PHYS 1320: SPECIALTY LABS 1-5 SPRING 2001

Prelab 1: Time & Frequency Plots

1) Draw the time and frequency- domain graphs for the clarinet.
2) Draw the time and frequency- domain graphs for a trumpet.
3) Comment on the prominent differences.

Prelab 2 - Wave Tank

1) List the 4 properties of waves.
2) For each, describe an experiment that can measure/verify this property for light waves.
3) Repeat the above for sound waves.

Prelab 3 - Resonant Flame Tube

a) Consider the Table 1 in your text, p. 44. Sort each entry into {solid, liquid, gas}, and then sub-sort based upon density. For the gasses, compute the AMU of each gas, and sort according to AMU.
WHAT PATTERS DO YOU OBSERVE? Make detailed comments.

b) What is the AMU of CH_4, methane?

c) You are given the following pressure wave at f=140Hz, in a tube of length, L= 2.4m.
   a) Find wavelength and the speed of sound in the tube.
   b) Is the tube i) open at both ends, or ii) open at one end and closed at the other?

d) Fire will be involved in today's lab. What are the two main precautions that the manual says should be taken?

Prelab 4 - Vibrating Chladni Plates

1) Consider a 1-dimensional vibrating bar. Assume the center AND the edges are anti-nodes. What is the wavelength of the resonant frequency in terms of the length of the bar, L? Explain your answer and draw an example.

2) For a vibrating circular disk driven from the center, draw the first four harmonics. Estimate the wavelength of each resonance in terms of the diameter of the disk D? Does this pattern make up a harmonic series?

Prelab 5: Wave Interference

1) What instrument makes a square wave on a time-domain graph?
   What harmonics are involved in making that graph?

2) What instrument makes a saw-tooth wave on a time-domain graph?
   What harmonics are involved in making that graph?