Chapter 14 Problem Set Advanced Physics II

1. Make a sketch of a sound wave.

2. Listen to the sound generator what is your hearing range? What is usually considered audible? What are the corresponding wavelengths? What is infrasonic? What is ultrasonic?

3. What factors affect the speed of sound?

4. What would happen to the speed of sound if you: increase temperature in a fluid? Increase frequency? Increase density?

5. Two loud speakers are placed one on top of the other and emit a frequency of 500.0hz. What minimum distance back would you have to move the top speaker to get destructive interference? What would happened at twice this distance?

6. Mr. L wants to attract fish in the No pond. If he sticks his head in the water and yells "Here fishy, fishy." and the fish are 50.0m away, how long will it take for the fish to hear him?

7. Mr. L is ice fishing in -50.0^{o}F at the North Pole with Dr. Skinner. (Dr. Skinner is not really fishing. He is trying to get his motorcycle started.) Their holes are .500miles apart. He sees a polar bear running at 25.0mi/hr toward Dr. Skinner. Dr. Skinner has his back turned to the bear and has no idea of looming danger. If the polar bear is 50.0ft from Dr. Skinner and Mr. L yells a warning, will Dr. Skinner hear it in time to run?

8. An Advanced Physics student is mad at the eMac they are using to gather data. He picks it up and drops it into a well. If the temperature is 10.0^{o}C and the splash is heard 2.00s after the drop, how deep is the well?

9. Mr. L yells at the student so loud that the student experiences ear pain. If the eardrum has an area of $5.0x10^{-5}m^2$, what is Mr. L's sound power? What is his decibel level?

10. The intensity level of the IMSA orchestra is 85dB and single violin is 70dB. How do the sound intensities compare?

11. An IMSA student is waiting at the Rt. 59 train platform to go to Chicago. She notices that the frequency of a passing freight train whistle is 442Hz approaching and only 441Hz receding. What is the speed of the train?

12. Mr. L is joining the IMSA science teacher rock band. He is going to play his one string guitar. If he adjusts the tension to 600.0n on the .700m and .300g string, what are the 1^{st}, 2^{nd}, and 3^{rd} harmonics?

13. It turns out Mr. L is not very good at the guitar and the band asks him to play a .55m tall pop bottle by blowing across the top. Mr. L would like to play two notes so he carefully slices off the bottom of the bottle and can get two frequencies by blowing and covering and uncovering the bottom with his hand. What are the two frequencies?

14. Given the motors on a string calculate the frequency the motor turns at.