Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V EXAMINATION – WINTER 2015

Subject Code: 150303 **Date:08/12/2015**

Subject Name: Signals and Systems

Time: 10:30am to 1:00pm **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)**	Define Signal & give classification of signals with necessary illustration.	**07**
	(b)	Sketch the following signals. i) $x(t) = u(t) - u(t-4)$ ii) $x(n)=u(n) + u(n-5) + \delta(n)$ iii) $x(n)=u(n-1) - u(n-4) + u(-n+1)$	**07**
Q.2	**(a)**	Explain in detail size of signal.	**07**
	(b)	Determine whether the following systems are static or Dynamic, Linear or Nonlinear, Time variant or Time Invariant, i) $dy(t)/dt + 6\, y(t) = 4x(t)$ ii) $y(t)dy(t)/dt + 3\, y(t) = x(t)$	**07**
		OR	
	(b)	Determine the values of power and energy of the following signals and find whether the signals are power, energy or neither energy nor power signal. i) $x(n)=(1/3)^n u(n)$ ii) $x(n)=\sin((\pi/4)n)$	**07**
Q.3	**(a)**	Define zero-input response of the system. How to find zero-input response of Continuous time systems?	**07**
	(b)	Find the unit impulse response of the system $y(n)-0.6y(n-1)-0.16y(n-2)=5x(n)$.	**07**
		OR	
Q.3	**(a)**	What is unit impulse response? How to find unit impulse response of system? Also explain simplified impulse matching method.	**07**
	(b)	Determine the forced response of the system: $5dy(t)/dt + 10y(t) = 2x(t)$, for the input $x(t)=2u(t)$.	**07**
Q.4	**(a)**	Describe properties of Convolution Integral.	**07**
	(b)	Obtain the z-transfrom and ROC of finite duration sequence $x(n)=\{1,2,4,5,0,7\}$.	**07**
		OR	
Q.4	**(a)**	Write properties of z-transform.	**07**
	(b)	Find Z-transform and sketch the ROC of $x(n)=(-1)^n 2^{-n} u(n)$.	**07**
Q.5	**(a)**	Write short note on System stability.	**07**
	(b)	Using Z-transform method obtain impulse response of a system described by, $y(n)= 2.5y(n-1)+x(n)$.	**07**
		OR	
Q.5	**(a)**	Explain Sampling Theorem and aliasing effect.	**07**
	(b)	Compute the Fourier transform of $x(n)=(a)^n u(n)$.	**07**