

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V- EXAMINATION – SUMMER 2016****Subject Code: 150303****Date: 09/05/2016****Subject Name: Signal & Systems****Time: 02:30 PM to 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 different types of signals with examples. **07**
 (b) Sketch the following signals: **07**
1. $u(-t+1)$
 2. $u(t-3) + u(t+1)$
 3. $u(-t-3)$

- Q.2** (a) For a system specified by the equation $y[n+1] - 0.8y[n] = x[n+1]$. Find the frequency response of this LTID system. **07**
 (b) With example explain signal shifting and time reversal. **07**

OR

- (b) Explain the significance of $h(t)$ and determine unit impulse response of $(D+2)y(t)=(3D+5)x(t)$. **07**
- Q.3** (a) Explain Nyquist sampling theorem. **07**
 (b) Determine the z-transform of $X[n]=(0.9)^n u[n] + (1.2)^n u[-(n+1)]$. **07**

OR

- Q.3** (a) Explain frequency-division multiplexing. **07**
 (b) Compute the Fourier transform of $x(n)=(1)^n u(n)$. Also give the applications of Fourier transform. **07**
- Q.4** (a) Design a second order notch filter to have zero transmission at 100 Hz and a sharp recovery of gain to unity on both sides of 100 Hz. The significant frequency to be processed is $f_h = 300$ Hz. **07**
 (b) Find the Z-transform: **07**
1. $\sin \beta n u(n)$
 2. $-\alpha n u(-n-1)$

OR

- Q.4** (a) Explain the properties of bilateral z-transform. **07**
 (b) Design a second order low pass filter with cut off frequency 100 Hz and sampling frequency is 2000 Hz. **07**

- Q.5** (a) Explain the advantages of digital signal processing. **07**
 (b) Find the inverse z-transform of **07**

$$X(Z) = \frac{-z(z + 0.2)}{(z - 0.4)(z - 1)}$$

OR

- Q.5** (a) Enlist the properties of DFT with explanation. **07**
 (b) Find Fourier transform of $e^{-2t}u(t)$ using DFT. Plot the results. **07**
