

Lesson Exercise

SOUND



Answer the following questions

Question # 1: Why sound is important?

Answer :

Sound is important because it can tell us about character, place, and time. It's important because it informs us and moves us in ways visuals can't, and because certain combinations of sound and visuals can evoke what neither can do alone. It's also potentially important because it can help to determine what we see.

Question # 2 : Describe sound?

Answer

Vibrations that travel through the air or another medium and can be heard when they reach a person's or animal's ear.

OR

We can describe a sound wave as a disturbance which travels through some medium. Sound is the term to describe what is heard when sound waves pass through a medium to the ear. All sounds are made by vibrations of molecules through which the sound travels. These vibrations make air molecules move.



Question # 3

Sound travels much more slower than light. Why?

Answer:

Light waves are electromagnetic transversal waves. They can travel through a vacuum and any particles they contact slow them down. So when they move through denser water they are slowed down more.

Sound waves are compressional waves that occur by particles hitting each other and moving the vibration along. Water molecules are more tightly compacted together so the vibrations can travel more easily than through air.

Question # 4

State and explain the medium through which sound travels.

Answer:

Sound can travel through, Solid, liquid and gas.

Question # 5

Can sound travel through a vacuum? Explain your answer

Answer

Sound waves are mechanical waves. Unlike electromagnetic waves, they require a medium to propagate.

Sound cannot travel through a vacuum. A vacuum is an area without any air, like space. So sound cannot travel through space because there is no matter for the vibrations to work on it.



Question # 6

Can sound travel through;

- (a) iron?
- (b) water?

Through which is sound faster and why?

Answer

Yes, sound can travel from iron and water. In solid or iron sound can travel faster than water.

Question # 7

What is the speed of sound in:

- (a) air 340 m/s
- (b) water. 1500 m/s
- (c) iron. 5130 m/s

Question # 8

Describe an experiment to show that sound cannot pass through a vacuum.

Answer:

Sound is a mechanical wave that needs a material medium like air, water, steel, etc., for its propagation. We can describe a sound wave by its frequency, wavelength and velocity. The sound wave is a longitudinal wave, ie., the particles of the medium vibrate in a direction parallel to the direction of the propagation of the wave.

A sound wave needs a medium to travel

A sound wave travels in the form of a longitudinal wave and it requires a material medium for its propagation. Sound always originates from some vibrating body. These vibrations are produced by tuning forks, drums, bells, the strings of a guitar, etc.



What is a bell jar?

A bell jar is a laboratory equipment used for creating a vacuum. It is so named as its shape is similar to that of a bell. A bell jar is placed on a base which is vented to a hose fitting that can be connected via a hose to a vacuum pump. By pumping the air out of the bell jar, the air pressure inside the jar can be varied.

How does the experiment work?

The experiment is done by placing an electrical bell in the bell jar. As the air is pumped out of the sealed bell jar, the sound from the bell jar fades. At a particular vacuum, no more sound is heard from the bell, but we can see that the hammer continues hitting the gong and sound is produced. However, the sound is not audible to our ears because of the vacuum inside the jar. This demonstrates that the sound wave cannot travel through vacuum. That is, a sound wave needs a material medium for its propagation.

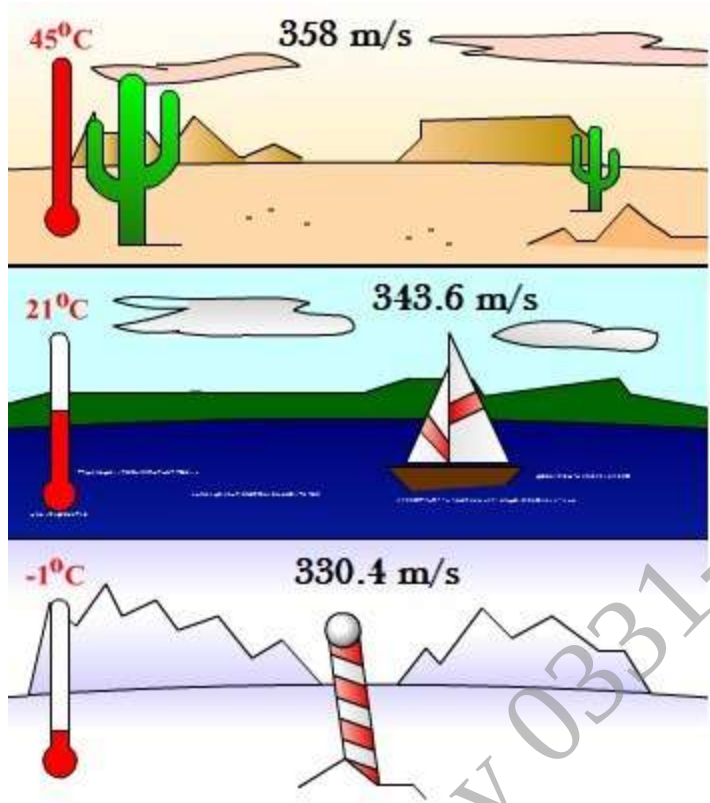
Question # 9

Determine the speed of sound at a temperature of -5°C ?

Answer:

Temperature is also a condition that affects the speed of sound. Heat, like sound, is a form of kinetic energy. Molecules at higher temperatures have more energy, thus they can vibrate faster. Since the molecules vibrate faster, sound waves can travel more quickly. The speed of sound in room temperature air is 346 meters per second. This is faster than 331 meters per second, which is the speed of sound in air at freezing temperatures.

So, at -5°C , the sound would decrease.



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