**ECE 381 Introduction to Digital Signal Processing**

**Spring 2020, 1:30pm – 2:45pm TR**

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**HW #6 Due on 4/24/2020**

1). 8.1-2

2). 8.1-10

3). 9.2-3 a) - d)

4). If a continuous time signal *xc*(*t*) is bandlimited to 5kHz, the signal is sampled at a sampling rate of 20kHz to obtain a discrete-time signal *x*[*n*]. What is the highest frequency component in *x*[*n*]?

5) Which of the following statements is true?

(a). The spectrum of an aperiodic continuous signal is aperiodic and discrete.

(b). The spectrum of a periodic continuous signal is periodic and continuous.

(c). The spectrum of a periodic discrete sequence is periodic and discrete.

(d). The spectrum of a periodic continuous signal is periodic and discrete.

(e). None of the above.

6). We are using *N*-point DFT to compute linear convolution for two sequences *x*[*n*] and *h*[*n*], where the length of *x*[*n*] is 10 and the length of *h*[*n*] is 23. What is the minimum value for *N* that can avoid time aliasing?

7). Two finite length signals, *x1*[*n*] and *x2*[*n*] are given as:

*x1*[*n*] = 2*u*[*n*] – 2 *u*[*n-*6]

*x2*[*n*] = *u*[*n*] – *u*[*n-*4]

Let *x*3[*n*] be the 6-point circular convolution of *x1*[*n*] and *x2*[*n*], and *y*[*n*] be the linear convolution of *x1*[*n*] and *x2*[*n*]

1. Determine *y*[*n*].
2. Determine *x*3[*n*].