

11. (a) Explain in detail Recursive and Non-Recursive discrete time systems. (16)

Or

- (b) Find the frequency response of the LTI system governed by the difference equation $y(x) - a_1 y(x-1) - a_2 y(x-2) = x(x)$. (16)

12. (a) Determine the closed form expression for frequency response $G(e^{j\omega})$ of an LTI system with impulse response given by,

$$g(n) = \begin{cases} a^n, & 0 \leq n \leq M-1 \\ 0, & \text{otherwise} \end{cases}$$

Or

- (b) Compute the DFT of each of the following :

(i) $x(n) = \delta(n - n_0)$

(ii) $y(n) = x_1(n) x_2(n)$.

13. (a) Derive the algorithm to obtain FFT in decimation in frequency and draw the flow chart for data length $N=8$. (16)

Or

- (b) (i) Describe the method of design of FIR filters using window technique. (8)

- (ii) Discuss the different impulse response of a linear phase filters. (8)

14. (a) (i) Discuss the round off effects in Digital filters. (10)

- (ii) Compare FIR and IIR filters. (6)

Or

- (b) Explain the designing methods of IIR filters from analog filters. (16)

15. (a) Explain interpolator and decimator with applications of multivariate signal processing. (16)

Or

- (b) (i) Using DFT find power spectrum of $x(n) = 5 \sin(2\pi(0.175)n)$ for $n = 0, 1, \dots, 7$. (8)
- (ii) Find auto correlation of $\{1, 0, 1, 2, 3, 0, 1, 2\}$. (8)

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