

Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

**Honors Physics: Sound**

**Beat Frequency, Wave Interference, Velocity of a String HW**

**Conceptual Questions:**

1. What is 'beat' frequency and what does it tell you?
2. Two tuning forks are sounding out at slightly different frequencies, 252 and 257 Hz. What beat frequency will the listener hear?
3. When all the strings on a guitar are stretched to the same tension, will the velocity of a wave along the more massive bass strings be faster or slower than the velocity of a wave on the lighter strings? (look at the formula for velocity of a string)
4. To increase the velocity, and therefore the pitch of a stringed instrument, how should the player change the tension?

**Mathematical Questions:**

5. A tuning fork with a frequency of 440 Hz is played simultaneously with another fork that plays a frequency of 437 Hz. How many beats will be heard over a period of 10 seconds?

6. The waves traveling on a stretched wire travel with a velocity of 180 m/s when the tension in the wire is 110 N. If the wire has a mass of 5.60 **grams**, what is the length?
7. A 39.0 **cm** length of wire has a mass of 0.006 kg. It is stretched between two fixed supports and under a tension of 175 N.
- A. What is the velocity of this string?
  - B. What is the fundamental frequency of this wire?
  - C. What is the value of the 5<sup>th</sup> harmonic based on the fundamental frequency of part B?

**8. Combination: Doppler Effect/Beat Frequency**

Two cars are equipped with the same horn. When one car is at rest, the other car is moving towards a stationary observer at a velocity of 15.0 m/s. A beat frequency of 5.50 Hz is heard between the horns of the stationary and moving car. What is the actual frequency the two horns emit?