

DIGITAL SIGNAL PROCESSING

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

(5 × 20 = 100)

1. (a) Explain in detail, the various types of discrete-time systems. (20)

Or

- (b) (i) Determine the inverse Z-transform of $X(z) = 1/(1 - 5z^{-1} + 2z^{-2})$

When

(1) ROC: $|z| > 1$ and

(2) ROC: $|z| < 0.5$. (12)

- (ii) Using the residue method, determine

$x(n)$ for $x(z) = \frac{z}{[(x-1)(x-2)]}$. (8)

2. (a) Explain in detail, the properties of DFT. (20)

Or

- (b) Compute circular convolution for the following two sequences $x(n) = \{1, 3, 2, 4\}$ and $h(n) = \{1, 2, 1, 2\}$. (20)

3. (a) With suitable sketches, explain the basic network structures for IIR systems. (20)

Or

- (b) (i) Explain the parameter quantization effects in FIR systems. (10)
(ii) State and prove Telegen's theorem for digital filters. (10)

4. (a) Explain the design of IIR digital filters using Bilinear transformation method. (20)

Or

- (b) (i) Discuss the magnitude response of a low pass chebyshev filter with a suitable sketch. (20)
(a) Explain in detail chirp z-transform (CZT) algorithm to compute the DFT. (20)

Or

- (b) With a neat internal block diagram, explain the architecture and features of TMS 320 C 50 digital signal processor. (20)