Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: 150303 **Date: 04-12-2013**

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)**	Define system and give its classification.	**07**
	(b)	Explain signal energy and signal power with diagram.	**07**
Q.2	**(a)**	Discuss the advantages of Digital signal processing.	**07**
	(b)	Write the statement of sampling theorem. And explain the effect of Nyquist criteria on power spectrum.	**07**
		OR	
	(b)	Short note on : PCM	**07**
Q.3	**(a)**	Explain time advance, time delay and time reversal with appropriate diagrams.	**07**
	(b)	Find $y_0(t)$, the zero-input component of the response for an LTIC system described by the following differential equation: $(D^2+ 6D + 9)\, y(t) = (3D+5)\, x(t)$ When initial conditions are $y_0(0) = 3$ and $\dot{y}_0(0) = -7$.	**07**
		OR	
Q.3	**(a)**	Explain time compression, time expansion and time reversal with appropriate diagrams.	**07**
	(b)	Determine the unit impulse response of LTIC system described by the following equation, $(D+2)\, y(t)=(3D+5)\, x(t)$	**07**
Q.4	**(a)**	Describe the properties of Z-transform.	**07**
	(b)	For an LTID system described by the following equation, $y[n+2]-0.6y[n+1]-0.16y[n]=5\, x[n+2]$ Find the total response it the initial conditions are $y[-1]=0$ and $y[-2]=25/4$, and if the input $x[n]= 4^{-n}u[n]$.	**07**
		OR	
Q.4	**(a)**	Find the z-transform of $\cos\beta nu(n)$.	**07**
	(b)	Find the unit impulse response h[n] of system specified by the equation, $y[n]-0.6y[n-1]-0.16y[n-2]=5\, x[n]$	**07**
Q.5	**(a)**	Explain Decimation in Time FFT algorithm.	**07**
	(b)	Find the inverse z-transform of, $\frac{1}{(z-1)(z+0.5)}$	**07**
		OR	
Q.5	**(a)**	Explain the properties of DFT in detail.	**07**
	(b)	Find the inverse z-transform of, $\frac{8z-19}{(z-2)(z-3)}$	**07**

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