Model Question Paper -1 with effect from 2020-21(CBCS Scheme)

USN | | | | | | | | | |

Fifth Semester B.E. Degree Examination

Fundamentals of Signals and DSP

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module – 1	**Marks**
Q.1	**(a)**	Distinguish between continuous and discrete time signal, State and Explain Sampling theorem.	10
	(b)	Prove the commutative and distributive properties of convolution.	6
	(c)	Determine wheather the following system are stable or unstable y(n)=5x(n). b) y(n)=nx(n)	4
		OR	
Q.2	**(a)**	Distinguish between Energy and power signal.Classify the four standard discrete time signals.	10
	(b)	Determine whether the following systems are linear or non linear a) y(n)=nx(n) b) $y(n)=x^2(n)$.	4
	(c)	Determine the convolution of the input sequence x(n)=(1,2,1,5) and impulse response h(n)=(2,1,3,1).	
		Module – 2	
Q.3	**(a)**	Discuss the following properties if Z transform. a)Linearity b)Time shift c) Time advance d) Multiplication by an exponential	8
	(b)	Find the Z transform of the following a) $x(n)=\delta(n)-\delta(n-4)$ b) $x(n)= 5\propto^n u(n)$	8
	(c)	Determine the signal x(n) using partial fraction method $X(Z)=8Z/(Z-4.5)(Z-0.5)$	4
		OR	
Q.4	**(a)**	Realize the following system function using a)Direct form I b)Direct form II $H(Z)=0.3(1-0.25Z^{-2})/1+0.1Z^{-1}-0.72Z^{-2}$	12
	(b)	Determine the inverse Z transform of $X(z)=Z/(Z+1)(Z+2)$ for $\|Z\|>2$	8
		Module – 3	
Q.5	**(a)**	Compute the 8 point DFT of the sequence x(n) given below x(n)=(1,0,1,1,1,2,1,1).	10
	(b)	Find the N point DFT of the sequence $x(n)=u(n)-u(n-n0)$	4
	(c)	Discuss the following properties of DFT a)Linearity b) Circular time shift	6
		OR	
Q.6	**(a)**	Compute the 5 point DFT of the sequence x(n)=(1,0,1,0,1) and verify the symmetry property	10
	(b)	Determine the DIT FFT for the sequence x(n)=(1,1,1,1,0,0,0,0)	10

Module – 4			
Q.7	**(a)**	Draw and explain the magnitude characteristics of a realizable lowpass filter.	6
	(b)	Summarize different window characteristics.	6
	(c)	Design FIR highpass filter using Hamming window where the order of the filter is 5 and the cutoff frequency 0.5 radians.	8
OR			
Q.8	**(a)**	Determine the system function H(z) of the lowest order Chebyshev filter that meets the following specifications a) 3dB ripple in the passband $0<\|w\|<0.3\pi$. b)atleast 20dB attenuation in the stop band $0.6\pi<\|w\|<\pi$ use bilinear transformation.	12
	(b)	A chebyshev I filter order N =3 and unit bandwidth is knoen to have pole at s=-1 a)find the two other poles of the filter and parameter∈	8
Module – 5			
Q.9	**(a)**	With necessary sketch discuss about the decimation process with example	10
	(b)	Describe the applications of adaptive filtering	10
OR			
Q.10	**(a)**	With a neat diagram explain adaptive filtering.	10
	(b)	Describe the architecture of TMS320C54XX processor	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Programme Outcome**
Q.1	(a)	L1	C01	PO1,PO2
	(b)	L2	C01	PO1,PO2,PO3
	(c)	L2	C01	PO1,PO2,PO3
Q.2	(a)	L1	C01	PO1,PO2
	(b)	L2	C01	PO1,PO2,PO3
	(c)	L2	C01	PO1,PO2,PO3
Q.3	(a)	L2	CO2	PO1,PO2,PO3
	(b)	L2	CO2	PO1,PO2,PO3
	(c)	L2	CO2	PO1,PO2,PO3
Q.4	(a)	L2	CO3	PO1,PO2,PO3
	(b)	L2	CO3	PO1,PO2,PO3
Q.5	(a)	L2	CO4	PO1,PO2,PO3
	(b)	L2	CO4	PO1,PO2,PO3
	(c)	L2	CO4	PO1,PO2,PO3
Q.6	(a)	L2	CO4	PO1,PO2,PO3
	(b)	L2	CO4	PO1,PO2,PO3
Q.7	(a)	L1	CO5	PO1,PO2,PO3
	(b)	L1	CO5	PO1,PO2,PO3
	(c)	L2	CO5	PO1,PO2,PO3
Q.8	(a)	L2	CO5	PO1,PO2,PO3
	(b)	L2	CO5	PO1,PO2,PO3
Q.9	(a)	L2	CO6	PO1,PO2,PO3
	(b)	L3	CO6	PO1,PO2
Q.10	(a)	L2	CO6	PO1,PO2
	(b)	L4	CO6	PO1,PO2,PO3

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6

Model Question Paper -2 with effect from 2020-21(CBCS Scheme)

USN | | | | | | | | | |

Fifth Semester B.E. Degree Examination

Fundamentals of Signals and DSP

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

			Marks
		Module – 1	
Q.1	**(a)**	Using mathematical expression describe the discrete time signals.	8
	(b)	For the input sequence x(n)=(3,1,2,-1) is applied to a discrete time processor with output y(n)=(9,9,11,2,0,-1). Determine the system response h(n).	8
	(c)	Determine the correlation of the given sequence x1(n)=(2,3,1) and x2(n)=(3,1,1)	4
		OR	
Q.2	**(a)**	Define the following discrete time systems a) Linear and non-linear system b)Stable and Unstable system c)time invariant and variant system d) Static and Dynamic system e) Causal and non casual system	10
	(b)	Consider an LTI system with unit sample response h(n)=55 $\propto^n$u(n) for 0<a<1. Determine the output of the system for input x(n)=b^nu(n) for 0<b<1 and express output in the form [$\propto 1a^n$+$\propto 2b^n$] u(n).	10
		Module – 2	
Q.3	**(a)**	With necessary equations describe the following properties of Z transform a) Time reversal b) Linear convolution c)Differentiation d) Correlation e) Initial value theorem	10
	(b)	Find the region of convergence and Z transform of the following a)x(n)=$(0.3)^{\|n\|}$	6
	(c)	Determine the inverse Z transform of the X(z)=5Z/(Z-4.5)	4
		OR	
Q.4	**(a)**	Consider an discrete LTI system difference equation y(n)-3/4 y(n-1)+1/8 y(n-2)=x(n)+5/3x(n-1) realize the a)cascade form b)parallel form	12
	(b)	Find the Z transform of the following a) x(n)=coswnu(n) b)x(n)=nu(n)	8
		Module – 3	
Q.5	**(a)**	Compute the N point DFT of the following sequence.x(n)=e^{jwmn}	6
	(b)	Find the 4 point IDFT of the given sequence X(K)={(1-j),2, (1+j), 0}	6
	(c)	Discuss the following properties of DFT a)Time reversal b) Circular frequency shift	8
		OR	
Q.6	**(a)**	For the sequence x1(n)=cos($2\pi n/N$) , x2(n)=sin($2\pi n/N$) ,0<n<N-1 find the N point circular convolution .	10
	(b)	Determine the DIF FFT for the sequence x(n)=(1,2,1,0,1,1,1,1)	10

Module – 4			
Q.7	**(a)**	Mention any three advantages and disadvantages of FIR filter	6
	(b)	Design the FIR low pass filter using hanning and rectangular window for the given cutoff frequency 0.4 radian and order 5	14
OR			
Q.8	**(a)**	Write the characteristics of butterworth and chebyshev filter.	10
	(b)	Design FIR bandpass filter using hamming window for the given order N=7 and cutoff frequency 0.5radian.	10
Module – 5			
Q.9	**(a)**	With necessary sketch discuss about the interpolation process with example	10
	(b)	Discuss about the LMS algorithm.	10
OR			
Q.10	**(a)**	Mention the features of TMS320C54xx Processor.	10
	(b)	With neat diagram explain the Quadrature mirror and DFT filter bank	10

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