Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 1710422 **Date: 12/07/2012**

Subject Name: Digital Signal Processing & Application

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.**
4. **BOLD-ITALIC character/number indicate initial point of sequence**

Q.1 (a) What do you mean by single sided Z-transform and double sided Z-transform? What is mean by ROC? What is the significance of it? **07**

(b) Explain Harvard Architecture. **07**

Q.2 (a) Find Z transform & ROC of the following sequence. **07**
$X(n)= 1/2\delta(n+1) + 5[1/2]^{-n}u(-n) + u(-n-1)$.

(b) Obtain Z transform of the following finite duration sequence $X(n)=\{\underset{\uparrow}{\boldsymbol{1}},2,4,5,0,7\}$ **07**

OR

Q.2 (a) What are the advantages and disadvantages of digital signal processing over analog signal processing? **07**

(b) Explain Linearity and Time shifting property of Z-transform. **07**

Q.3 (a) Find inverse Z transform of $X(Z)= \dfrac{Z}{Z-a}$; if $|Z|< |a|$ **07**

(b) Find the circular convolution of the two sequence of length four are **07**
$X(n)=\{\underset{\uparrow}{\boldsymbol{0}},1,2,3\}$
$h(n)=\{\underset{\uparrow}{\boldsymbol{2}},1,1,2\}$

OR

Q.3 (a) Find the circular convolution using Matrix Method for following sequence **07**
$X(n)=\{\underset{\uparrow}{\boldsymbol{1}},2,3,1\}$
$h(n)=\{\underset{\uparrow}{\boldsymbol{4}},3,2,2\}$

(b) What is time shifting property of Z transform? Using this property find the Z transform of $X(n)= \delta(n-k)$ and $X(n)= \delta(n+2)$ **07**

Q.4 (a) Explain the Multiplier-Accumulator register of DSP. **07**

(b) Write short notes on four important properties of DFT. **07**

OR

Q.4 (a) Explain the given system with respect to following properties **07**
1) Dynamicity 2) Time variance 3) Linearity 4) Causality

$$Y(n) = \sum_{k=-\infty}^{n} X(k)$$

(b) Explain the Program Sequencer and Cache Memory. **07**

Q.5 (a) Obtain DFT of unit impulse $\delta(n)$ and delayed unit impulse $\delta(n-n_0)$ **07**

(b) What is DFT? What is the relation between DTFT & DFT? **07**

OR

Q.5 (a) Obtain Z transform of signal $X(n)=u(-n)$. **07**

(b) Write notes on fixed point and floating point DSP. **07**