Zewail City for Science and Technology Nanotechnology Engineering Program Assignment 2 NANENG 461 Communication Theory and Systems Spring 2020

## Problem 1

A discrete-time signal is shown in the figure, Sketch and label carefully each of the following signals:

a- 
$$X[n-4]$$

b- 
$$X[3-n]$$

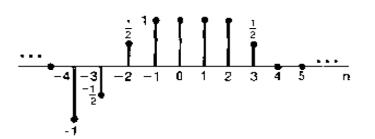
c- 
$$X[3n]$$

d- 
$$X[3n + 1]$$

e- 
$$X[n]u[3-n]$$

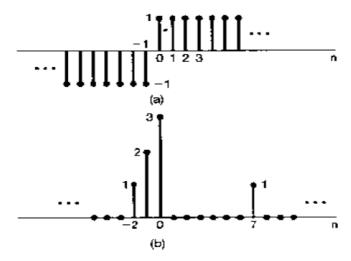
f- 
$$X[n-2]\delta[n-2]$$

g- 
$$\frac{1}{2}X[n] + \frac{1}{2}(-1)^nx[n]$$



## Problem 2

Determine and sketch the even and odd parts of the signals in following figures, label your sketches carefully.



## Problem 3

Determine whether the signal is periodic or not

a- 
$$X[n] = cos(\frac{8\pi}{7}n + 2)$$

b- 
$$X(t) = j e^{j10t}$$

$$c- X[n] = e^{j\frac{8\pi}{35}n}$$

d- 
$$X[n] = sin (0.2n + \pi)$$

e- 
$$X(t) = 2e^{j\left(t + \frac{\pi}{4}\right)}u(t)$$