Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720702 **Date: 09/07/2012**

Subject Name: Digital Signal Processing

Time: 10:30 am – 13:00 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)**	Draw block diagram of DSP. Explain each block. Compare it with ASP.	**07**
	(b)	Explain Z-transform & ROC in brief. Find Z transform & ROC of signal $x(n)=a^n$ for n>=0, =0 for n<0.	**07**
Q.2	**(a)**	Explain various types of discrete time signals and discrete time systems with example	**07**
	(b)	Check the causality and find impulse response of the discrete time LTI system with transfer function as $H(z)= 2z/(2z-1) + z/(z-2)$ ROC $\|z\|>2$	**07**
		OR	
	(b)	Determine the inverse Z transform of $x(z)= z/(3z^2-4z+1)$ If the ROC are (i) $\|z\|>1$ (ii) $\|z\|<1/3$ (iii) $1/3<\|z\|<1$	**07**
Q.3	**(a)**	Explain DFT. Find DFT of a four point sequence x(n)={0,1,2,3}	**07**
	(b)	Compare linear convolution & circular convolution. Find circular convolution of x(n)={0,1,2,3} & h(n)={2,1,1,2}	**07**
		OR	
Q.3	**(a)**	Compare DFT & FFT. Explain (i) butterfly computation (ii) Bit reversal	**07**
	(b)	Explain (i)stability (ii) decimation in Time (iii) difference equation	**07**
Q.4	**(a)**	What are advantages of representing a digital filter in block diagram form. Explain canonic & non canonic structure. Draw direct form I realization structure of 3rd order system	**07**
	(b)	List various kinds of windows used for filter design. Explain any one window in detail with example.	**07**
		OR	
Q.4	**(a)**	Explain any one method of IIR filter design with example	**07**
Q.4	**(b)**	Give difference between parametric & non parametric spectral estimation. Explain any one parametric methods of power spectrum estimation	**07**
Q.5	**(a)**	Write short note on multi rate digital signal processing	**07**
	(b)	Write short note on DSP processor	**07**
		OR	
Q.5	**(a)**	Explain following properties of DFT (i) Time reversal (ii) Circular Time shift(iii) linearity	**07**
	(b)	Explain (i) Frequency response (ii) cascade realization (iii) convolution	**07**

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