

Homework 5

(100 points)

Instructions: Submit in canvas a copy of your solution.

Student's name:

A. Choose one answer from the following multiple-choice questions (5 points each, 40 total)

1) Through which medium will sound travel most rapidly?

- A) vacuum
- B) air
- C) water
- D) steel

2) Sound waves in air

- A) are longitudinal waves.
- B) are produced by something vibrating.
- C) undergo refraction when they pass through warm and cold air.
- D) All of the answers are correct.

3) The time that is required for a vibrating object to complete one full cycle is called

- A) frequency.
- B) wavelength.
- C) amplitude.
- D) period.

4) Longitudinal waves with a frequency above 20,000 Hz are

- A) impossible.
- B) supersonic.
- C) ultrasonic.
- D) infrasonic.

5) If $v = \lambda f$, then how are λ and f related?

- A) λ is directly proportional to f
- B) λ is inversely proportional to f
- C) λ is a factor of f
- D) λ and f are unrelated

6) In longitudinal waves, the medium

- A) vibrates in a direction perpendicular to the direction of motion of the wave.
- B) vibrates in the same direction the wave is moving.
- C) moves in sort of a circular motion.
- D) doesn't vibrate; the disturbance just moves through the medium.

7) A nearby noise level of 65 decibels is about the same as

- A) a whisper.
- B) a jet plane.
- C) normal conversation.
- D) a library.

8) When the trough of one wave collides at the same time and place as the crest of otherwise identical wave,

- A) constructive interference occurs.
- B) destructive interference occurs.
- C) resonance occurs.
- D) they don't interact with each other.

B. Define the following terms and give an example of each (5 points each, 20 points total):

Refraction:

Interference:

Doppler Effect:

Dispersion:

3. A submarine sends a sonar signal, which returns from another ship 2.250 s later. How far away is the other ship if the speed of sound in seawater is 1,530.0 m/s?

4. A warning buoy is observed to rise every 5.0 s as crests of waves pass by it. (a) What is the period of these waves? (b) What is the frequency?