Question Paper Code: 55401A

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2021

Fifth Semester

Electronics and Communication Engineering

15UEC501 - DIGITAL SIGNAL PROCESSING

(Regulation 2015)

Duration: 1:45 hrs Maximum: 50 Marks

PART A

(Answer any Ten Questions 10 x 2 Mark = 20 Marks)

1.	Draw the basic butterfly structure for radix-2 DIT algorithm?	CO1 U
2.	Find the IDFT of X(k) = {1,0,1,0}.	CO1 App
3.	Compute the N-point DFT of the signal $x(n)=\cos\left(\frac{n\pi}{4}\right)$ for $0 \le n \le 3$.	CO1 App
4.	What is prewarping? Why it is employed?	CO2 U
5.	Compare the Butterworth and Chebyshev filter.	CO2 U
6.	Given that $H_a(s)=\frac{1}{(s+1)}+\frac{1}{(s+3)}$ Obtain the digital filter transfer function using impulse invariant transformation.	CO2 App
7.	What are FIR filters?	CO3 U
8.	What are the advantage of FIR filters?	CO3 U
9.	How the constant group delay and phase delay achieved in linear phase FIR filters?	CO3 U
10.	Convert $(+0.125)_{10}$ to 2's compliment format of binary and verify the result by converting the binary to decimal.	CO4 App
11.	What are the differences between Overlap – add and Overlap – save method?	CO1-R
12.	Write the steps in designing chebyshev filer?	CO2- U
13.	Give the equations of the following windows a)Rectangular window b) Hamming window c)Hanning window	CO3- U

14.	What is product quantization error	CO4- U	
15.	What are he different buses of TMS320C5X and their functions	CO5- U	

PART – B

(Answer any three Questions 3 X 10 = 30 Marks)

16.	Find the inverse DFT of X(k) = {1,2,3,4} using DIF FFT algorithm	CO1 - APP	(10)
17.	For the analog transfer function $Ha(s)=(s^2+1)/(s^2+2s+1)$ determine H(z) using Impulse invariant transformation with T=1sec.	CO2 - APP	(10)
18.	Design an Ideal LPF with frequency response $H_d(e^{jw}) = 1$, for $-\pi/2 <= \lvert\omega\rvert <= \pi/2$ $= 0$, for otherwise. Using Rectangular window for N=7 samples.	CO3 - APP	(10)
19.	Explain the characteristics of limit cycle oscillation with respect to the system described by the difference equation: $y(n) = 0.95\ y(n-1) + x(n)$. Determine the dead band of the system when x(n)=0.875 for n=0, 0 for $n \neq 0$	CO4 - U	(10)
20.	Write down and explain the TMS320C5x processor addressing modes.	CO5 - U	(10)