

J.C. Bose University of Science and Technology, YMCA, Faridabad
B.Tech Vth Sem (Computer Engg.)
Class Test 1st
September, 2025
Signal and Systems
ESC-501

Time: 1½ Hours
M.Marks:30

Note: All the questions are compulsory. Assume the suitable date if necessary

- Q1** (a) Determine whether the following discrete signals are periodic or not. If periodic, determine the fundamental period (04)
 CO1(IOQ)
- $(i) \cos\left(\frac{\pi}{2} + n\right)$ $(ii) 1 + e^{\frac{j2\pi n}{3}} - e^{\frac{j2\pi n}{7}}$
- (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: (03)
 CO1(HOQ)
- $y(n) = 2x(n+1) + [x(n-1)]^2$
- (b) Find the convolution of following sequence graphically or analytically (03)
 CO1(IOQ)
- $x(n) = \{1, 2, 2, 3\}$ and $h(n) = \{2, -1, 3\}$
-
- (c) Determine the solution of the difference equation (04)
 CO1(HOQ)
- $y(n) = \frac{5}{6}y(n-1) - \frac{1}{6}y(n-2) + x(n)$ for $x(n) = 2^n u(n)$