Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 150303 Date: 21-05-2013

Subject Name: Signals and Systems

Time: 10.30 am - 01.00 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)**	Give classification of signals with example.	**07**
	(b)	What is signal energy and signal power? Explain.	**07**
Q.2	**(a)**	With example discuss time scaling and time reversal.	**07**
	(b)	Write short note on (a) Unite Impulse Function $\delta(t)$, and (b) Exponential Function e^{st}.	**07**
		OR	
	(b)	Distinguish between (a) Instantaneous and dynamic systems, and (b) causal and noncausal systems.	**07**
Q.3	**(a)**		**07**
	(b)	With example explain signal shifting and time reversal.	**07**
		OR	
Q.3	**(a)**	Explain the advantages of digital signal processing.	**07**
	(b)	Determine $c[n] = x[n] * g[n]$ for $x[n] = (0.8)^n u[n]$ and $g[n] = (0.3)^n u[n]$	**07**
Q.4	**(a)**	Explain the properties of bilateral z-transform.	**07**
	(b)	For the system specified by the equation $y[n+1] - 0.8y[n] = x[n+1]$ find the system response to the input (a) $1^n = 1$, (b) $\cos[\frac{\pi}{6}n - 0.2]$, (c) a sampled sinusoid $\cos 1500t$ with sampling interval T = 0.001.	**07**
		OR	
Q.4	**(a)**	Explain frequency-division multiplexing.	**07**
Q.4	**(b)**	Find the inverse z-transform of $X(z) = \frac{-z(z+0.4)}{(z-0.8)(z-2)}$	**07**
Q.5	**(a)**	Enlist the properties of DFT with explanation.	**07**
	(b)	Find the zero-state response of a stable LTIC system with frequency response $H(s) = \frac{1}{s+2}$ and the input is $x(t) = e^{-t}u(t)$	**07**
		OR	
Q.5	**(a)**	Explain Nyquist sampling theorem.	**07**
	(b)	Find Fourier transform of $e^{-2t}u(t)$ using DFT. Plot the results.	**07**

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