Department of Electrical Engineering
National Institute of Technology Srinagar

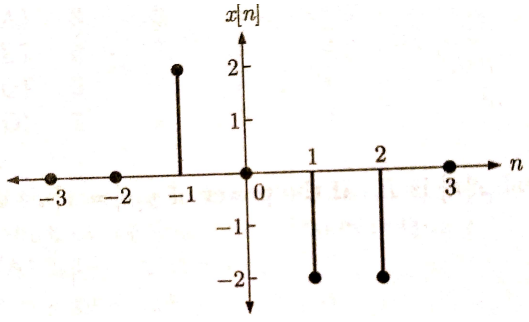
Tutorial I

Course Title: Digital Signal processing Semester: Sixth (6^{th})
Date: 23.04.2020
Course Code: ELE-605

Q.1) Find the even and odd parts of the following signals:

1. x[n]= (6, **4**↑, 2, 2)
2. x[n]= (-4, 5, 1, **-2**↑, -3, 0, 2)
3. x[n]= $a^{|n|}$
4. x[n]= $na^n u[n]$

Q.2) Consider a signal x[n] as shown in the figure below



1. If x[n] is transformed into $y[n] = \frac{2}{3}x[-n-2]-2$, y[n] is
2. What is y[n]=x[-n/3]

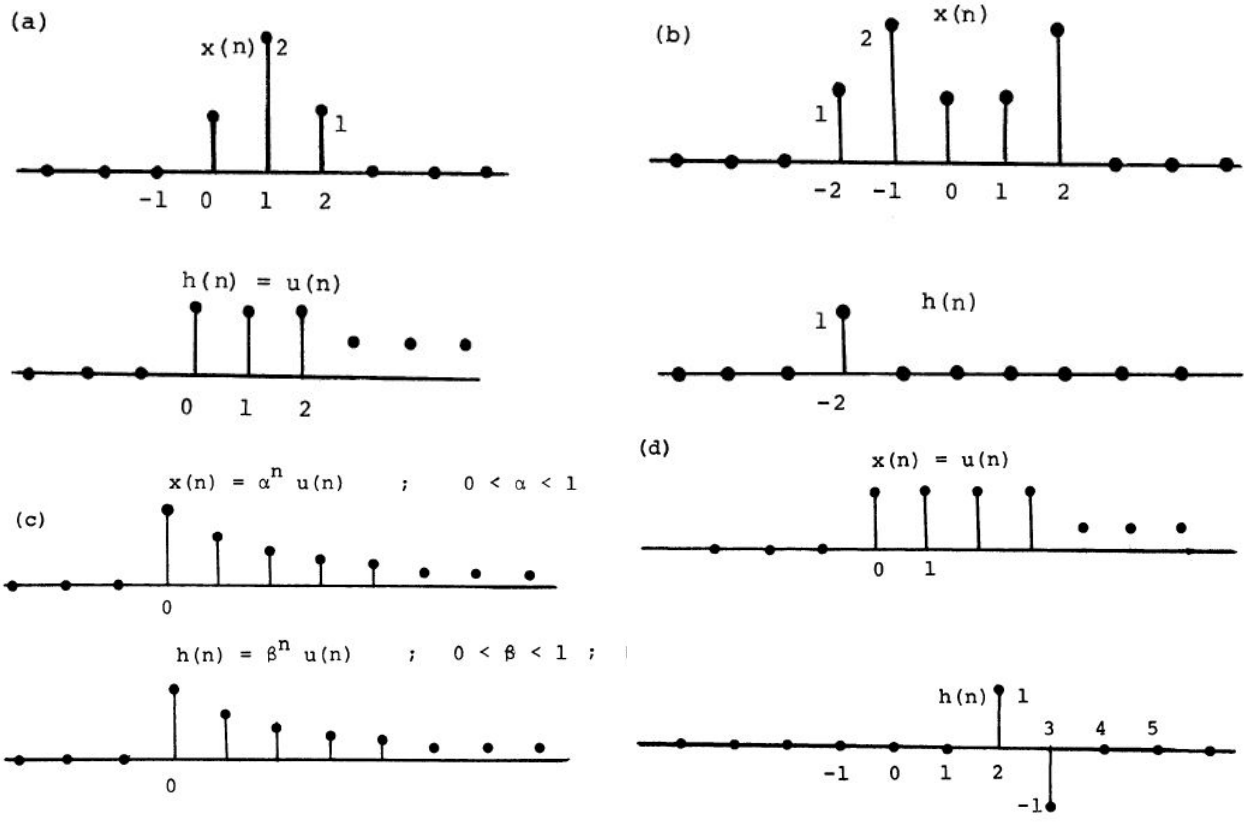
Q.3) Determine whether or not each of the following sequences is periodic. If your answer is yes, determine the period.

1. x[n]= $A\cos\left(\frac{3\pi}{7}n - \frac{\pi}{8}\right)$
2. x[n]= $e^{j\left(\frac{n}{8}-\pi\right)}$

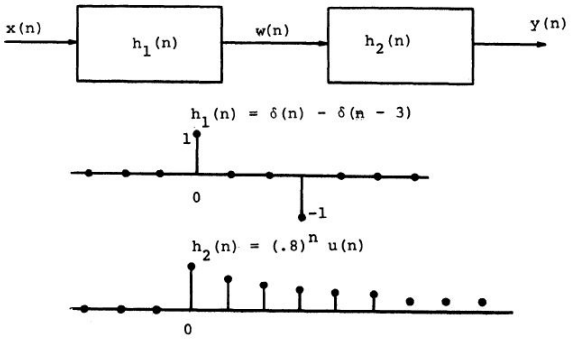
Q.4) For each of the following systems, y(n) denotes the output and x(n) the input. Determine for each whether the specified input-output relationship is linear, shift-invariant and causal.

1. y[n]= $2x[n]+3$
2. y[n]= $x[n]\sin\left(\frac{2\pi}{7}n+6\right)$
3. y[n]=$(x[n])^2$
4. y[n]= $\sum_{m=-\infty}^{n} x[m]$

Q.5) For each of the following pairs of sequences, x(n) represents the input to an LTI system with unit-sample response h(n). Determine each output y(n). Sketch your results.



Q.6) The system shown below contains two LTI subsystems with unit sample responses h_1 (n) and h_2 (n), in cascade. Consider x[n] as a unit step.



NOTE : Submit the tutorial sheet to **aaqi072@gmail.com** (by 10^{th} May) and for any queries.