O.P.Code: 23EC0419	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year II Semester Regular Examinations April-2026
DIGITAL SIGNAL PROCESSING
(Electronics & Communications Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define Discrete time LTI system.	CO1	L1	2M
	b	What is meant by inverse Z-transform?	CO1	L1	2M
	c	Define Discrete Fourier series.	CO2	L1	2M
	d	Define Inverse FFT.	CO3	L1	2M
	e	List the filter types in designing the IIRfilters?	CO4	L1	2M
	f	Compare impulse invariant and bilinear transformaion.	CO4	L1	2M
	g	What are the advantages of FIR filters?	CO5	L1	2M
	h	List the different types of structures for realizing FIR systems.	CO5	L1	2M
	i	What are general purpose DSPs? Give one example.	CO6	L1	2M
	j	What are the applications of on-chip timer?	CO6	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Discuss the various classifications of Discrete time signals with examples.	CO1	L2	5M
	b	What are the types of representation of discrete-time signals? Represent a sequence in all types.	CO1	L1	5M
		OR			
3		A discrete-time LTI system is described by the difference equation is y(n)-0.7 y(n-1)+0.12 y(n-2)=x(n)+0.5x(n-1). i) Obtain the transfer function H(z), ii) Find the poles and zeros of the system. iii) Comment on the stability of the system.	CO1	L3	10M

UNIT-II

4	a	Find the IDFTof the sequence $X(K) = \{1,0,1,0\}$.	CO2	L3	6M
	b	Explain the difference between linear convolution and circular convolution.	CO2	L2	4M
		OR			
5		Compute DFT of the sequence x(n) = {1,1,1,1,1,1,1,0} using Radix-2 DIT FFT algorithm.	CO3	L3	10M

UNIT-III

6	a	Explain the steps in the design of an analog Chebyshev low pass filter.	CO4	L2	5M
	b	Design an analog filter using Chebyshev approximation for the specifications α_p=3dB and α_s=16dB; f_p=1KHz and f_s= 2KHz.	CO4	L3	5M
		OR			
7		Construct the cascade and parallel form structure of the system with difference equation. $y(n)$=−0.1$y(n-1)$+0.72$y(n-2)$+0.7$x(n)$−0.252$x(n-2)$	CO4	L3	10M

UNIT-IV

8	a	Explain the Procedure for designing FIR filters using windows.	CO5	L2	4M
	b	Give the equations for Rectangular, Hanning and Hamming window and Blackman.	CO5	L2	6M
		OR			
9		Design an ideal High pass filter using Hanning window with the frequency response. $H_d(e^{jw}) = 1\ for\ \frac{\pi}{4} \le \omega \le \pi$ $= 0\ for\ \|\omega\| \le \pi$	CO5	L3	10M

UNIT-V

10	a	Describe about the bus structure of TMS320C5x DSP processor.	CO6	L2	5M
	b	Describe the Auxiliary Register ALU (ARAU) and explain its role in address generation.	CO6	L2	5M
		OR			
11		Explain about the Central Processing unit of TMS320C5X	CO6	L2	10M

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