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BT-6/M-20 36136

DIGITAL SIGNAL PROCESSING

Paper–EEN-312 N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. (a) Explain the basic elements of DSP System with suitable examples. (8)

(b) Determine the z-transform of the signal

$$x(n) = \begin{Bmatrix} 1, & 0 \le n \le N-1 \\ 0, & \text{elsewhere} \end{Bmatrix}. \quad (7)$$

2. (a) Determine the inverse z-transform of the signal for ROC $|z| > 1$. (8)

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

(b) State and prove time reversal property of z-transform. (7)

UNIT–II

3. (a) Define DFT and explain its properties. (8)

(b) Compute the DFT of 4 point sequence $xx() = (0\ 1\ 2\ 3)$. (7)

4. Explain in detail the Radix-2 FFT Algorithm. (15)

UNIT–III

5. Determine a direct form realization for the following linear phase filters

(a) $h(n) = \{1, 2, 3, 4, 3, 2, 1\}$
$\uparrow$

(b) $h(n) = \{1, 2, 3, 3, 2, 1\}$ (15)
$\uparrow$

6. Determine the order and the poles of a low pass Butterworth filter that has a –3 dB bandwidth of 1500 Hz and an attenuation of 40 dB at 2000 Hz. (15)

UNIT–IV

7. (a) Discuss lattice structure of FIR filter in detail. (10)

(b) Explain Jury Test. (5)

8. Write short notes on :

(a) TMS Processor Architecture.

(b) Discrete Hilbert Transform.

(c) Ladder Structure of FIR Filter. (15)