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1078
B.E. (Electrical and Electronics Engineering)
Seventh Semester
EE-708: Digital Signal Processing

Max. Marks: 50

Time allowed: 3 Hours

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.*

x-x-x

Answer in brief. (1x10)

a) List down the merits of Digital Signal Processing.
b) Define conditions for stability of a system in Z-domain.
c) What is the role of LPF in practical sampling?
d) Give computational complexity of DFT calculation.
e) Discuss one practical application of Correlation process.
f) Differentiate energy and power signals.
g) What are the factors responsible for reduced computations in **FFT** algorithms?
h) How DSP processors are different from Analog processors?
i) Differentiate between homogeneous and particular solutions **of LCCDE''**
j) Out of FIR and IIR implantations of digital filters. which **one is preferable** and why?

Section - A

II a) Compute the auto-correlation of the signal x(n) and **comment on the** result. (5, 5)

$x(n)= \{1.2.3.4.2.1\}$

b) State sampling theorem and show the aliasing effect if **the signal** is $x(t)= \sin 100\pi t$.

III a) Differentiate convolution and correlation and discuss one **application** of each. (5, 5)

b) Determine all possible signals that can have the following **z-transform**

$X(z) = (1 - 1.5\ z^{-1} + 0.5\ z^{-2})^{-1}$.

IV a) Compute the 8-ponit circular convolution of the following **sequences**: (5, 5)

$x(n) = \{1, 0, 2, 1\}$ and $y(n) = \sin(3\pi\ n/8)$

b) Define and derive the DITFFT algorithm.

Section- B

V a) Obtain cascade and parallel form structures for the system **defined by** (5, 5)

$$y(n) = \frac{1}{4}y(n - 1) + \frac{1}{4}y(n - 2) + x(n) + x(n - 1)$$

b) Explain the effects of finite word length on digital IIR **filter structures**

VI a) Design an FIR filter of length M = 15 having a frequency **response that** satisfies the condition

H_r '

b'