University of Victoria
Department of Electrical and Computer Engineering
ELEC 310-Spring 2010
Assignment 1 worth 3% of final course mark

Issued: January 15, 2009 **Due: January 22, 2010, 4:00 pm**

Please use the ELEC 310 drop box by the ELW 2nd floor elevator
Questions 1, 2, and 3 are selected from Oppenheim and Schafer, third edition.

Question1.
Problem 2.21 a), b), c), d), e).
NOTE: Please use graphic paper for the required signal sketches.

Question 2.
Problem 2.23 b), c), d).
NOTE: 2.23 a) has been solved in class.

Question 3.
Problem 2.10 c), d). The result in 2.10 a) is supposed to be known.
Note: 2.10 a) and b) have been solved in class.

Question 4.
A linear time-invariant system has the impulse response h[n]=u[n]. Determine the response y[n] of the system to the input x[n] described as:

$$x[n]=\begin{cases}0 & n<0\\ a^n & 0\le n\le N_1\\ 0 & N_1<n<N_2\\ a^{n-N_2} & N_2\le n\le N_2+N_1\\ 0 & N_2+N_1<n\end{cases}$$ where 0<a<1, and N_1, N_2 positive integers with $N_1 < N_2$

Question 5.

Determine whether or not each of the following signals is periodic. If the signal is periodic, determine its fundamental period.

a) $x[n]=\cos\left(\frac{n}{8}-\pi\right)$

b) $x[n]=2\cos\left(\frac{\pi}{4}n\right)+\sin\left(\frac{\pi}{8}n\right)-2\cos\left(\frac{\pi}{2}n+\frac{\pi}{6}\right)$

c) $x[n]=1+e^{j4\pi n/7}-e^{j2\pi n/5}$