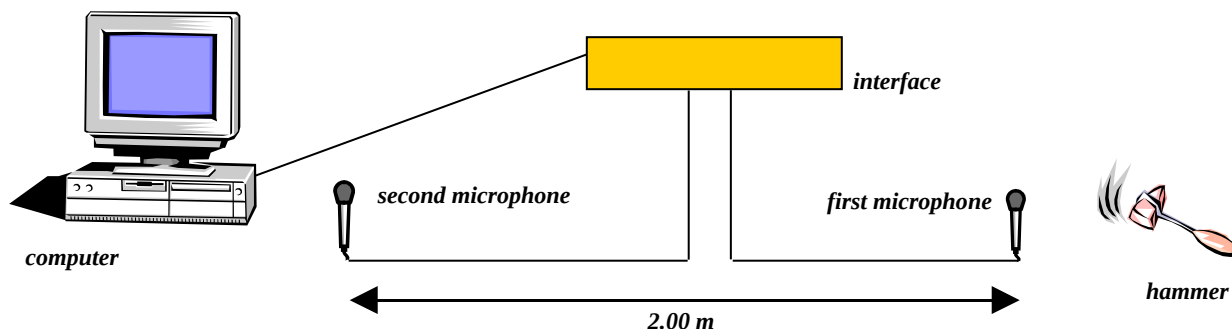


Homework 1.1 - Communication Using Waves I

1. A pupil reads about an experiment that can be carried out to measure the speed of sound in air. When the hammer hits the metal block a sound wave is produced. The computer is used to measure the time it takes for the sound wave to travel from one microphone to the other. The computer will display the time taken for the sound to travel this distance or it can be used to calculate the speed of sound directly.



The pupil carried out the experiment, and the time measured was 0.006 s.

- (a) What other information does the computer need to calculate the speed of sound for her?
- (b) Find the speed of sound using the pupil's results.
- (c) The pupil found that the speed was not calculated properly when the experiment was done close to a wall. Suggest a reason for this.
2. A person at the mouth of a cave shouts, and hears an echo from the back wall of the cave. Using a stopwatch, she times 1 second between shouting and hearing the echo. Calculate how far away the back wall of the cave is. Take the speed of sound to be 340 m/s.
3. The questions below refer to this diagram.
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- The diagram shows a sinusoidal wave. A horizontal double-headed arrow above the wave indicates a wavelength of 12 m. A vertical double-headed arrow to the left of the wave indicates an amplitude of 2 m.
- (a) Calculate the wavelength of the waves shown.
- (b) If the waves took 6 seconds to travel this distance, what is their frequency?
- (c) What is the amplitude of these waves?
- (d) Use the **wave equation** to calculate the speed of the waves.
4. Describe how the electron gun in a cathode ray tube can produce a complete picture on a television screen.
5. How does a television show moving pictures?
6. A colour television can produce millions of different colours on screen.
- (a) How many colours of paint are on a colour television's screen?
- (b) Name these colours.
- (c) How are these colours used to produce the millions of colours seen on screen?