Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:171704 **Date:18/05/2016**

Subject Name:Digital Signals & Systems

Time:02:30 PM to 05:00 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 the detail classification of signals and respective mathematical representation.	**07**
	(b)	Determine the zero state response of second order system described as difference equation y(n) – 3y(n - 1) -4 y(n-2) = x(n) + 2x(n -1), where x(n) = 4n u(n)	**07**
Q.2	**(a)**	Explain with suitable example recursive and non-recursive system	**07**
	(b)	Prove the following properties of z transform. 1. Convolution 2. Initial value theorem	**07**
		OR	
	(b)	Prove the following properties of z transform. 1. Perseval's relationship 2. Differentiation	**07**
Q.3	**(a)**	Find out Z transform of following signal 1. X(n)=-n a_n u(-n) 2. X(n)=n2 u(n)	**07**
	(b)	Explain various properties of ROC.	**07**
		OR	
Q.3	**(a)**	For a given discrete time systems, check whether they are: (1) Static or dynamic (2) Linear or non-linear (3) Shift invariant or shift-varying (4) Causal or non-causal (5) Stable or unstable Explain with reasons: (i) $e^{x(n)}$ (ii) x(2n) (iii) x(-n-1)	**14**
Q.4	**(a)**	Perform circular convolution of following signal x1(n)={5,4,3,2,1} ,x2(n)={1,1,2,2}	**07**
	(b)	Find out the linear convolution of two sequences X(n)= {1,2,1,-1}, h(n)= {1,2,3,1}	**07**
		OR	
Q.4	**(a)**	Find out inverse z transform of $X(z) = 1+z^{-1} / 1- z^{-1} + 0.5z^{-2}$	**07**
	(b)	Determine the z-transform and sketch the ROC of x(n) = (1/2)n{u(n)-u(n-10)}	**07**
Q.5	**(a)**	Narrate the properties of DFT.	**07**
	(b)	Derive the frequency sampling structures of IIR filters.	**07**
		OR	
Q.5	**(a)**	Compute 4 point DFT of the given sequence x[n]={1,0,1,0}	**07**
	(b)	Explain oversampling of D to A converter	**07**

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