

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 $h(n) = (2, 3, \underset{\uparrow}{1}, 2, 3)$ 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
 $x(t) = t u(t) - (t-1)u(t-1) + u(t-2) - 3 u(t-3)$.
 $x(t) = 2 \delta(n) + 3 \delta(n-2)$
 - 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: 10

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

Find out linear convolution using circular of the following: 10

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

Q.6 Write short note on **any Two** 20

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