EE 362: Signals and Systems Name:----------

Spring 2019

Homework #13 (Due: Tuesday, May 7, 2019)

- Circle or box your answer (don't forget units).
- **Show** your steps.
- Use 8.5" x 11" paper, and trim off any ragged edges.
- **Staple** your work together and write your name neatly.

Problems 4 to 7 are from your textbook (Edward W. Kamen and Bonnie S. Heck, Fundamentals of Signals and Systems Using the Web and MATLAB, 3rd Ed, Prentice Hall, 2006).

1. A discrete-time signal $x[n]$ has z-transform [5 points]

$$X(z) = \frac{z}{8z^2 - 2z - 1}$$

Determine the z-transform $V(z)$ of the following signals:

(a) $v[n] = x[n-4]u[n-4]$

(b) $v[n] = \cos(2n)\, x[n]$

(c) $v[n] = e^{3n}x[n]$

(d) $v[n] = n^2 x[n]$

(e) $v[n] = x[0] + x[1] + x[2] + \cdots + x[n]$

2. Compute the z-transform of the following discrete-time signals: [4 points]

(a) $x[n] = \delta[n] + 2\delta[n-1]$

(b) $x[n] = e^{0.5n}u[n] + u[n-2]$

(c) $x[n] = (0.5)^n nu[n]$

(d) $x[n] = u[n] - nu[n-1] + (1/3)^n u[n-2]$

3. Using the transform pairs in Table 7.3 and the properties of the z-transform in Table 7.2, determine the z-transform of the following discrete-time signals: [3 points]

(a) $x[n] = \cos^2(\Omega n)u[n]$

(b) $x[n] = n\sin(\Omega n)\, u[n]$

(c) $x[n] = ne^{-bn}\cos(\Omega n)\, u[n]$

4. Work out problem 7.8. [2 points]

5. Work out problem 7.9 without the MATLAB part. [8 points]

6. Work out problem 7.32, parts (a) and (b). [0 points]

7. Work out problem 7.41. [0 points]

Problems 6 and 7 will not be graded.