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 $h(n) = 3n2$ 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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