Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 150303 **Date: 01/05/2017**

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 some Useful signal Models in detail.	**07**
	(b)	Explain Power and Energy of the signal with example.	**07**
Q.2	**(a)**	Determine whether the following systems are Linear or Nonlinear, Time variant or Time Invariant, i) $dy(t)/dt + y(t) = x(t)$ ii) $y(t)dy(t)/dt + y(t) = x(t)$	**07**
	(b)	Sketch the following Signals. i) $x(t) = u(t) - u(t-2) + \delta(n+2)$ ii) $x(n)=u(n-1) + u(-n-2) + \delta(n)$	**07**
		OR	
	(b)	Determine whether the following systems are Linear or Nonlinear i) $y(n) = x(n^2)$ ii) $y(n) = nx^2(n)$	**07**
Q.3	**(a)**	Define Zero-State Response of the system. How to find Zero-State Response of Discrete time systems?	**07**
	(b)	Find the Unit Impulse response of the system $y(n)-4y(n-1)+4y(n-2)=2x(n)$.	**07**
		OR	
Q.3	**(a)**	What is Unit Impulse response? How to find Unit Impulse response of system?	**07**
	(b)	Write short note on System Stability.	**07**
Q.4	**(a)**	Explain Convolution Integral with example.	**07**
	(b)	Find $y_o(t)$, the Zero-Input component of the response for an LTIC system described by the following differential equation: $(D^2+ 4D + 4)\, y(t) = (D+5)\, x(t)$ When initial conditions are $y_0(0) = 2$ and $\mathring{y}_o(0) = -3$.	**07**
		OR	
Q.4	**(a)**	Write short note on Amplitude Modulation.	**07**
	(b)	Find z-transform and sketch corresponding ROC for the Sequences: $x(n) = [a^n + a^{-n}]\, u(n)$.	**07**
Q.5	**(a)**	Write properties of Discrete Fourier transform.	**07**
	(b)	Find x(n) for the given $X(z) = 10z/(z-1)(z-2)$.	**07**
		OR	
Q.5	**(a)**	Explain Correlation and its Application in Signal Detection.	**07**
	(b)	Compute the Fourier transform of $x(n)=(a)^{-n}u(-n-1)$	**07**

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