14. World of sounds

Exercises

1 A. Question

Imagine that you are listening to a popular song from a radio. Using volume control knob, you slightly increase the volume. The factor related to sound wave in this process is, increase in

A. frequency

B. velocity

C. amplitude

D. both frequency and wavelength

Answer

Amplitude refers to the maximum displacement of a sound wave. It is the factor which determines the volume of the sound. On the other hand frequency refers to the number of cycles per unit time and it determines the pitch of the sound. Velocity and wavelength both determines the pitch of the sound.

1 B. Question

The velocity of sound is highest in

A. air

B. water

C. glass

D. vacuum

Answer

Sound waves need a medium to travel. Vacuum does not provide any medium to sound waves. This is the reason why we are not able to listen anything in space. The velocity of sound waves depends on the density of the material medium. Higher the density, higher the velocity of sound waves. As glass is denser than air and water therefore velocity will be more in glass.

1 C. Question

In an unoccupied hall of a courtly you will experience the echo effect of sound. If the same hall is furnished with almirahs, tables, chairs, and other

commodities, you may not experience the echo clearly. It is because,

A. sound waves get absorbed by the objects in the hall.

B. the area of reflecting surface decreases

C. reflected sound is reflected again.

D. sound does not get reflected

Answer

An echo is a sound that is repeated because the sound waves are reflected back. In an empty room, sound waves repeatedly reflect from the walls and ceilings of the room. When the room gets occupied, the furniture absorbs the sound waves and the sound waves will not get reflected.

1 D. Question

The factor that is transmitted in wave motion is,

A. particles of the medium

B. vibrations of particles

C. energy of the cause of the wave

D. electrons of the medium

Answer

Through a wave, energy gets transmitted from one place to another. Particles of the medium do not transmit because if they do, the composition of the material would change. If electrons gets transmitted then it would not be called wave instead it would be called current. Vibrations would pass from one particle to another which is ultimately transmitting energy.

2 A. Question

Fill in the blanks with suitable words :

The product of frequency and wavelength of a sound wave is equal to its _____ .

Answer

The product of frequency and wavelength of a sound wave is equal to its **velocity**.

Explanation: $v = \lambda f$ where v is velocity, λ is wavelength and f is frequency. They determine the pitch of the sound wave.

2 B. Question

Fill in the blanks with suitable words :

The SI unit of wavelength is _____ .

Answer

The SI unit of wavelength is **metre** .

Explanation: Wavelength refers to the distance between two consecutive crests or two consecutive troughs. As it is a distance hence measured in metres.

2 C. Question

Fill in the blanks with suitable words :

The velocity of sound in air at 25 °C is approximately _____.

Answer

The velocity of sound in air at 25°C is approximately **346 m/s** .

Explanation: Velocity of sound depends on the medium as well as temperature of the medium. Hence at a particular temperature, a particular velocity can be measured.

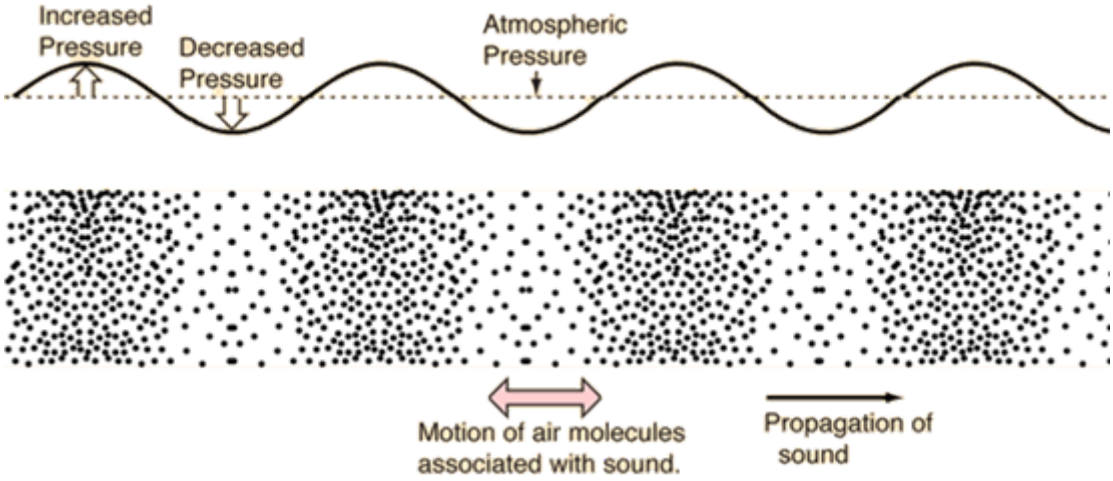
3 A. Question

Answer the following:

Why is sound a longitudinal wave?

Answer

Sound waves are longitudinal waves because during compression and rarefaction, the particles of the medium vibrate parallel to the direction of propagation of the sound wave.



3 B. Question

Answer the following:

Explain an activity to show that sound can do work.

Answer

Activity: To show that sound can do work

Materials required: music system which produces ultra high frequenciesProcedure: Put cotton balls in your ears. Now connect the plug of music system to the electricity board. Switch on the system and increase its volume to the full level.

Observations: You will observe that the objects in the rooms are vibrating and if it is in the ultra high frequency range then the glass panes will also break.

3 C. Question

Answer the following:

Describe an activity to show that sound is produced by vibration of materials.

Answer

Activity: To show that sound is produced by vibration of materials.

Materials required: A steel dish and a spoon

Procedure: Hold the dish with the left hand and strike it hard with the spoon. Leave the spoon and touch the dish immediately. Repeat the steps to observe again.

Observations: You will fell the vibrations of the dish. You will also notice the dish vibrating.

3 D. Question

Answer the following:

Make a list of five musical instruments. State how each of them produces sound.

Musical instrument	The way it produces sound

Answer

Musical instrument	The way it produces sound
Guitar	strings are plucked or strummed with fingers
Piano	uses a keyboard to activate a hammer striking tuned strings
Trumpet	vibrating air set in motion by the lips
Tabla	striking on the stretched membrane so that it can vibrate
Flute	by blowing onto a sharp edge, causing air enclosed in a tube to vibrate

3 E. Question

Answer the following:

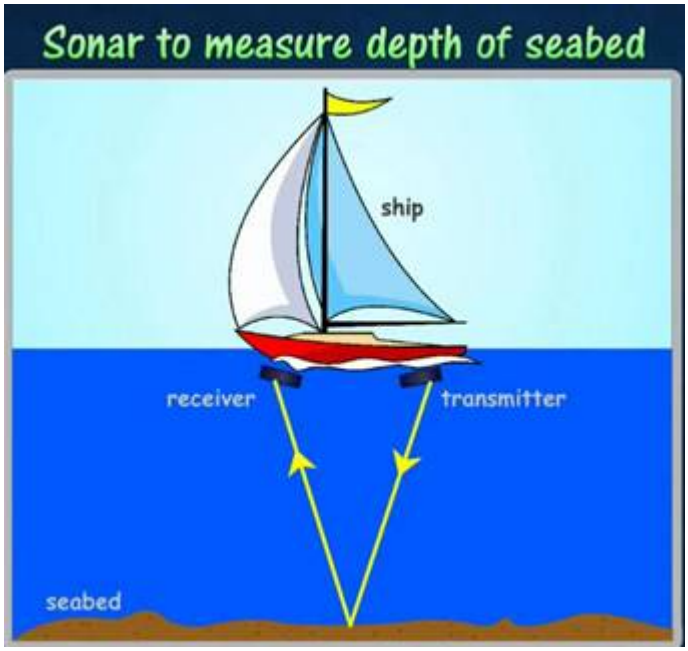
List two applications of reflection of sound.

Answer

The two applications of reflection of sound are:

● Reflection of sound is used to measure the distance and speed of underwater objects. This method is known as SONAR.

● In a stethoscope, the sound of the patient's heartbeat reaches the doctor's ear by multiple reflections of sound.



3 F. Question

Answer the following:

Describe an activity to show that sound requires a material medium for its propagation.

Answer

Activity: To show that sound requires a material medium for its propagation

Materials Required: A glass jar fitted with cork and a hole at bottom, electrical connection, electronic bell, vacuum pump

Procedure:

● Make a hole in the cork and make the connections to the electric bell with a switch.

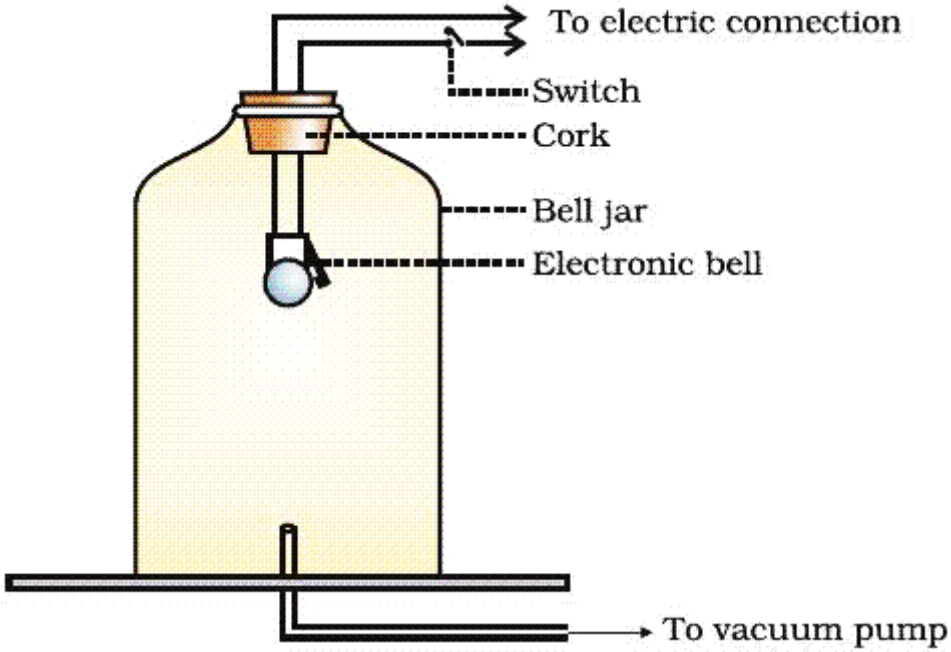
● Make sure the bell is inside the jar and close the jar with the cork.

● At the bottom connect the jar with vacuum pump.

● Now switch on the electric bell. The sound of the bell will come out.

● Now switch on the vacuum pump which will suck the air inside the jar.

● It is observed that the sound of the bell fades gradually and ultimately the sound will not come.



3 G. Question

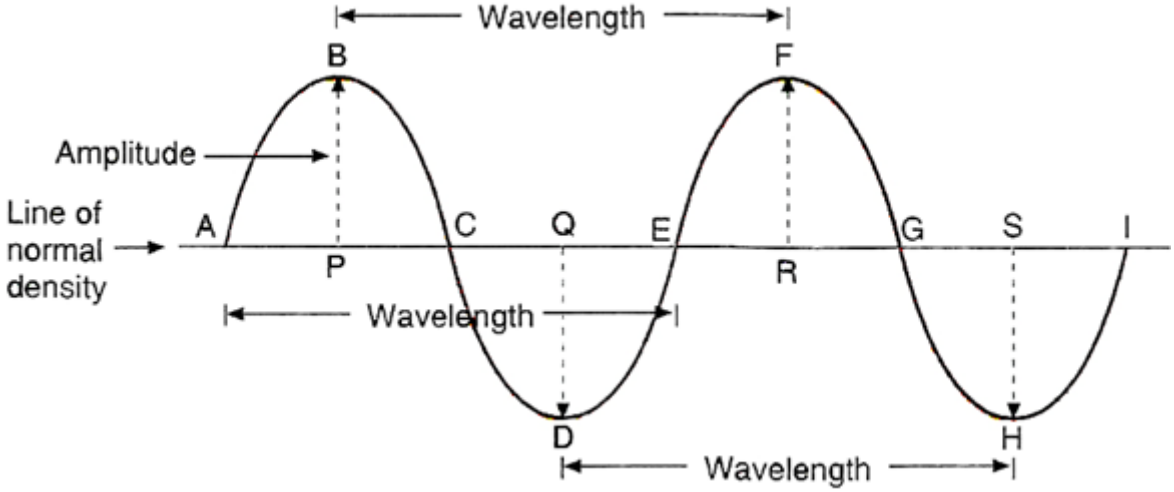
Answer the following:

Represent a wave graphically. Show in the diagram, the wavelength and amplitude.

Answer

Amplitude refers to the maximum displacement of a sound wave. It is the factor which determines the volume of the sound.

Wavelength refers to the distance between two consecutive crests or two consecutive troughs. As it is a distance hence measured in metres.



4 A. Question

Think :

Why is sound both a boon and a bane?

Answer

Sound is a boon as well as a bane:

● Without sound we cannot transfer information from one person to another. We can express our views through our words.

● In many scientific fields, sound is used such as SONAR, stethoscope etc.

● It helps in the navigation of traffic for example the vehicles can sound the horn to alert the other vehicles about their approach.

● Movies and music are a source of entertainment based on sound.

● Sometimes sound causes noises which are unpleasant to hear and causes noise pollution.

● Loudspeakers are a bane as it creates noise which can lead to hearing impairment and disturbance to heart patient.

4 B. Question

Think :

What measures would you take to minimize the sound disturbance caused to others?

Answer

Steps to minimize the sound disturbance are:

● Unnecessary honking by the vehicles should be banned.

● Loudspeakers can play music at low volume.

● After 10 pm, loud sounds by speakers should be banned.

● Regularly checking noise level in industrial complex and indoor to keep noise level within limit.