

QP Code : 31256

(3 hours)

Total Marks: 80

- N.B. 1. Question No. 1 is compulsory.
2. Attempt any **three** questions out of remaining.
3. Assume suitable data if **necessary** and justify the assumptions.
4. Figures to the **right** indicate full marks.

- Q1 A For the given causal sequences $x(n) = \{8, 9, 2, 3\}$ and $h(n) = \{4, 3, 6\}$ find the cross correlation. 05
B State the condition for stability of LTI system and determine for the given discrete time system $h(n) = (0.3)^n u(n) + 5\delta(n)$, is stable or not. 05
C Differentiate IIR and FIR systems. 05
D For the causal signal $x(n) = \{2, 2, 4, 4\}$ compute four point DFT using DIT-FFT. 05
- Q2 A Check whether following system $y(n) = 2x(n-1) + x(2n)$ is: 10
1. Linear or non Linear 2. Causal or non-causal
3. Time variant or Time invariant 4. Static or Dynamic
- B Draw the radix 2 DIT flow graph and find the DFT of the sequence $x(n) = \{10, 11, 8, 5\}$ using FFT flow graph. 10
- Q3 A For $x(n) = \{2 \ 3 \ 4 \ 5 \ 1 \ 3\}$, plot the following Discrete Time signals: 10
 \uparrow
1.) $x(n-1)$ 2.) $x(n)u(-n)$ 3.) $x(n-1)u(-n-1)$
4.) $x(-n)u(n)$ 5.) $x(2n)$
- B Determine whether or not the following signals are periodic. 10
If periodic specify its fundamental period.
1. $x(n) = \sin(0.25n\pi + 0.4)$
2. $x(n) = \cos(0.5n\pi) + \sin(0.25n\pi)$
- Q4 A For the FIR digital filter with impulse response given by 10
 $h(n) = 2\delta(n) + 3\delta(n-1) + 4\delta(n-3) + \delta(n-4)$ sketch the magnitude response of the filter.
- B State any five DFT properties. 10

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- Q5 A Find circular convolution of $x_1(n) = \{5, 6, 2, 1\}$ and $x_2(n) = \{3, 2, 1, 4\}$ by computing DFT of $x_1(n)$ and $x_2(n)$. 10
- B Compute Linear Convolution of causal sequence $x(n) = \{7, 6, 4, 5, 2, 4, 5, 2, 3\}$ and $h(n) = \{1, 2, 3, 1\}$ using fast overlap save method. 10
- Q6 A Write a detailed note on Carls' Correlation Coefficient Algorithm. 10
- B Write a detailed note on DSP Processor and Architecture. 10
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