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PRN:		Course Code :	ECE301R1

Third Year **B. Tech** End Semester Examination Summer 2023

Digital Signal Processing

Day and Date: Monday 12/6/23 Max Marks: **100**

Time : 10:30 AM – 1:30 PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Explain in detail overlap-add method of filtering of long duration sequences.	08	2	1
	b)	Compute IDFT of following sequences: i) X(k)= {1, 0, 1, 0} ii) X(k)= { 10, -2+2j, -2, -2-2j }	08	3	1
		OR			
	b)	Compute circular convolution for h(n)={1,1,2,1} and x(n)={1,2,3,4} using concentric circle method.	08	3	1
Q.2		**Attempt the following**			
	a)	Explain DIT-FFT algorithm.	08	2	2
	b)	Determine 8-point DFT of the sequence, x(n)={1,1,1,1,1,0,0,0} using DIF-FFT algorithm.	08	4	2
		OR			
	b)	Determine 4-point DFT of a sequence, x(n)={0,1,2,3} using DIT -FFT algorithms.	08	4	2
Q.3		**Attempt any two from the following**			
	a)	Design high pass filter to meet the following specifications; Cut off frequency= 250 Hz, Sampling frequency= 1 KHz & filter length 7 using Rectangular window.	08	5	3
	b)	Explain the properties of FIR filter.	08	2	3
	c)	Explain windowing method used in FIR filter design and give any two window functions.	08	2	3
Q.4		**Attempt any two from the following**			
	a)	Explain impulse invariant method of IIR filter design	08	2	3
	b)	For the analog transfer function H(s) = 1/(s+1) (s+2), determine H(z) using impulse invariant technique, Assume T= 1 sec.	08	4	3
	c)	Design digital low pass filter to approximate $H(s) = 1/s^2+\sqrt{2}\, s+1$ using BLT method. Assume cut off frequency of 100 Hz. & sampling frequency of 1 KHz.	08	5	3
Q.5		**Attempt any Two of the following**			
	a)	Describe cascade form realization of IIR system.	09	2	4
	b)	Determine direct form realization of system function given below; $H(z)=1+4z^{-1}-3z^{-2}+6z^{-3}-9z^{-4}+5z^{-5}+7z^{-6}$	09	4	4
	c)	Illustrate methods of FIR filter realization.	09	2	4

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Q.6	**Attempt any Two of the following**				
a)	Illustrate Radar signal processing as application of DSP.	09	2	4
b)	Compare General purpose and DSP Processor.	09	5	4
c)	Describe speech processing as application of DSP.	09	2	4

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