Q.P. Code: 16EC422 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year II Semester Supplementary Examinations February-2022

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Determine whether or not the system y(n)= x(-n+2) is static/dynamic, linear/non-linear, time variant/invariant, causal/non-causal, stable/unstable	**7M**
	b	Explain frequency analysis of discrete-time systems.	**5M**
		OR	
2	a	Describe the relation between i) DFT to Z- transform ii) DFT to Fourier Series.	**6M**
	b	Find the output y(n) of a filter whose impulse response is h(n)=[1,-1] and input x(n)= [1,-2,2,-1,3,- 4,4,-3] using overlap add method	**6M**

UNIT-II

3	a	Compute 8-point DFT of the sequence x(n)= {1,2,1,2,1,2,2,1} using radix-2 DIF-FFT Algorithm	**8M**
	b	Interpret the applications of FFT algorithm.	**4M**
		OR	
4	a	Construct Radix-4 DIF FFT algorithm with neat sketch.	**7M**
	b	Describe Quantization errors in the direct computation of DFT.	**5M**

UNIT-III

5	a	The transfer function of a discrete causal system is given as $H(Z)= (1-Z^{-1}) /(1-0.2Z^{-1}-0.15Z^{-2})$ i) Find difference equation ii) Draw parallel realization iii) Calculate impulse response of the system.	**8M**
	b	Differentiate the different structures for IIR systems	**4M**
		OR	
6	a	Realize system with following difference equation in Cascade form $y(n) = (3/4)\, y(n-1) - (1/8)\, y(n-2) + x(n) + (1/3)\, x(n-1)$.	**7M**
	b	Discuss transposed structures.	**5M**

UNIT-IV

7	a	Determine the order and the pole of the low pass filter that has a 3-dB attenuation at 500 Hz and an attenuation of 40 dB at 1000 Hz.	**8M**
	b	Discuss the location of poles for Chebyshev filter.	**4M**
		OR	
8	a	Compare features of different windowing functions.	**6M**
	b	Describe the IIR filter design approximation using Bilinear Transformation method.	**6M**

UNIT-V

9	a	Determine the frequency response of the FIR filter defined by $y(n)= 0.25x(n)+ x(n-1) + 0.25x(n-2)$.	**6M**
	b	Illustrate Hanning window and Hamming window	**6M**
		OR		
10		A band pass FIR filter of length 7 is require. It is to have lower and upper cut off frequencies of 3kHz and is intended to be used with a sampling frequency of 24kHz. Determine the filter coefficients using hamming window. Consider the filter to be causal.	**12M**

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