Q.P. Code: 18EC0414 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations Feb-2021

DIGITAL SIGNAL PROCESSING

(Common to EEE & ECE)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Distinguish between linear and circular convolution.	**2M**
	b	What is necessity of Pre-warping?	**2M**
	c	What is the basis for Fourier series method of FIR filter design? Why truncation is necessary?	**2M**
	d	How to prevent limit cycle oscillations.	**2M**
	e	Define Pipelining.	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2		Determine the 8 point DFT of the sequence x(n)={1,1,1,1,1,1,0,0}	**10M**

OR

3	a	Identify the output y(n) of a filter whose impulse response is h(n)=[1,1,1] and input signal x(n)= [3,-1,0,1,3,2,0,1,2,1] using overlap add method.	**5M**
	b	Compute the IDFT of a sequence Y(K)={1,0,1,0 }	**5M**

UNIT-II

4	a	Determine the order of analog Butterworth filter that has 2 dB passband attenuation at a frequency of 20 rad/sec and atleast 10 dB stopband attenuation at 30 rad/sec.	**3M**
	b	Determine the transfer function H(s) for analog Butterworth filter that has 2 dB passband attenuation at a frequency of 20 rad/sec and atleast 10 dB stopband attenuation at 30 rad/sec.	**7M**

OR

5		Apply the bilinear transformation, to design a high pass filter, monotonic in pass band with cut off frequency of 1000 Hz and down 10dB at 350 Hz. the sampling frequency is 5000Hz.	**10M**

UNIT-III

6	a	Explain the design steps of FIR filters using windows.	**5M**
	b	Construct the cascade realization of FIR Filters for the function $H(z) = (1 + 2\,z^{-1} - z^{-2})(1 + z^{-1} - z^{-2})$	**5M**

OR

7 Design an ideal High Pass Filter with a frequency response **10M**

$$H_d(e^{jw}) = 1 \quad for\ \frac{\pi}{4} \leq |\omega| \leq \pi$$

$$= 0 \qquad\qquad |\omega| \leq \frac{\pi}{4}$$

Find the values of h(n) for N=11. Find H(z) and plot the magnitude response.

UNIT-IV

8 Explain the characteristics of limit cycle oscillation with respect to the system described by the difference equation y(n) = 0.7 y(n-1) + x(n). Determine the dead band range of the system. **10M**

OR

9 **a** What is a dead band of a filter? Explain. **5M**

b What is quantization noise? Derive the expression for quantization noise power. **5M**

UNIT-V

10 **a** Discuss the advantages and disadvantages of VLIW architecture. **5M**

b Draw and explain the architecture of von Neumann. **5M**

OR

11 **a** What are the different buses of TMS320C5X and their functions? **5M**

b Distinguish between the dual-access RAM and single-access RAM used in the on-chip memory of 5X. **5M**

END