National Institute of Technology Andhra Pradesh
Department of Electronics and Communication Engineering
EC 202: Signals and Systems
Assignment 1

1. Determine whether or not each of the following signal is periodic ? If the signal is periodic, find its fundamental time period.
   (a) $x(n) = \sum_{k=-\infty}^{\infty} \{\delta(n-4k) - \delta(n-1-4k)\}$
   (b) $x(n) = 1 + e^{j4\pi n/7} - e^{j2\pi n/5}$
   (c) $x(t) = 2\cos(10t+1) - \sin(4t-1)$.

2. Consider the discrete time signal

$$x(n) = 1 - \sum_{k=3}^{\infty} [\delta(n-1-k)].$$

   Determine the values of the integers M and n_0 so that $x[n]$ may be expressed as

$$x[n] = u[Mn - n_0].$$

3. Determine the energy and power for each of the following signals;
   (a) $x_1(t) = e^{-2t}u(t)$
   (b) $x_2(t) = e^{j(2t+\pi/4)}$
   (c) $x_3(t) = \cos(t)$
   (d) $x_1(n) = \left(\frac{1}{2}\right)^n u(n)$
   (e) $x_2(n) = e^{j(\pi/2n+\pi/8)}$
   (f) $x_3(n) = \cos(\frac{\pi}{4}n)$