

“Please check whether you have got the right question paper.”

- i) Solve any three questions from each section.
- ii) Assume suitable data wherever necessary.

**SECTION-A**

- Q.1 a) State & explain the properties of convolution. 06  
 b) Compute the convolution  $y(n) = x(n) * h(n)$  of the following signal.  $x(n) = \{1, 2, 0, 2, 1\}$   $h(n) = x(n)$  07
- Q.2 a) Determine whether the following systems are. 09  
 1) Causal or non causal  
 2) Linear or non linear  
 3) Time variant or invariant  
 i)  $y(n) = \cos[x(n)]$   
 ii)  $y(n) = x[-n + 2]$   
 iii)  $y(n) = x[2n]$
- b) Differentiate the following signals with suitable example. 04  
 i) Multichannel and multidimensional  
 ii) Periodic and aperiodic  
 iii) Symmetric and asymmetric  
 iv) Energy & power
- Q.3 a) State and explain sampling theorem. 07  
 b) Determine the zero input response of system described by second order difference equation 06  

$$y(n) - \frac{5}{6}y(n-1) + \frac{1}{6}y(n-2) = 0$$
- Q.4 a) Determine the z-transform and ROC of the signal.  $x(n) = [3(2^n) - 4(3^n)]u(n)$  06  
 b) State & explain the properties of z-transform. 07
- Q.5 Write short note on (Any Two)  
 1) Block –diagram representation of discrete time system. 07  
 2) Quantization of continuous time signals 07  
 3) Correlation 06

**SECTION-B**

- Q.6 a) Find 8 point DFT of following sequence. 07  

$$x(n) = \{1, 1, 1, 1, 1, 1, 0, 0\}$$
  
 b) Compute 1DFT of following sequence 06  

$$x(k) = \{5, 0, 1 - j, 0, 1, 0, 1 + j, D\}$$
- Q.7 a) Determine direct form I & II realization for IIIrd order IIR filter. 07  

$$H(Z) = \frac{z^{-1} - 3z^{-2}}{(10 - z^{-1})(1 + 0.5z^{-1} + 0.5z^{-2})}$$
- b) State and explain the advantages and disadvantage of digital filters. 06
- Q.8 a) Perform autocorrelation of sequence  $x(n) = \{-3, -2, 1, 4, 8, -3\}$  07  

$$\uparrow$$
  
 b) Differentiate between auto correlation & cross correlation. 06
- Q.9 a) State and explain the properties of fourier transform. 07  
 b) Give the relationship between z-transform & fourier transform. 06
- Q.10 Write Short note(Any Two)  
 a) Structure of FIR filter 07  
 b) Structure of IIR filter 07  
 c) Relationship of DFT with other transforms 06