frac{3-\frac{5}{6}Z^{-1}}{(1-\frac{1}{4}Z^{-1})(1-\frac{1}{3}Z^{-1})}$$

OR

	(b)	What is FFT? Explain ñDecimation in time Fast Fourier Transform (FFT) algorithm Fundamentally.	07
Q.3	(a)	With Necessary equation explain ñDiscrete Cosine Transformò.	07
	(b)	Write Short Note on: Fast Wavelet Transform	07

OR

Q.3	(a)	Explain ñMulti Waveletò fundamentally with necessary equations.	07
	(b)	Write Short Note on: Hilbert Transform.	07
Q.4	(a)	[i] State and Prove: ñDifferentiation Propertyò of Z-Transform. [ii] Find Z-Transform for : $X[n] = na^n u[n]$	07
	(b)	Write Short Note on: Signal Distortion over a Communication Channel.	07

OR

Q.4	(a)	Write Short Note on: Stability of Linear Time-Invariant System.	07
	(b)	Define the terms: (1) Signal Power, (2) Signal Energy, (3) Energy Spectral Density and (4) Power Spectral Density	07
Q.5	(a)	Write Short Note on : Haar Transform	07

	(b)	Discuss: Continuous Wavelet Transform and Discrete Wavelet Transform briefly.	07

OR

Q.5	(a)	Explain properties of Eigen values and Eigen vector of Hermitian matrices.	07
	(b)	Write Short Note on : Radon Transform	07

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