## Code No: 127CK

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B. Tech IV Year I Semester Examinations, February/March - 2022 DIGITAL SIGNAL PROCESSING (Electrical and Electronics Engineering) Time: 3 Hours Max. Marks: 75

**R15** 

Answer Any Five Questions All Questions carry equal marks		
1.a)	Find the even and odd components of the following signals:	
	i) $x(n) = \{-3, 1, 2, -4, 2\}$ (ii) $x(n) = \{5, 4, 3, 2, 1\}$	
b)	$\uparrow \qquad \uparrow$	
	A causal L11 system is defined by the difference equation 2v(n) - v(n - 2) = r(n - 1) + 3r(n - 2) + 2r(n - 3)	
	Find the frequency response, magnitude response and phase response.	[8+7]
		[ · · ]
2.a)	Find the linearity, time invariance, causality of the following systems:	
1)	$y(n) = x(n^2) + x(-n)$	[0 + 7]
6)	Determine the inverse Z – transforms of $X(z) = \log_{10} (1 + az^{-1})$ ; ROC $ z  > a$	[8+/]
	$A(2) = \log_{e}(1 + u_{2}), \text{ NOC }  2  \ge u$	
3.a)	Find the linear convolution of the following sequences	
	$x(n) = \{1, 0, 2\},$ $h(n) = \{1, -1\}$	
b)	Find the IDFT of $X(k) = \{3, 2+j, 1, 2-j\}.$	[8+7]
4.	Given a sequence $x(n) = \{$ $(0, 2, 3, 4, 5, 6, 7\}$ , determine $X(k)$ using DIT FFT algorithm	
		[15]
	aller t	
5.a) What is the frequency transformation and write the expressions for con		ng LPF to
b)	HPF and LPF to BPF. Enumerate the differences between UR and EIR filters	[8+7]
0)	Endinerate inedimerences between fitte and Fitte inters.	[0+7]
6.	Convert the analog filter with transfer function	
	$H_{a}(s) = \frac{s+0.1}{(s+0.1)^2+0}$	
	$(s+0.1)^2+9$	
	into a digital filter using the bilinear transformation.	[15]
7.a)	Discuss the frequency sampling method of FIR filter design.	[8+7]
b)	Compare the characteristics of Hamming and Blackman windows.	
8.a)	Obtain the necessary expression for decimation process and explain.	
b)	Write a short note on dead band effects.	[8+7]

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