

**Time: 1½ Hours**  
**M.Marks:30**

Q1 (a) Determine whether the following discrete signals are periodic or not. If periodic, determine the fundamental period

- (i)  $\cos\left(\frac{\pi}{2} + n\right)$  (ii)  $1 + e^{\frac{j2\pi n}{3}} - e^{\frac{j2\pi n}{7}}$  (03)  
CO1(LOQ)
- (b) What are the various operations on signals? Illustrate with an example. (03)  
CO1(LOQ)
- (c) Differentiate between continuous time and digital signals. (03)  
CO1(LOQ)

- Q2 (a) Differentiate between deterministic and probabilistic signals. (03)  
CO1(IOQ)
- (b) Check the following signals are power signals or energy signals also calculate the energy or power (04)  
CO1(LOQ)
- (i)  $x(t) = \text{rect}\left(\frac{t}{T_0}\right)$  (ii)  $x(n) = u(n)$
- (c) Prove that the overall impulse response for two LTI systems with impulse responses  $h_1(n)$  and  $h_2(n)$  is given by  $h_1(n)*h_2(n)$  (03)  
CO1(IOQ)

- Q3 (a) Determine whether the following system linear, stable, causal and time invariant using appropriate tests:  $y(n) = 2x(n+1) + [x(n-1)]^2$  (03)  
CO1(HOQ)
- (b) Find the convolution of following sequence graphically or analytically  $x(n] = \{1, 2, 2, 3\}$  and  $h(n) = \{2, -1, 3\}$  (03)  
CO1(IOQ)

- (c) Determine the solution of the difference equation  
 $y(n) = \frac{5}{6}y(n-1) - \frac{1}{6}y(n-2) + x(n)$  for  $x(n) = 2^n u(n)$