Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code: 720702

Subject Name: Digital Signal Processing

Date: 06 /07 /2010 **Time: 11.00am – 1.30pm**

Total Marks: 60

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Find impulse response h[n]= { 1, 2, 1, -1} with the input signal x[n]= {1, 2, 3, 1} **06**

(b) Find linear convolution by tabular method for sequence h[n]= { 1, 1, 1}; x[n]= {1, 1, 1 } **06**

Q.2 **(a)** Explain how can we determine the system is time invariant or not ? Determine the following system are time invariant or not **06**

1) Y(n) = x(n) –x(n-1)
2) T[x(n)] =e x(n)

(b) Find inverse Z transform of X(z)= $\frac{z}{z-1}$ by long division method. **06**

OR

(b) Find inverse Z transform of X(z)= $\frac{1-\frac{1}{2}z^{-1}}{1-\frac{1}{4}z^{-2}}$ $|z| > \frac{1}{2}$ **06**

Q.3 **(a)** Determine the Z transform signal of the signals **06**

1) X(n)=(cos won) u(n)
2) X(n)=(sin won) u(n)

(b) Determine Z-transform and ROC of X(n)=(1/2)n u(-n) **06**

OR

Q.3 **(a)** Give the definition of DFT. Find relation between DTFT & DFT. **06**

(b) Obtain N-point DFT of exponential sequence X(n)=an u(n) for 0≤ n≤ (N-1) **06**

Q.4 **(a)** Find the circular convolution of two sequence of length 4 X(n)= {0, 1, 2, 3} ; h(n)= { 2, 1, 1, 2} **06**

(b) Determine the circular convolution by matrix method for sequence y(n) = x(n) N h(n) where x(n)= { 1, 2, 3, 1} **06**

h(n)= { 4, 3, 2, 2 }

OR

Q.4 **(a)** Explain lattice ladder structure for FIR filters. **06**

	(b)	Design the digital IIR filter using BLT for transfer function of $H(s)=\frac{3}{(s+2)(s+3)}$ with Ts= 0.1 sec.	**06**
Q.5	**(a)**	Explain the application of DSP in image processing.	**06**
	(b)	Explain the application of DSP in voice processing.	**06**
		OR	
Q.5	**(a)**	Explain architecture of general purpose digital signal processor.	**06**
	(b)	Explain Periodicity, Linearity and Symmetry properties of the DFT.	**06**

****