

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Digital Signal Processing

Subject Code : 4TE08DSP1

Branch: B.Tech (EEE)

Semester : 8

Date : 24/04/2018

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Attempt the following questions:

(14)

- a) Which of the following is true regarding the number of computations required for direct computing an N-point DFT?
- a) N^2 complex multiplications and $N(N-1)$ complex additions
 - b) N^2 complex additions and $N(N-1)$ complex multiplications
 - c) N^2 complex multiplications and $N(N+1)$ complex additions
 - d) N^2 complex additions and $N(N+1)$ complex multiplications
- b) Drawback of DSP is _____.
- a) Digital processing needs pre and post processing devices
 - b) High cost
 - c) No memory storage
 - d) None of above
- c) Which of the following is used in the realization of a system?
- a) Delay elements
 - b) Multipliers
 - c) Adders
 - d) All of the above
- d) Which of the following methods is not used find out inverse z transform?
- a) Cauchy Rihemen's theorem
 - b) Long division method.
 - c) Partial function.
 - d) Taylor Series
- e) Finite Impulse Response (FIR) is a _____.
- a) Feedforward filter
 - b) Feedback filter
 - c) Both a & b
 - d) None of these



- f) The filter coefficients are stored in _____.
- a) Binary registers
 - b) Digital system
 - c) Hex memory
 - d) None of above
- g) How many multiplication are required to compute N point DFT using radix 2 FFT?
- a) $N \log_2 N$
 - b) $N/2 \log_2 N$
 - c) N^2
 - d) None of these
- h) How many additions are required to compute N point DFT using radix 2 FFT?
- a) $N \log_2 N$
 - b) $N/2 \log_2 N$
 - c) N^2
 - d) None of these
- i) Consider two finite duration sequences $x(n)$ and $h(n)$ of duration L samples and M samples then the linear convolution of these two sequences produces an output sequence of duration _____.
- a) L+M-1 samples
 - b) L
 - c) M
 - d) None of these
- j) What of the following is not the application of FFT algorithm?
- a) Linear filtering
 - b) Correlation
 - c) Spectrum analysis
 - d) Analog computation
- k) IIR filteris/are _____.
- a) Use feedback
 - b) Are sometimes called recursive filters
 - c) Can oscillate if not properly designed
 - d) All of the above
- l) Drawback of FIR filter is/are _____.
- a) More computation than an IIR with similar effect
 - b) Prevent phase distortion
 - c) Less computation
 - d) All of above
- m) Calculate DFT of $x(n) = \delta(n)$.
- a) 1
 - b) 0
 - c) Infinite
 - d) Can't find
- n) The process of quantization introduces _____.
- a) Error
 - b) Noise



- c) Power
- d) None of the above

Attempt any four questions from Q-2 to Q-8

Q-2	Attempt all questions	(14)
a)	Enlist and explain various types of System.	09
b)	Enlist the advantages of Digital Signal Processing and explain.	06
Q-3	Attempt all questions	(14)
a)	What are the differences and similarities between analog and digital signal processing?	05
b)	Write a short note on applications of DSP.	05
c)	Explain similarity and differences between linear and circular convolution.	04
Q-4	Attempt all questions	(14)
a)	Enlist and explain property of Z-Transform	07
b)	Give the differences between FIR & IIR filter.	07
Q-5	Attempt all questions	(14)
a)	Compute the length-4 sequence from its DFT which is given by $X(k) = \{4, 1-j, -2, 1+j\}$.	05
b)	Realize the following system function by linear phase FIR filter $H(z) = \frac{1}{2} + \frac{1}{3}z^{-1} + z^{-2} + \frac{1}{4}z^{-3} + z^{-4} + \frac{1}{3}z^{-5} + \frac{1}{2}z^{-6}$	05
c)	Enlist different properties of Discrete Fourier Transform.	04
Q-6	Attempt all questions	(14)
a)	Perform linear convolution of $\{1, 3, 1\}$ and $\{1, 2, 2, \dots\}$.	05
b)	Give the differences between analog filter and digital filter.	05
c)	What is the relationship between z-transform and the discrete fourier transform? Discuss.	04
Q-7	Attempt all questions	(14)
a)	Explain different types of structures of an IIR filter that can be realized.	07
b)	Write a technical note on radix-2 decimation in time FFT.	07
Q-8	Attempt all questions	(14)
a)	Explain in detail different types of structures of an FIR filter that can be realized.	07
b)	Write a technical note on radix-2 decimation in frequency FFT.	07

