EE431 Test I: Student Objectives Review Sheet

Test 1 will consist of 1 question from each of the following four areas:

I. **Sampling sinewaves** (PS4, CP4)
- Given a continuous time (CT) sinewave x(t) and sampling frequency f_s
  - convert to a DT x[n], find the DT frequency $0 \le \omega \le \pi$
- Given a DT sinewave x[n]
  - convert to a CT x(t), find the CT frequency $0 \le \Omega \le f_s/2$
- Aliasing
  - Given a continuous time (CT) function with many sinewaves find the lowest sampling frequency $f_s$that prevents aliasing
  - Given a CT sinewave, find the f_s that creates a given ω using aliasing

II. **Signals** (CP3, PS3)
- Be able to describe the type symmetry (cs, ca, pcs, pca) given a signal in any of these notations
  - Formula, e.g. x[n] = |n|+5
  - Stem plot
  - Vector listing of elements, e.g. [-1 3+j 0 3-j -1]
    ↑
- Be able to complete a signal described by a vector of partially-given values to make it have a given symmetry

III. **Systems** (CP2, PS2)
- Be able to convert from block diagram → DE
- Be able to evaluate the output of a block diagram manually given a few input samples
- Be able to convert from a block diagram → first few samples of h[n] (CP2, PS2 using impulse input)
- Be able to convert from DE to first few samples of h[n]

IV. **Convolution** (PS6, CP6)
- Given an x[n] and h[n], find y[n] using
  - graphical convolution
  - Matlab

In addition, the following terms may be embedded into any of the above four questions:

Signal Terms: Right-sided, left-sided, dual-sided, finite length

System Terms: Given a system h[n] or DE describe it as being
- BIBO, causal, linear, time invariant, order

You may bring
- Calculator
- 1 3x5 notecard, both sides, your own work

To study, use the CP and PS problems listed. Try making up your own problems; you can learn a lot by trying to create a signal with periodic conjugate symmetry, or trying to alias a CT signal of one frequency down to a different frequency, for example!