

Section

13-1

HOLT PHYSICS

Concept Review*Sound Waves*

1. In an experiment for measuring the speed of sound, a gun was shot 715 m away from the observer. It was heard 2.13 seconds after the flash was seen. What was the speed of sound in air at that time?

2. Sound travels at 1530 m/s in sea water. A signal sent down from a ship is reflected at the bottom of the ocean and returns 1.35 s later. Assuming the speed of sound was not affected by changes in the water, how deep was the ocean at that point?

3. A train at rest blows a whistle to alert passengers that it is about to depart from a subway station. The pitch of this whistle is 1.14×10^4 Hz. The speed of sound in the air in that subway tunnel is 342 m/s. The speed of sound in iron is 5130 m/s.

- a. What is the wavelength of that sound in the air?

- b. What is the distance between consecutive areas of compression and of rarefaction in the spherical sound waves spreading from the whistle in the air?

- c. Assuming that the sound was loud enough to be heard from the end of the 1200 m long tunnel, when was it heard through air? through the rails?

- d. What was the apparent frequency of the sound waves that reached the end of the tunnel?

- e. As the train left the station, did the frequency appear to change for a listener on the platform? inside the train? at the other end of the tunnel?
