Part C

What frequency would the police car have received if it had been traveling toward the other car at 24.0 $\mathrm{m/s}$?

Express your answer in hertz.

$f =$ Hz

Submit Request Answer

Problem 16.58

A uniform 165 N bar is supported horizontally by two identical wires A and B (Figure 1). A small 185 N cube of lead is placed three-fourths of the way from A to B. The wires are each 75.0 cm long and have a mass of 5.50 g.

Figure 1 of 1

Review | Constants

Part A

If both of them are simultaneously plucked at the center, what is the frequency of the beats that they will produce when vibrating in their fundamental?

Express your answer with the appropriate units.

f_{beat} = Value Units

Submit Request Answer

Provide Feedback

Next >

Problem 16.62

✔ Complete

A bat flies toward a wall, emitting a steady sound of frequency 1.70 kHz. This bat hears its own sound plus the sound reflected by the wall.

Review | Constants

Part A ✔

How fast should the bat fly in order to hear a beat frequency of 8.00 Hz?

Express your answer with the appropriate units.

$v =$ 0.808 $\frac{\mathrm{m}}{\mathrm{s}}$

Submit Previous Answers

✔ **Correct**

Return to Assignment Provide Feedback

Exercise 16.39 - Enhanced - with Feedback

A violinist is tuning her instrument to concert A (440 Hz). She plays the note while listening to an electronically generated tone of exactly that frequency and hears a beat of frequency 6.00 Hz, which increases to 7.00 Hz when she tightens her violin string slightly.

Review | Constants

Part A

What was the frequency of her violin when she heard the 6.00 Hz beat?

Express your answer to three significant figures and include the appropriate units.

f = 446 Hz

Submit | Previous Answers

✔ Correct

Part B

To get her violin perfectly tuned to concert A, should she tighten or loosen her string from what it was when she heard the 6.00 Hz beat?

- She should tighten her string.
- She should loosen her string.

Submit | Request Answer

Provide Feedback

Next >

Exercise 16.40 - Enhanced - with Feedback

Two organ pipes, open at one end but closed at the other, are each 1.03 m long. One is now lengthened by 3.00 cm.

Review | Constants

Part A

Find the frequency of the beat they produce when playing together in their fundamental.

Express your answer in hertz.

f_{beat} = Hz

Submit Request Answer

Provide Feedback

Next

Exercise 16.42 - Enhanced - with Feedback

A railroad train is traveling at a speed of 26.0 $\mathrm{m/s}$ in still air. The frequency of the note emitted by the locomotive whistle is 450 Hz. Use 344 $\mathrm{m/s}$ for the speed of sound in air.

Review | Constants

Part A

What is the wavelength of the sound waves in front of the locomotive?

Express your answer in meters.

$\lambda =$ 0.707 m

Submit | Previous Answers

✔ Correct

Part B

What is the wavelength of the sound waves behind the locomotive?

Express your answer in meters.

$\lambda =$ m

Part C

What is the frequency of the sound heard by a stationary listener in front of the locomotive?

Express your answer in hertz.

$f =$ Hz

Submit Request Answer

Part D

What is the frequency of the sound heard by a stationary listener behind the locomotive?

Express your answer in hertz.

$f =$ Hz

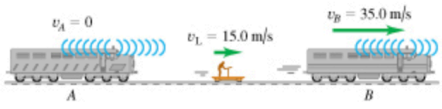
Exercise 16.43 - Enhanced - with Solution

Two train whistles, A and B, each have a frequency of 392 Hz. A is stationary and B is moving toward the right (away from A) at a speed of 35.0 $\mathrm{m/s}$. A listener is between the two whistles and is moving toward the right with a speed of 15.0 $\mathrm{m/s}$ (Figure 1). No wind is blowing. Take the speed of sound to be 344 $\mathrm{m/s}$.

For related problem-solving tips and strategies, you may want to view a Video Tutor Solution of Doppler effect iii: a moving listener.

Figure

1 of 1



Review | Constants

Part A

What is the frequency from A as heard by the listener?

Express your answer in hertz.

$f =$ Hz

Submit Request Answer

Part B

What is the frequency from B as heard by the listener?

Express your answer in hertz.

$f =$ Hz

Part C

What is the beat frequency detected by the listener?

Express your answer in hertz.

f =

Hz

Submit

Request Answer

Exercise 16.45 - Enhanced - with Solution

A swimming duck paddles the water with its feet once per time interval of 1.0 s, producing surface waves with this period. The duck is moving at constant speed in a pond where the speed of surface waves is 0.33 $\mathrm{m/s}$, and the crests of the waves ahead of the duck have a spacing of 0.16 m.

For related problem-solving tips and strategies, you may want to view a Video Tutor Solution of Doppler effect i: wavelengths.

Review | Constants

Part A

What is the duck's speed?

Express your answer in meters per second.

$v =$ $\mathrm{m/s}$

Submit Request Answer

Part B

How far apart are the crests behind the duck?

Express your answer in meters.

$d =$ m

Exercise 16.51 - Enhanced - with Solution

A stationary police car emits a sound of frequency 1230 Hz that bounces off of a car on the highway and returns with a frequency of 1260 Hz. The police car is right next to the highway, so the moving car is traveling directly toward or away from it.

For related problem-solving tips and strategies, you may want to view a Video Tutor Solution of Doppler effect iii: a moving listener.

Review | Constants

Part A

Was the moving car moving towards or away from the police car?

Please Choose

Submit Request Answer

Part B

How fast was the moving car going?

Express your answer in meters per second.

$v =$ m/s

Submit

Request Answer