Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – WINTER 2015

Subject Code:182402 **Date:04/12/2015**

Subject Name:Digital Signal Processing

Time: 2:30pm to 5:00pm **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 following terms a) Signal b) System c) Sampling Also classify signals.	**07**
	(b)	What is pipelining? Explain with reference to DSP. What is interlocking? State need of interlocking in brief.	**07**
Q.2	**(a)**	Find the convolution of x(n) = (e)^(-n^2) and h(n) = $3n^2$ for all n.	**07**
	(b)	State and prove Final Value theorem for Z-transform. State	**07**
		OR	
	(b)	State and prove the relationship between z-transform and discrete time Fourier transform.	**07**
Q.3	**(a)**	State Parseval's relation for DTFT and prove the same.	**07**
	(b)	What is ROC in z transform? What is its importance? State the properties of z transform and ROC.	**07**
		OR	
Q.3	**(a)**	Find the correlation of following sequences. x(n) = {-1, 2, $\underset{\uparrow}{1}$} and y(n) = {5, $\underset{\uparrow}{1}$, 1}	**07**
	(b)	Discuss interconnection of LTI systems.	**07**
Q.4	**(a)**	Explain the architecture of general purpose Digital Signal Processors.	**07**
	(b)	Find the Z-transform and ROC of x(n) = $(a)^n$ u(-n).	**07**
		OR	
Q.4	**(a)**	Find the inverse Z-transform of x(z) = $\frac{1}{1-1.8z^{-1}+0.8z^{-2}}$ by partial fraction expansion method for ROC: (1) $\lvert z\rvert > 1$ (2) $\lvert z\rvert < 0.8$	**07**
	(b)	What is MAC? Explain it and state its importance with reference to DSP.	**07**
Q.5	**(a)**	State basic structures of IIR systems. Also explain realization of direct form I structure.	**07**
	(b)	State the properties of Discrete Fourier Transform (DFT) and prove the Time Reversal property of DFT.	**07**
		OR	
Q.5	**(a)**	Define the following terms: 1) Impulse Response 2) Convolution 3) ROC 4) Correlation 5) Aliasing 6) State space	**07**
	(b)	Explain following. (1) Radix-2 FFT algorithm (2) DIT algorithm	**07**

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