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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech IV Year I Semester Supplementary Examinations August-2021

DIGITAL SIGNAL PROCESSING

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	**a**	Explain how DFT can use as linear transform.	**6M**
	b	Find the forced response of the system described by the difference equation: $y(n)+ 2y(n-1)+y(n-2)=x(n)+x(n-1)$ for input $x(n) =(-1)^n u(n)$.	**6M**
		OR	
2	**a**	Determine the linear convolution of following two sequences: $x(n) = \{3,2,1,2\}$; $h(n) = \{1,2,1,2\}$ ↑	**6M**
	b	Explain the power signal and Energy signal.	**6M**

UNIT-II

3	**a**	Explain divide and conquer approach to computation of the DFT.	**6M**
	b	Describe Quantization errors in the direct computation of DFT.	**6M**
		OR	
4		Determine 8-point DFT of the sequence $x(n)= \{1,2,3,4,4,3,2,1\}$ using radix-2 DIT-FFT Algorithm.	**12M**

UNIT-III

5	**a**	Explain the advantages and disadvantages of Direct form-II realization	**6M**
	b	Explain about lattice structure for FIR systems	**6M**
		OR	
6		Determine the direct form I , direct form-II ,cascade and parallel form realization for the system $y(n)= -0.1y(n-1)+0.2y(n-2)+3x(n)+3.6x(n-1)+0.6x(n-2)$.	**12M**

UNIT-IV

7	**a**	Explain the design steps of a digital filter using Impulse Invariance method	**5M**
	b	For the analog transfer function $H(s)=2/(s+1)(s+2)$ determine H(s) using impulse invariance method. Assume T=1 sec.	**7M**
		OR	
8		Design an analog Butterworth filter that has a -2db pass band attenuation at a frequency of 20rad/sec and at least -10dB stop band attenuation at 30 rad/sec (assume Ωc = 21.3868 rad/sec).	**12M**

UNIT-V

9	**a**	Explain about characteristics of practical frequency selective filters.	**6M**
	b	What are the merits and demerits of FIR filters?	**6M**
		OR	
10		Design a FIR low pass filter satisfying the following specifications $\alpha_p \leq 0.1$ dB; $\alpha_s \geq 44.0$ dB; $\omega_p = 20$rad/sec; $\omega_s = 600$ rad/sec and $\omega_{sf} = 100$ rad /sec.	**12M**

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