Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 710422N **Date: 11-01-2013**

Subject Name: Digital Signal Processing and Application

Time: 02.30 pm – 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 various properties of discrete time system with example.	**07**
	(b)	Find Inverse Z-Transform of $x(z)=(z+1)/(3z^2-4z+1)$, ROC $\|z\|>1$. Explain importance of ROC in Z-Transform.	**07**
Q.2	**(a)**	Explain following terms with example (i) Recursive Filter (ii) Power signal (iii) Difference equation	**07**
	(b)	Prove & explain time shifting property of DFT. Find 4 point DFT of $x(n)=\cos n\pi/4$.	**07**
		OR	
	(b)	How linear & circular convolution differs from each other. Find circular convolution of x(n)=(4,3,2,1) & h(n)=(3,2,1,0)	**07**
Q.3	**(a)**	Explain with block diagram various component of DSP processor	**07**
	(b)	Write short note on Multi rate digital signal processing	**07**
		OR	
Q.3	**(a)**	Write short note on Multi bus digital signal processor architecture	**07**
	(b)	Explain following terms with example (i) Finite word length effect (ii) Sampling (iii) Stability	**07**
Q.4	**(a)**	Compare IIR & FIR filter. Explain window method	**07**
	(b)	Differentiate between FFT & DFT. Draw Decimation in Frequency FFT algorithm.	**07**
		OR	
Q.4	**(a)**	Explain any one speech processing application of DSP in detail.	**07**
Q.4	**(b)**	Determine Z-transform of sequence given by (i) $X(n)= 2^n$ for $n<0$ (ii) $X(n)=(1/2)^n$ for n=even (iii) X(n)=(1/3) for n=odd	**07**
Q.5	**(a)**	Explain following terms with example (i) Parseval's theorem (ii) Impulse response (iii) Final value theorem	**07**
	(b)	Prove following properties of discrete time Fourier transform (i) Convolution (ii) Frequency shifting (iii) Time reversal	**07**
		OR	
Q.5	**(a)**	Compare various transform techniques. Compare analog and digital Filter.	**07**
	(b)	Explain following terms with example (i) Twiddle factor (ii) Aliasing (iii) Causal system	**07**

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