

## **ME 360: FUNDAMENTALS OF SIGNAL PROCESSING, INSTRUMENTATION, AND CONTROL**

### **Experiment No. 2 Signal Conditioning and Analog-to-digital Conversion Issues Pre-lab Questions**

**These short answer questions must be completed and turned in at the beginning of the laboratory period.**

1. What is the resolution (expressed as a voltage) of a  $\pm 5$  V, 16-bit, digital-to-analog converter (DAC)? (Note the one used in the lab is a  $\pm 10$  V 12-bit DAC)
2. What three methods of waveform reconstruction are discussed in the Laboratory 2 write up? All else being equal, which one yields the smallest reconstruction error? Which one yields the largest error?
3. If the sampling rate is 2500 samples per second, at what frequency does aliasing begin?
4. If an 1555-Hz sine wave is sampled at the rate of 2000 samples per second, what will be the frequency of the reconstructed waveform?
5. The output of the digital-to-analog converter produces multiple tones in the right speaker of the earphone. What is the origin of the lowest frequency tone? What is the origin of the higher frequency tone?

6. How would you measure the frequency of a reconstructed waveform?
  
7. If the ADCs in the lab have as an input a 200Hz 1Vpp sine wave, what sample period, (1/sample rate) should be chosen so the computer collects 30 samples per period.