Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2170914 **Date:02/11/2017**

Subject Name: Digital Signal Processing(Departmental Elective - II)

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
1. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Differentiate: Analog and digital signal processing.	**03**
	(b)	Define 1) Signal 2) System 3) Sampling (4) Quantization Give example of each.	**04**
	(c)	What is pipelining? Explain with reference to DSP. What is interlocking? State need of interlocking in brief.	**07**
Q.2	**(a)**	What is ROC in z transform? What is its importance?	**03**
	(b)	Discuss interconnection of LTI systems.	**04**
	(c)	State and prove the relationship between z-transform and discrete time Fourier transform.	**07**
		OR	
	(c)	State and prove properties of Fourier transform.	**07**
Q.3	**(a)**	Explain the following terms with respect to Digital Signal Processor: 1) MAC	**03**
	(b)	Explain DIT algorithm.	**04**
	(c)	State and prove Parseval's relation for DTFT.	**07**
		OR	
Q.3	**(a)**	Draw the block diagram of basic generic harward architecture for a Signal processor.	**03**
	(b)	Define the following terms: 1) Impulse Response 2) Convolution 3) Correlation 4) Aliasing	**04**
	(c)	State basic structures of IIR systems. Also explain realization of direct form I structure.	**07**
Q.4	**(a)**	Determine which of following signal is periodic. (1) $x_1(t) = \sin 10\pi t$ (2) $x_2(t) = \sin 3\pi t$	**03**
	(b)	Explain General Application of DSP.	**04**
	(c)	Define cross correlation and auto correlation. Find out correlation of sequences. X(n)={2, 1, 3, 7, 1, 2,-3}, y(n)={1, -1, 2, -2, 4, 1, -2, 5} ⇧ ⇧	**07**
		OR	
Q.4	**(a)**	(1) Determine the z-transform of the signal $x(n) = \delta(n+1)+6\delta(n)+12\delta(n-3))- \delta(n-4)$	**03**
	(b)	Find the convolution of $x(n) = (e)^{(-n2)}$ and $h(n) = 3n_2$ for all n.	**04**
	(c)	Write short note on: Hilbert Transform.	**07**
Q.5	**(a)**	State Properties of DFT	**03**
	(b)	State and prove Final Value theorem for Z-transform	**04**

	(c)	Explain the structures for realization of FIR systems.	**07**

OR

Q.5	**(a)**	For the system described by y(t) =x(2t) , determine whether the system is (i) Stable (ii) causal	**03**
	(b)	Find the Z-transform and ROC of x (n) = (a)^n u(n).	**04**
	(c)	Discuss the concept of zero input limit cycle oscillation. How this can be eliminated?	**07**

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