GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016
Subject Code:2170914   **Date:18/11/2016**
Subject Name:Digital Signal Processing(Departmental Elective - II)
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)**	Define sampling. State and explain sampling theorem.	**07**
	(b)	For the system described by $y(t) =x(2t)$, determine whether the system is (i) Stable (ii) causal (iii) linear (iv) time – invariant and (v) memory less or not.	**07**
Q.2	**(a)**	State and prove the relationship between z-transform and discrete time Fourier transform.	**07**
	(b)	Define 1) Signal 2) System. Classify them.	**07**
		OR	
	(b)	State and prove properties of Fourier transform.	**07**
Q.3	**(a)**	What is the importance of ROC in z transform? State the properties of z transform and ROC.	**07**
	(b)	Explain the concept of pipelining in DSP. Also discuss the need of interlocking in brief.	**07**
		OR	
Q.3	**(a)**	State and prove Parseval's relation for DTFT.	**07**
	(b)	Describe any one type of DSP architecture.	**07**
Q.4	**(a)**	Define the following terms: 1) State space 2) Correlation 3) ROC 4) Sampling 5) Aliasing 6) Impulse Response 7) Convolution.	**07**
	(b)	Define periodicity. Check whether the following signals are periodic or not. If the signal is periodic, then specify its fundamental period. (1) $x1(t) = je^{j10t}$ (2) $x2(t) = e^{(-1+j)t}$ (3) $x3(n) = e^{j7\pi n}$.	**07**
		OR	
Q.4	**(a)**	Explain Radix-2 FFT and DIT algorithm.	**07**
	(b)	Explain the structures for realization of FIR systems.	**07**
Q.5	**(a)**	Write short note on: Hilbert Transform.	**07**
	(b)	Explain the structures for realization of IIR systems.	**07**
		OR	
Q.5	**(a)**	What are the different formats of fixed point representation? Explain the fixed point representation of binary numbers.	**07**
	(b)	Discuss the concept of zero input limit cycle oscillation. How this can be eliminated?	**07**

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