QP Code: SN23BTECH212 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BECPC35002 Digital Signal Processing

(ECE)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	What is similarity between DIT and DIF?	CO2	K1
b.	State the complex conjugate property of DFT?	CO1	K1
c.	Draw the direct form structure of 2nd order FIR system.	CO3	K2
d.	What is the difference between Analog filter and Digital filter?	CO4	K2
e.	What is the Von-Neumann Architecture?	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Find the DFT if x(n)={1,-1,2,-4}?	5	CO1	K3
b.	State and proof the Parseval's Relation?	5	CO1	K2
	(OR)			
c.	Calculate the linear convolution using Overlap Save method if x(n)={2,3,-5,6,4,7,9,5,2,-1} & h(n)={1,-3,4}	10	CO1	K3
3.a.	Find the 8-point DFT using DIT-FFT algorithm if x(n)={1,2,-3,-3,2,1}	10	CO2	K3
	(OR)			
b.	Explain DIF-FFT algorithm with the 8-point Butterfly Structure?	10	CO2	K2
4.a.	Find the transfer function and draw the linear phase structure for length 9	5	CO3	K3
b.	Draw the cascade form structure of $H(Z) = 1 - 4Z^{-1} - 21Z^{-2}$	5	CO3	K2
	(OR)			
c.	Design a FIR filter using Hamming window of length 5 if the desired frequency response is $H(\omega) = e^{-j\omega\frac{(N-1)}{2}}$ for $-\pi/4 \leq \omega \leq \pi/4$ $= 0$ Otherwise	10	CO3	K5
5.a.	Design a digital IIR filter using impulse invariant method of sampling period 1 second and the system function is $H(S) = \frac{7}{(S+4)(S-3)}$	5	CO4	K5
b.	Consider the casual system y(n)=-0.5y(n-1)-0.12y(n-2) +0.7x(n)-0.252x(n-2) Obtain Parallel form structure of the system	5	CO4	K4

(OR)

c.	Find the system function and draw the DF-I and DF-II structure of 3rd order IIR system	5	CO4	K4
d.	Design a digital IIR filter using Bilinear Transformation method and the system function is $$H(s) = \frac{3}{(s+1)(s-5)}$$	5	CO4	K5
6.a.	Explain the digital signal processor architecture.	5	CO5	K2
b.	Describe the functional units of TMS320C5X Digital Signal processor.	5	CO5	K2

(OR)

c.	Explain the addressing modes of TMS320C5X Digital Signal processor.	5	CO5	K2
d.	Differentiate Digital Signal Processor and Microprocessor.	5	CO5	K2

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