

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 $n \geq 0$, $=0$ 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 **07**
 $H(z) = 2z/(2z-1) + z/(z-2)$ ROC $|z| > 2$

OR

- (b) Determine the inverse Z transform of $x(z) = z/(3z^2 - 4z + 1)$ **07**
 If the ROC are (i) $|z| > 1$ (ii) $|z| < 1/3$ (iii) $1/3 < |z| < 1$

- 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 **07**
 (ii) Circular Time shift (iii) linearity
 (b) Explain (i) Frequency response (ii) cascade realization (iii) convolution **07**
