KONERU LAKSHMAIAH EDUCATION FOUNDATION
(Deemed to be University, Estd. u/s. 3 of UGC Act 1956)

B.Tech - Odd Sem : End Semester Exam
Academic Year:2020-2021

19EM3201 - SIGNAL PROCESSING

Set No: 3

Time:		**Max.Marks: 100**					
S.NO	Answer All Questions	Choice	Options	Marks	CO	CO BTL	COI BTL
1.	Outline the basic components of digital signal processing system with proper illustrations.	choice Q-2		10Marks	CO1	2	2
2.	Represent the symmetric and anti-symmetric signals with proper mathematical descriptions.			10Marks	CO1	2	2
3.	Answer the following questions	choice Q-4		15Marks	CO1	2	2
3.A.	Highlight any three properties of Z-transform with proper mathematical equations.			7Marks	CO1	2	2
3.B.	Sketch the following signal with proper steps: x(n) = u(n+2).			8Marks	CO1	2	2
4.	Answer the following questions			15Marks	CO1	2	2
4.A.	Elucidate the dynamic range of quantizer with proper derivation of the 6 dB per bit rule.			7Marks	CO1	2	2
4.B.	Determine if the given signal x(n) is periodic: x(n) = 1+ exp (j 2πn/3) - exp (j 4πn/7). If the signal is periodic, determine the fundamental period.			8Marks	CO1	2	2
5.	Justify the concept for linearity property of discrete fourier transform.	choice Q-6		10Marks	CO2	4	4
6.	Without performing any actual DFT/FFT computations, determine the 16-point DFT of x[n], where x[n]= cos(π n/2)+2 cos(π n/8), n = 0, 1, . . . , 15.			10Marks	CO2	4	4
7.	Answer the following questions	choice Q-8		15Marks	CO2	4	4
7.A.	Elucidate the steps to obtain circular convolution using DFT and IDFT.			7Marks	CO2	4	4
7.B.	Illustrate and examine the magnitude spectrum of rectangular window.			8Marks	CO2	4	4
8.	Answer the following questions			15Marks	CO2	4	4
8.A.	Highlight the periodicity property of DFT with proper derivation.			7Marks	CO2	4	4
8.B.	Let x = [1, 2, 2, 1, 2, 1, 1, 2]. Compute the 4-point DFT of x using the definition in matrix form. Recompute it by first reducing x modulo 4 and then computing the 4-DFT of the result.			8Marks	CO2	4	4
9.	Outline the steps for designing of second-order peaking filters.	choice Q-10		10Marks	CO3	4	4
10.	" Using the Kaiser window, design a lowpass digital filter with the following specifications: fs = 20 kHz,f(pass) = 4 kHz, f(stop) = 5 kHz A(pass) = 0.1 dB, A(stop) = 80 dB."			10Marks	CO3	4	4

11.	Answer the following questions	choice Q-12		15Marks	CO3	4	4
11.A.	Illustrate the frequency response of digital peaking filter and its analog equivalent withmathematical expression and proper illustrations.			7Marks	CO3	4	4
11.B.	Estimate the transfer function of the first order low pass IIR filter with prewrapped analogversion as 1.9626.			8Marks	CO3	4	4
12.	Answer the following questions			15Marks	CO3	4	4
12.A.	Sketch the cutoff frequency specifications for lowpass digital IIR filter.			7Marks	CO3	4	4
12.B.	Examine the frequency response schematic for Ideal lowpass, highpass, bandpass, and bandstop filters.			8Marks	CO3	4	4
13.	Outline the different techniques of performing companding technique.	choice Q-14		10Marks	CO4	4	4
14.	Paraphrase the Huffman encoding technique in data compression technique.			10Marks	CO4	4	4
15.	Answer the following questions	choice Q-16		15Marks	CO4	4	4
15.A.	Outline the working description of the sections in DSP unit that are involved in the arithmetic processing			7Marks	CO4	4	4
15.B.	With the help of pole zero diagram and frequency response curve, discuss the operation of a Lowpass noise reduction filter.			8Marks	CO4	4	4
16.	Answer the following questions			15Marks	CO4	4	4
16.A.	Demonstrate layout of the active nodes that are used in the hidden and output layers of the neural network with the help of a flow diagram.			7Marks	CO4	4	4
16.B.	Outline the types of the noise signals that are encountered in the signal processing applications.			8Marks	CO4	4	4

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