SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

III B.Tech II Semester (SVEC-16) Regular/Supplementary Examinations August - 2021

DIGITAL SIGNAL PROCESSING

[Electronics and Communication Engineering]

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

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

1.	a)	Check the following systems for time variance causality, linearity and stability. i) $y(n)= x(n) + x(n-1)$; ii) $y(n) = n\,x(n)$.	CO4	7 Marks
	b)	Given the sequence x(n)=(5-n)[u9n0-u9n-5), make a sketch of: i) $y(n) = x(4-n)$; ii) $y(n) = x(n^2 - 2n + 1)$.	CO2	7 Marks
		(OR)		
2.	a)	Discuss the concept of causality and stability with examples.	CO2	7 Marks
	b)	State and prove linearity, time shifting and symmetry properties of DFS.	CO4	7 Marks

UNIT-II

3.	a)	Perform circular convolution of the following sequences. $x_1(n) = \{1,2,3,4\}$ and $x_2(n) = \{1,1,2,1\}$	CO2	7 Marks
	b)	With a neat derivation, explain the procedure to compute IDFT using Radix - 2 FFT.	CO1	7 Marks
		(OR)		
4.	a)	An 8 point sequence is given by $x(n)$ {1,0,1,0,1,0,1,0}. Compute 8 point DFT of $x(n)$ by Radix - 2 DIT FFT.	CO1	7 Marks
	b)	Determine 4 point Discrete time Fourier Transform of a sequence $x(n) = \{1, -1, 2, -2\}$.	CO2	7 Marks

UNIT-III

5.	a)	For the given analog transfer function $H_a(s) = 3/(s+1)(s+4)$, determine H(z) for T=1sec using impulse invariant method.	CO5	7 Marks
	b)	Obtain the direct form I and II form realization for the system $y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$	CO2	7 Marks
		(OR)		
6.	a)	Design a digital low pass Butterworth digital IIR filter which is required to meet the following specifications. Pass band attenuation ≤ 2dB, Pass band edge frequency = 4KHz, Stop band attenuation ≥ 40dB, Stop band edge frequency = 8KHz, Sampling rate = 24 KHz by using bilinear transformation.	CO5	7 Marks
	b)	Derive an expression for order of the chebyshev analog proto type filter.	CO2	7 Marks

UNIT-IV

7.	a)	Compare an FIR filter with IIR filter. What conditions are to be satisfied by the impulse response of an FIR filter in order to have a linear phase.	CO2	7 Marks
	b)	Obtain direct form and cascade form realizations for the transfer function of an FIR system given by $H(z) = \left(1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2}\right)\left(1 - \frac{1}{8}z^{-1} - \frac{1}{2}z^{-2}\right)$.	CO3	7 Marks
		(OR)		

8.	a)	Analyse the characteristics of rectangular, Bartlet and Blackman windows with neat sketch.	CO3	7 Marks
	b)	Design a Linear phase band pass FIR filter with cutoff frequencies in the range 0.4π to 0.6π rad/sample by taking 7 samples of hamming window.	CO3	7 Marks

UNIT-V

9.	a)	Explain various types of general purpose registers in TMS 320C6X DSP processor.	CO1	7 Marks
	b)	Explain about various on-chip peripherals provided on DSP processors.	CO1	7 Marks

(OR)

10.	a)	Explain the VLIW architecture with its block diagram. State the advantages and disadvantages of VLIW architecture.	CO1	7 Marks
	b)	Discuss in detail bout pipelining of instruction execution in DSP processors.	CO1	7 Marks