

**Phy114: Electromagnetism, Waves and Radiation
for the Sports Science
Homework Problems
Set #1: Due Wednesday, February 6, 2008**

Note: Students are encouraged to work together and discuss the problems. However, each student must arrive at her/his own final answers. Show all your work. Simply copied homework will result in zero.

1. (5 points) What is the time required for one complete vibration of an ultrasonic stethoscope that operates at a frequency of 1.6 MHz?
2. (10 points) What are the periods of the lowest and highest frequencies normally audible to dogs (67 and 45,000 Hz)?
3. (10 points) Calculate the wavelengths of the lowest and highest frequency sounds normally audible to dogs (67 and 45,000 Hz), given the speed of sound to be 340 m/s?
4. (5 points) A start gun is fired at a 100 m race on a day when the speed of sound is 343 m/s and an echo is heard 0.60 s later. How far is the object that created the echo?
5. (10 points) How many times a minute does a surfer bob up and down on ocean waves that have a wavelength of 30 m and a speed of 5 m/s?
6. (10 points) What is the period of ultrasound with a wavelength of 0.22 mm in tissue if the speed of sound in tissue is 1600 m/s?