Exam.Code:0937
Sub. Code: 6682

2122

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

ed: 3 Hours **Max. Marks: 50**

tempt five questions in all, including Question No. I which is compulsory selecting two questions from each Section.

x-x-x

Short answer type questions. (01x10)

a Define Sectional Convolution.
b Draw the direct form structure of an IIR filter.
c What is Zero Padding?
d State any two properties of the Autocorrelation function.
e What is known as Gibbs phenomenon?
f What is meant by DIT Algorithm?
g Define causality.
h What do you mean by Nyquist rate?
i Give the equation for Blackman Window.
j What is aliasing?

Section - A

II a) Prove that the following signals are either energy or power signal. (05, 05)

i) 4 ii) $e^{j(\frac{\pi}{2}n+\frac{\pi}{4})}$ iii) $e^{2\Pi t}$ iv) $e^{j2\pi t}$

b) Find the inverse z-transform of X (z) = $\frac{z^2+z}{(z-1)(z-3)}$, ROC:$|z| > 3$, using

(i) Residue method and
(ii) Convolution Method.

III a) Find DFT of the following sequence using DIT FFT algorithm. x(n)={1,1,1,1,1,1,1,0} (04)

b) What is ROC of Z- transform? State its properties. (03)

c) Distinguish between linear convolution and circular convolution of two sequences. (03)

IV a) Compute IDFT of the sequence. (03)

X (k) = {7,-0.707-j0.707,-j, 0.707-j0.707, 1, 0.707+j0.707,j,-0.707+j0.707}

b) State and prove the following properties of z-transform. (04)

(i) Time shifting (ii) Differentiation

c) Discuss about "in-place computation" in FFT algorithm. (03)

Section- B

V a) Explain the filtering methods based on DFT and FFT. (05, 05)

b) Determine H (z) for a Butterworth filter satisfying the following conditions using impulse invariant transformation and T=1 Second. Pass Band edge magnitude = $\sqrt{0.5}$, Pass Band frequency =$\frac{\pi}{2}$, Stop Band magnitude= 0.2 & Stop Band frequency = $\frac{3\pi}{2}$

VI a) Design a non-recursive High Pass Filter with cut-off frequency 1.2 radians of length N=9 using Hamming Window. (05, 05)

b) Convert the given analog filter with a transfer function.

H(s) = $\frac{2}{(S+1)(S+2)}$ into an IIR filter using a bilinear transformation. Assume T = 1 second.

VII a) Describe the data path architecture of a Digital Signal Processor with suitable diagram. Discuss the addressing modes of TS320C5X. (05)

b) State the advantage of instruction cache in a DSP processor. Mention important features of Harvard architecture and illustrate its advantage in Digital Signal Processing. (03)

c) Describe about warping and pre warping. (02)

x-x-x