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**SNS College of Technology, Coimbatore-35.**  
(Autonomous)

**B.E/B.Tech Internal Assessment -I**  
**Academic Year 2023-2024(Even)**

**Fourth Semester**

**Electronics and Communication Engineering**  
**19ECB212 – Digital Signal Processing**

B
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**Time: 1<sup>1/2</sup> Hours**

**Maximum Marks: 50**

**Answer All Questions**

**PART - A (5 x 2 = 10 Marks)**

			CO	Blooms	
1.		If $x(n) = \{4,1\}$ . Find $X(K)$ of the given sequence.	CO1	Rem	
2.		Outline the mathematical and graphical representation of unit step signal.	CO1	Und	
3.		Sketch the 2 Point DIF FFT.	CO1	Rem	
4.		Compare analog and digital filter.	CO2	Und	
5.		Define Impulse Invariant transformation.	CO2	Rem	
<b>PART – B (2 x 13 = 26 Marks) (1 x 14 = 14 Marks)</b>					
			CO	Blooms	
6.	(a)	State and prove any five properties of DFT.	13	CO1	Und
		(or)			
	(b)	(i) Find the linear convolution $x(n) = \{1,2,3,4,4,3,2,1\}$ and $h(n) = \{-1,1\}$ using Overlap Add Method	7	CO1	Rem
		(ii) Find the DFT of the given sequence $x(n) = \{1,2,3,4\}$ using radix-2 DIF - FFT algorithm	6		
7.	(a)	Analyze Butterworth digital IIR high pass filter satisfying the following constraints using Bilinear transformation. $T = 0.1$ Sec $0.6 \leq  H(e^{j\omega})  \leq 1.0$ ; for $0.7\pi \leq \omega \leq \pi$ $ H(e^{j\omega})  \leq 0.1$ ; for $\pi \leq \omega \leq 0.35\pi$	13	CO2	Ana

		(or)			
	(b)	(i) Find $H(z)$ using impulse invariant technique for the analog filter design. $H(z)=10/(S^2 + 7S+10)$ ( <b>T = 0.2sec</b> )	7	CO2	Rem
		(ii) Find $H(z)$ using bilinear transformation when $H(s) = 1/ (S+1)^2$ , <b>T=0.1 Sec</b>	6		
8.	(a)	Examine radix-2 DIT - FFT algorithm for the sequence $x(n) = \{2,2,2,2,1,1,1,1\}$ .	14	CO1	Ana
		(or)			
	(b)	(i) Apply circular convolution steps of the given sequences $X_1(n) = \{1,2,3,4\}$ and $X_2(n) = \{1,-1,2,1\}$	7	CO1	App
		(ii) Make use of Discrete Fourier Transform to find $X(K)$ for the given sequence: $x(n) = \{1,0,1,0\}$	7		
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**Abbreviations:**

**CO** – Course Outcomes; **Rem**- Remembering; **Und** – Understanding; **App** – Applying;  
**Ana** – Analyzing; **Eva** – Evaluating; **Cre**- Creating