

1129

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

Time allowed: 3 Hours

Max. Marks: 50

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

x-x-x

- I. Attempt the following:-
- List any four applications of digital signal processing.
 - Determine the Z transform of unit step function.
 - What is the significance of pipelining in digital signal processors?
 - What is Gibbs phenomenon?
 - What are the advantages of bilinear transformation method for the design of HR filter? (5x2)

UNIT - I

- II. a) Explain the features of Linear, Time invariant, causal and stable systems.
b) A digital system is characterized by the difference equation
$$y(n) = x(n) - 0.5 y(n - 1) + 0.25 x(n - 1). \text{ Check the system for Linearity, Time invariance, causality and stability.} \quad (5,5)$$
- III. a) State and explain any four properties of Z transform.
b) Determine the pole zero plot for the system described by the difference equation

$$y(n) - \frac{3}{4} y(n - 1) + \frac{1}{8} y(n - 2) = x(n) - x(n - 1). \quad (5,5)$$

- IV. a) Compute the DFT for the following sequence using Radix-2 decimation in frequency FFT algorithm. $X(n) = \{1, 2, 2, 1, 1, 2, 2, 1\}$.
b) Indicate how inverse DFT can be computed by using FFT algorithm, (7,3)

UNIT - II

- V. Design a Chebyshev filter for the following specification using bilinear transformation.

$$\begin{aligned} 0.8 \leq |H_e^{(j\omega)}| \leq 1, 0 \leq \omega \leq 0.2\pi \\ |H_e^{(j\omega)}| \leq 0.2, 0.6\pi \leq \omega \leq \pi \end{aligned} \quad (10)$$

P.T.O.

(2)

VI. Design a filter using Hamming window with the specification $N=7$ of the system

$$H_d(e^{j\omega}) = e^{-j3\omega}, -\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4}; \text{ otherwise zero}$$

$$-\frac{\pi}{4} \leq \omega \leq \pi \quad (10)$$

VII. Explain the various types of addressing modes of digital signal processor with suitable example. (10)

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