LAHORE UNIVERSITY OF MANAGEMENT SCIENCES
Department of Electrical Engineering

EE310 Signals and Systems
Quiz 1

Name: _____

Campus ID: _____

Total Marks: 10
Time Duration: 10 minutes

Question 1 (2 marks)

Determine whether each discrete-time signal is periodic. If periodic, find the *smallest positive period* N_0.

(a) $x_1[n] = \sin\left(\frac{\pi}{5}n\right)$

(b) $x_2[n] = \cos(2n)$

Question 2 (2 marks)

Evaluate the following:

(a) $\displaystyle\int_{-\infty}^{\infty} (t^2 + 1)\,\delta(t - 2)\,dt$.

(b) $\displaystyle\int_{-\infty}^{\infty} \sum_{k=-1}^{1} \delta(k - t)\,dt$

Question 3 (3 marks)

Consider the signal

$$x(t) = \begin{cases} t, & 0 \le t \le 1, \\ 1, & 1 < t \le 2, \\ 0, & \text{otherwise.} \end{cases}$$

(a) Plot the signal.

(b) Find E_∞ (total energy) and P_∞ (average power).

Question 4 (3 marks)

The discrete-time signal $x[n]$ is shown below.

(a) Express $x[n]$ using a sum of shifted discrete-time impulses $\delta[n - k]$.

(b) Express $x[n]$ using unit steps $u[n]$ (and constants), with no deltas.