

**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)**

III - B.Tech II-Semester Regular Examinations (BR23), MAY - 2026

DIGITAL SIGNAL PROCESSING (ECE)

Time: 3 hours

Max. Marks: 70

Question Paper consists of Part-A and Part-B

Answer ALL the question in Part-A and Part-B

PART-A (10X2 = 20M)

	Marks	CO	BL
1. a) Analyze the system described by the equation $y(n) = nx(n)$ is linear or not.	(2M)	CO1	4
b) What is system function.?	(2M)	CO1	1
c) State the Parseval's Theorem of DFT	(2M)	CO2	3
d) State the properties of ROC	(2M)	CO2	1
e) What is the mapping procedure between S-plane & Z-plane in the method of mapping differentials?	(2M)	CO3	4
f) What is window function, its importance in Filter Techniques	(2M)	CO3	1
g) What are the advantages of bilinear transformation?	(2M)	CO4	1
h) What is the advantage of cascade realization?	(2M)	CO4	1
i) What is pipelining?	(2M)	CO5	1
j) What are special addressing modes?	(2M)	CO5	1

PART-B (5X10 = 50M)

2a. Check the time invariant and stability of the given system $y(n)=\cos x(n)$.	5(M)	CO1	4
b. Find the convolution of the given two signals: graphically: $x(n)=u(n)-u(n-5)$; $h(n)=2[u(n)-u(n-3)]$	5(M)		4

(OR)

3a. Find whether the following system are linear Time invariant $y(n)=n.x(n)$	5(M)	CO1	4
b. Analyze the types of signals with its mathematical expression and neat diagram.	(M)		4

4a. Compute the DFT of the Four-point sequence $x(n) = \{2, 1, 2, 0\}$. Using the same sequence, compute the 4-point DFT $h(n) = \{2, 1, 2, 0\}$. and compare the two DFTs.	5(M) 5(M)	CO2	5 1
b. How is the FFT algorithm applied to determine inverse discrete Fourier transform?			

(OR)

5a. State and prove any four properties of DFT.	5(M)	CO2	1
b. Find the Z-transform for the following functions (i) $x(n)=nu(n)$ (ii) $x(n)=\sin\omega(n)$ (iii) $x(n)=\cos\omega(n)$	5(M)		4

6a. Realize the following FIR system with difference equation. $y(n)=3/4 y(n-1)-1/8y(n-2)+x(n)+1/3x(n-1)$ in direct form I.	5(M) 5(M)	CO3	6 4
b. Compare the FIR and IIR systems			

(OR)

7a.	Explain the cascaded form structure with an suitable example using IIR system	5(M)	CO3	2
b.	Determine the DFT of the given sequence $x(n)=\{1,2,3,4,4,3,2,1\}$, using DIF FFT algorithm.	5(M)		5
8a.	Compare between Butterworth and Chebyshev (Type-I) filter.	5(M)	CO4	4
b.	Convert the following analog transfer function into digital using impulse invariant technique with sampling period $T=1\text{sec}$. $H(s)=\frac{s+1}{(s+3)(s+5)}$	5(M)		4
(OR)				
9a.	Explain the bilinear transformation method of designing IIR filter.	5(M)	CO4	2
b.	Design a band pass filter to pass frequencies in the range 1to2radians/sec using Hanning window, with $N=5$	5(M)		6
10a	What is meant by VLIW architecture? Give the advantages and disadvantages.	5(M)	CO5	1
b.	With a flow diagram explain the multiply and accumulated (MAC) unit in a digital signal processor.	5(M)		2
(OR)				
11a	Discuss different addressing modes used in programmable Digital signal processor.	5(M)	CO5	2
b.	Explain the architecture of TMS320C50 with a neat diagram.	5(M)		2
