

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 $|z|>1$. **07**
 Explain importance of ROC in Z-Transform.

- Q.2** (a) Explain following terms with example **07**
 (i) Recursive Filter (ii) Power signal
 (iii) Difference equation
 (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 **07**
 (i) Finite word length effect
 (ii) Sampling (iii) Stability

- 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 **07**
 (i) $X(n)=2^n$ for $n<0$
 (ii) $X(n)=(1/2)^n$ for $n=\text{even}$ (iii) $X(n)=(1/3)$ for $n=\text{odd}$

- Q.5** (a) Explain following terms with example **07**
 (i) Parseval's theorem (ii) Impulse response (iii) Final value theorem
 (b) Prove following properties of discrete time Fourier transform **07**
 (i) Convolution (ii) Frequency shifting (iii) Time reversal

OR

- Q.5** (a) Compare various transform techniques. Compare analog and digital Filter. **07**
 (b) Explain following terms with example **07**
 (i) Twiddle factor (ii) Aliasing (iii) Causal system
