1. How to represent an arbitrary sequence from delayed and weighted impulse sequence? Explain Briefly. 7

2. State whether the following system is linear, causal, time-invariant and stable: 8

$$y(n) + y(n-1) = x(n) + x(n-2)$$

1. State and Prove the convolution property of Z-transform. 6

2. Using long division, determine the inverse Z-transform for the following function: 6

$$X(z) = \frac{z^2 + 2Z}{z^3 - 3z^2 + 4z + 1}$$

3. A causal LTI system is defined by the difference equation: 8

$$2y(n) - y(n-2) = x(n-1) + 3x(n-2) + 2x(n-3)$$

Find the transfer function and frequency response of the system.

1. Compute the linear convolution of the following signals.

$x(n) = \{2,1,0,5\}$ $h(n) = \{2,0,1,1\}$

2. Compute the circular convolution of the following signals.

$x(n) = \{1,0,2,0\}$ $h(n) = \{2,-1,-1,2\}$

4
2
2
1 2

1. What is FFT? Why it is needed?
2. Describe the divide and conquer method for the DIT FFT algorithm.