Homework 2

Due Feb 20 at 11:59pm **Points** 10 **Questions** 10
Available Feb 7 at 8am - Feb 20 at 11:59pm **Time Limit** None
Allowed Attempts Unlimited

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Attempt History

	Attempt	Time	Score
KEPT	Attempt 2	12 minutes	10 out of 10
LATEST	Attempt 2	12 minutes	10 out of 10
	Attempt 1	28 minutes	7 out of 10

Correct answers are hidden.

Score for this attempt: **10** out of 10
Submitted Feb 18 at 7:32pm
This attempt took 12 minutes.

Question 1

1 / 1 pts

The periodic discrete time signal cos(0.5 πk + 0.2) has a period of N_0 samples according to the following equation:

$$N_0 = m\left(\frac{2\pi}{\Omega}\right)$$

where Ω is 0.5 π. Find the value of N_0 and the **minimum** integer value of m.
Note: N_0 represents the number of samples and it must be an integer.
(a). m=1, N_0=4 (b). m=10, N_0=40 (c). m=100, N_0=400

- (a) a
- ( ) b

c

Question 2

1 / 1 pts

The periodic discrete time signal cos(0.6 πk + 0.2) has a period of N_0 samples according to the following equation:

$$N_0 = m\left(\frac{2\pi}{\Omega}\right)$$

where Ω is 0.6 π. $N_0 = m\left(\frac{2\pi}{0.6\pi}\right) = m\left(\frac{10}{3}\right)$

Find the value of N_0 and the **minimum** integer value of m.

Note: N_0 represents the number of samples and it must be an integer.

(a). m=1, N_0=3 (b). m=3, N_0=10 (c). m=100, N_0=333.33

a

b

c

Question 3

1 / 1 pts

Rational number can be defined as p/q where both p and q are **integers**.

Which statement about the discrete time signals shown below is correct?

(a). sin(0.5 πk + 0.2) is periodic because 2 π/(0.5 π) =4 and 4 is a rational number.

(b). sin(0.5 k + 0.2) is periodic because 2 π/(0.5) = 4 π and 4 π is a rational number.

(c). None of the above.

- (●) a
- ( ) b
- ( ) c

Question 4

1 / 1 pts

For the discrete time signal, $\cos(\Omega \pm 2\pi m)k = \cos(\Omega k)$, and the fundamental frequency range can be reduced to the range of 0 ~ π. Determine the lowest frequency which can be used to describe the sinusoid of the frequency 22.9 π.

(a). 22.9 π - 2 π x 11 = 0.9 π

(b). 22.9 π - 2 π x 10 = 2.9 π

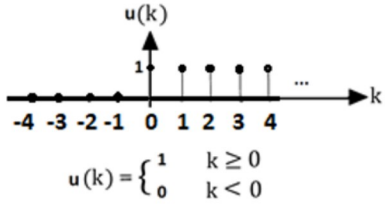
(c). 22.9 π - 2 π x 5 = 12.9 π

- (●) a
- ( ) b
- ( ) c

Question 5

1 / 1 pts

The discrete time step function signal u(k) is defined below:



For the discrete time signal f[k] = (0.8^k) u[k], which statement below is correct?

(a). When k=-1, u[k]= u[-1] = 0, f[k]=f[-1] = 0.8^{-1} u[-1] =1/0.8.

(b). When k=0, u[k]= u[0] = 1, f[k]=f[0] = 0.8^{0} u[0] = 1 x 1 = 1.

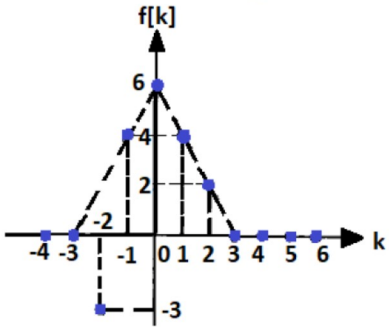
(c). When k=1, u[k]= u[1] = 0, f[k]=f[0] = 0.8^{1} u[1] = 0.8 x 0 = 0.

- a
- b
- c

Question 6

1 / 1 pts

For the discrete time signal shown below, find the signal energy.



(a). $E = f[-4]^2 + f[-3]^2 + f[-2]^2 + f[-1]^2 + f[0]^2 + f[1]^2 + f[2]^2 + f[3]^2 + f[4]^2 + f[5]^2 + f[6]^2$
$= 0 + 0 + (-3)^2 + 4^2 + 6^2 + 4^2 + 2^2 + 0 + 0 + 0 + 0$
$= 9 + 16 + 36 + 16 + 4 = 81$

(b). $E = f[-4] + f[-3] + f[-2] + f[-1] + f[0] + f[1] + f[2] + f[3] + f[4] + f[5] + f[6]$
$= 0 + 0 + (-3) + 4 + 6 + 4 + 2 + 0 + 0 + 0 + 0$
$= 13$

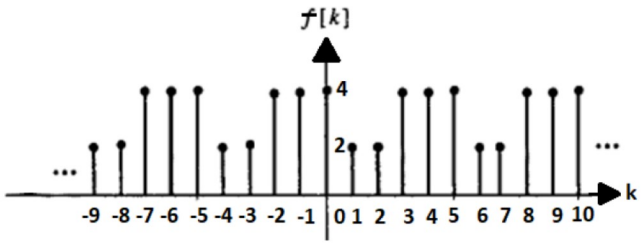
(c). $E = |f[-4]| + |f[-3]| + |f[-2]| + |f[-1]| + |f[0]| + |f[1]| + |f[2]| + |f[3]| + |f[4]| + |f[5]| + |f[6]|$
$= 0 + 0 + 3 + 4 + 6 + 4 + 2 + 0 + 0 + 0 + 0$
$= 19$

- (•) a
- ( ) b
- ( ) c

Question 7

1 / 1 pts

The following discrete time signal has a period of 5 which means the signal repeats after every 5 samples. f[1]= f[2]=2, f[3]=f[4]=f[5]=4. Find the power of this signal.



(a). $P = \frac{1}{5} \times (2^2 + 2^2 + 4^2 + 4^2 + 4^2) = \frac{56}{5}$

(b). $P = \frac{1}{5} \times (2 + 2 + 4 + 4 + 4) = \frac{16}{5}$

(c). $P = \frac{1}{10} \times (2 + 2 + 4 + 4 + 4 - 2 - 2 - 4 - 4 - 4) = 0$

- (•) a
- ( ) b
- ( ) c

Question 8

1 / 1 pts

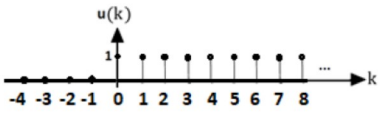
The continuous-time sinusoids f(t) = 10 cos (11 π t + 0.2 π) is sampled with a sampling interval of T=0.1 second. Find the expression for the resulting discrete-time sinusoid.
(a). f[k] = 10 cos (11 π k T + 0.2 π) = 10 cos (1.1 π k + 0.2 π)
(b). f[k] = (10 x T) cos (11 π k + 0.2 π) = cos (11 π k + 0.2 π)
(c). Both (a) and (b) are wrong.

- (●) a
- ( ) b
- ( ) c

Question 9

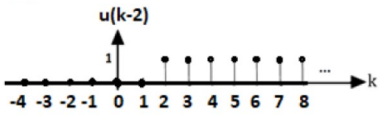
1 / 1 pts

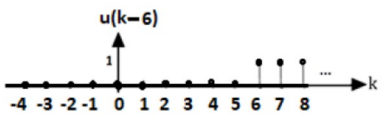
The discrete time step function signal u(k) is defined below:



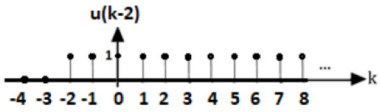
$$u(k) = \begin{cases} 1 & k \geq 0 \\ 0 & k < 0 \end{cases}$$

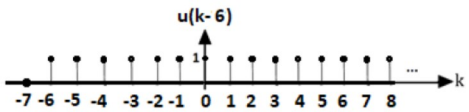
Which figures below represents the discrete signal u[k-2] and u[k-6]?
(a).





(b).





(c). None of the above.

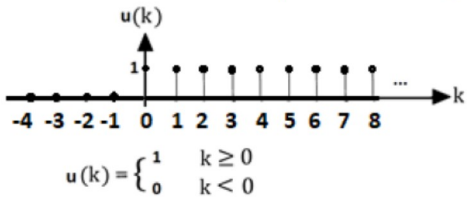
- (●) a
- ( ) b

c

Question 10

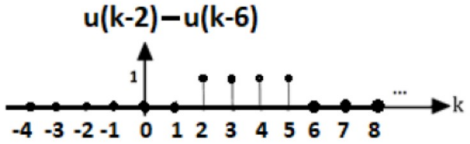
1 / 1 pts

The discrete time step function signal u(k) is defined below:

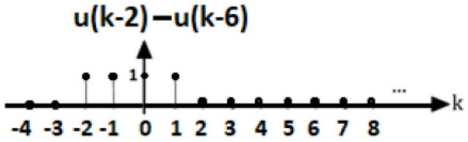


Which figures below represents the discrete signal u[k-2] - u[k-6]?

(a).



(b).



(c). None of the above.

a

b

c

Quiz Score: **10** out of 10