

# Spring 2019 - Quiz 4

## ECE 301: Signals and Systems

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### Problem 1

Let  $x[n]$  be a discrete periodic signal with fundamental period  $N$  equal to 15. The discrete Fourier Series coefficients of  $x[n]$  are  $a_k$  as given.

$$a_k = \begin{cases} 2, & k = 0 \\ -1, & 1 \leq k \leq 6 \\ 1, & 7 \leq k \leq 12 \\ 4, & 13 \leq k \leq 14 \end{cases}$$

Find the following:

a  $\sum_{n=60}^{74} x[n]$

b Average power of the signal.

c  $x[90]$

d  $x[91]$

e Fourier Series Coefficients of  $x[n + 1]$ .

## Problem 2

Consider an LTI system with impulse response  $h[n] = (\frac{1}{4})^n u[n]$ . The input to the system is  $x[n] = \cos(\frac{3\pi n}{10})$ . Find the Fourier series coefficients of the output signal  $y[n]$ .