Department of Electronics & Communication Engineering

Year: III year II semester **Sub: Digital Signal Processing**

Short Answer Questions

Unit I:

1) Establish the relation between DFT and Z-transform
2) Explain any three properties of convolution sum
3) Find DTFT of $(1/4)^n u(n+4)$, $[1/2]^n u(n+3)$
4) Determine whether the following systems are stable or not
   $h(n) = e^{an}$, $h(n) = a \cdot e^{-b|n|}$
5) Determine whether the following system is time-invariant or not. $y(n) = \sin[x(n)]$
6) Find the circular convolution $x(n) = \{1,2,3\}$ $h(n) = \{-1, -2\}$
7) Check for the stability and causality of $h(n) = x^2(n)$
8) Check for the causality and linearity of $h(n) = x(-n-2)$, $h(n) = e^{x(-n)}$
9) Find the DFT of the sequence $x(n) = \{1,0,0,1\}$ using DIF algorithm
10) Calculate the number of multiplications needed in the calculation of DFT and FFT with 64-point sequence
11) Find the properties of DTFT
12) Find DTFT of unit step sequence
13) Write properties of DFT
14) Differentiate between DTFT, DFT and DFS in spectral domain
15) Draw the two point butterfly diagram for DIF algorithm
16) State Parsevals theorem of DFT
17) Write the Z-transform of the sequence $x(n) = [3,8,2,1,-1,4]$
18) Write short notes on overlap-save and overlap-add method
19) What is meant by in place computation in FFT
20) What are the differences and similarities between DIF and DIT algorithms
21) Explain the properties of twiddle factor
22) Write advantages of FFT algorithms
23) List the advantages of DSP
24) Differentiate between linear convolution and circular convolution
25) Write applications of DSP

Unit II:

1) State the condition for a filter to have linear phase characteristics in terms of its impulse response
2) Advantages of digital filters
3) Give the mathematical expressions for all types of windows

4) Explain finite word length effects
5) Explain Gibbs phenomenon
6) What is a Kaiser window? In what way it is superior to other window functions
7) What are the conditions for a FIR system to have linear phase
8) What is window? Why it is necessary
9) What are the desirable characteristics of the window
10) Why triangular window is not a good choice for designing FIR filters

Unit III:

1) Differentiate between bilinear transformation and impulse invariant transformation techniques
2) Differentiate between FIR and IIR filters
3) Obtain impulse response of digital filter corresponding to an analog filter with impulse response $h_a(t)=0.5e^{-2t}$, with a sampling rate $T_s=1$
4) Using IIT obtain H(z) if $H(s)=1/[(s+1)(s+2)]$. Assume T=1sec
5) Using bilinear transformation obtain H(z) if $H(s)=1/[(s+1)(s+2)]$. Assume T=1sec
6) What is aliasing
7) What is frequency warping
8) What is prewarping
9) Write the properties of Butterworth filter
10) Compare butterrworth and chebyshev filters

Unit IV:

1) What is Decimation? When it is performed?
2) Write any three applications of multi rate signal processing
3) Explain the terms decimation and interpolation
4) Explain the need for multi rate processing
5) What are the applications of Multi rate processing
6) What is interpolation? When it is performed
7) What is sampling rate conversion
8) What is the need for anti imaging filter after up sampling a signal
9) What is the need for anti aliasing filter prior to down sampling
10) What are the advantages of multi rate signal processing

Unit V:

1) Explain circular addressing mode for a DSP processor
2) How VLIW (Very Large instruction word) architecture is differ from Horvard architecture
3) Compare fixed point and floating point processors
4) Write short notes on RISC Vs CISC CPU
5) Explain about the need for ASP
6) Differentiate between DSP and other microprocessors architectures
7) Explain any two data transfer functions of TMS320C54XX

8) Explain addressing modes of TMS320C54XX
9) Compare the architectures of conventional microprocessor and DSP processor
10) What are the applications of on chip timer