Physics 100   Name: _____
Practice Quiz 3

1.   Suppose something is vibrated at one of its natural frequencies. Draw the wave pattern that you would
        see if the object had…

        a.   2 nodes and three antinodes

        b.   3 nodes and 3 antinodes

2.   What is the name for the sets of waves that you drew above (waves that are produced by alternating

        constructive and destructive interference)?   _____

3.   Draw the fundamental frequency and the 1st and 2nd overtone frequencies for a 1m long string that is fixed
        on both ends. For each drawing, provide the wavelength of the string wave.

        Fundamental (wavelength = _____)

        1st Overtone (wavelength = _____)

        2nd Overtone (wavelength = _____)

4.   Draw the fundamental frequency and the 1st and 2nd overtone frequencies for a 1m long pipe that is open
        on one end and closed on the other. For each drawing, provide the wavelength of the sound wave that is
        produced.

        Fundamental (wavelength = _____)

        1st Overtone (wavelength = _____)

        2nd Overtone (wavelength = _____)

5.   Define resonance and give an example of resonance.

6.   A cello's C string is 70cm long, and its fundamental frequency is 65Hz.

   a.   Draw the string in its fundamental (1st harmonic) vibrational mode.

   b.   What is the wavelength of the waves that are traveling along this string when its frequency is 65Hz? (show a full wavelength on your diagram).

   c.   What is the speed of the waves moving along the string.

   d.   To what length would you need to shorten the string in order to play a frequency o 160Hz?

Formulas:

$$V = \frac{d}{t} \qquad V = f\lambda$$

$$f = \frac{1}{T} \qquad T = \frac{1}{f}$$