Decibel Problem Worksheet VI Name: _____
UCONN Physics Date: _____ Period ____

This sample decibel problems handout is designed to give you an idea of the type of problems you might encounter on a typical college exam. However, these are only examples. You need to think and try to problem solve. The main point is that you need to understand the decibel, and all of the reference systems and be able to convert between them.

1. A machine produces a sound with an intensity of 2.9×10^{-3} W/m^2. What would be the decibel rating if four of these machines occupy the same room? (101 dB)

2. The sound in the United Center during a Chicago Bulls basketball game in 1998 was seven times as intense as it is today. If the decibel rating today is 89 dB, then what was the intensity rating in 1998? (5.56×10^{-3} W/m^2 or 97.5 dB)

3. A sound has an intensity of 8.0×10^{-3} W/m^2 at a distance of 2.0 m from its source. What is the intensity at a distance of
   a .... 4.0 m from the source? (2.0×10^{-3} W/m^2)
   b. ... 6.0 m from the source? (8.9×10^{-4} W/m^2)
   c. ... 8.0 m from the source? (5.0×10^{-4} W/m^2)
   d. ... 24.0 m from the source? (5.56×10^{-5} W/m^2)
   e. ... 46.1 m from the source? (1.5×10^{-5} W/m^2)

4. Ben Stupid is sitting 2.0 m in front of the speakers on the stage at the Twisted Brother concert. The decibel rating of the sound heard there is 110 dB. What would be the decibel rating at a location of ...
   a. ... 4.0 m from the speaker? (104 dB)
   b. ... 6.0 m from the speaker? (100.5 dB)
   c. ... 20.0 m from the speaker? (90 dB)

5. Use the Doppler equation for a moving source to calculate the observed frequency for a 250-Hz source of sound if it is moving with a speed of ____ . (Assume that the speed of sound in air is 340 m/s.)
   a. 30. m/s towards the observer. (274 Hz)
   b. 30. m/s away from the observer. (230 Hz)
   c. 300. m/s towards the observer. (2125 Hz)
   d. 300. m/s away from the observer. (133 Hz)
   e. 320. m/s towards the observer. (4250 Hz)
   f. 335 m/s towards the observer. (1.7×10^4 Hz)