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Q.P. Code :24726

[Time: 03 Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Q.1 is compulsory.
 2. Attempt any three questions from remaining questions
 3. Assume suitable data wherever required.

- Q.1 a) Find even and odd components for $h(n) = (2, 3, 1, 2, 3)$ 05
b) Find z-transform of the following $x(n) = \cos \omega n u(n)$. 05
c) Find the sequence for: $-x(n) = \delta(n) + 2\delta(n-1) - \delta(n-2)$. 05
d) Give proof of any two properties of Z-Transform. 05
- Q.2 a) Identify the filter based on its pass band by analytical method. Draw pole-zero plot: 10
 $H(z) = \frac{1}{1+0.08z^{-1}}$
b) Find $X(K)$, using DIT-FFT algorithm for given sequence: 10
 $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$.
- Q.3 a) Sketch the signals using step and ramp signals. 10
 $x(t) = t u(t) - (t-1)u(t-1) + u(t-2) - 3u(t-3)$
 $x(t) = 2\delta(n) + 3\delta(n-2)$
b) System is described by the difference equation: 10
 $y(n) = y(n+1) + x(n) + x(n-1)$
Find: 1) Transfer function 2) Impulse response
- Q.4 a) Find out circular convolution to the following sequence using DFT and IDFT: 10
 $x(n) = \{1, 1, 2, 1\}$ $h(n) = \{1, 2, 3, 4\}$.
b) Classify the following systems as linear / nonlinear, variant / invariant, causal / non-causal and 10
dynamic / static
1 $y(n) = e^{x(n)}$
2 $y(n) = A x(n) + B$
- Q.5 a) Find Z-inverse transform of the following: 10
 $X(z) = \frac{1}{1-1.5z^{-1}+0.5z^{-2}}$
For:
1. Causal system
2. Anti-causal system
3. Stable system

b) Find out linear convolution of the following:

$$x(n) = \{1,2,3\} \quad h(n) = \{1,2\}$$

Find out linear convolution using circular of the following:

$$x(n) = \{1,2\} \quad y(n) = \{2,3,4\}$$

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Q.6

Write short note on **any Two**

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1. Properties of DFT
2. Min, Max on Mix phase system
3. Significance of ROC in z- transform with examples
4. Types of signals
