GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (old) - EXAMINATION – SUMMER 2018

Subject Code:182402   **Date:30/04/2018**

Subject Name:Digital Signal Processing

Time:10:30 AM to 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)**	Compare Analog and digital signal processing in tabular form.	**04**
	(b)	state whether the following signal is an Energy or power signal.give Justification for your answer:- $x(n) = (0.5)^n * u(n)$	**04**
	(c)	What is the importance of ROC in z transform? State & prove any two the properties of Linear convolution.	**06**
Q.2	**(a)**	Define sampling. State and explain sampling theorem.	**07**
	(b)	Differentiate continuous and discrete valued signal. For an analog signal $x(t) = 3\cos50\pi t + 10\sin300\ \pi t - \cos100\ \pi t$. Calculate Nyquist rate.	**07**
		OR	
	(b)	Define stable system. Check whether the following system functions are memory-less, stable, causal, linear and time-invariant or not. (1) $y(n) = sign[x(n)]$ (2) $y(n) = Trunc[x(n)]$	**07**
Q.3	**(a)**	State Parseval's relation for DTFT. Also prove it.	**07**
	(b)	Find convolution of two sequences $x(n) = (-1)^n * u(n)$ and $h(n) = u(n)$	**07**
		OR	
Q.3	**(a)**	Explain the interconnection of LTI systems.	**07**
	(b)	State the properties of Discrete Fourier Transform (DFT) and prove the Time Reversal property of DFT.	**07**
Q.4	**(a)**	What do you understand by twiddle factor? Derive the relationship between DFT and Z Transform.	**07**
	(b)	Explain following. (1) Radix-2 FFT algorithm (2) DIT algorithm	**07**
		OR	
Q.4	**(a)**	(1) obtain the value of x(4) for 8 Point DFT if $x(n) = \{\ 1, -1,\ 0, 2, 1, -2, -1, 1\}$ $\uparrow$ (2) Find out the circular convolution of $x(n) = \{1,2,3,4\}$ and $h(n) = \{1,1,2,2\}$	**07**
	(b)	Determine the value of signal x(n) at n=0 and n=∞ if, $$X(z) = \frac{2}{Z^2 + 1/6*Z - 1/6}$$	**07**
Q.5	**(a)**	Explain the structures for realization of FIR systems.	**07**
	(b)	Explain the following terms with respect to Digital Signal Processor: (1) Pipelining (2) MAC	**07**
		OR	
Q.5	**(a)**	What are the different formats of fixed point representation? Explain the fixed point representation of binary numbers.	**07**
	(b)	What do you understand by scaling? Discuss the effect of round-off in the digital filter.	**07**

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