

Important Questions Class 9 Science Chapter 11: Chapter 11 of Class 9 Science is all about sound. It talks about what sound is, how it is made and how it travels. Some important questions to study include the main features of sound, like pitch (how high or low a sound is), loudness (how loud or soft a sound is) and timbre (the quality of the sound).

You should also know how sound moves through different materials, like air, water, and solids and how fast it goes in each. Understanding echoes (the sound that bounces back to you) and how sound can be reflected and refracted (bent) is important too.

By practicing these questions students can improve their understanding and problem-solving skills.

Important Questions Class 9 Science Chapter 11 Overview

In Chapter 11 of Class 9 Science, titled Sound students learn the fundamental concepts related to sound, including its properties, production and propagation. The important questions in this chapter, created by subject experts of Physics Wallah are designed to help students grasp the key concepts effectively.

By practicing these questions, students can strengthen their understanding of the chapter, improve their problem-solving skills, and ensure they are well-prepared for their exams. These solutions provide clear and easy explanations, helping students grasp the fundamental ideas with ease.

Important Questions Class 9 Science Chapter 11 PDF

For students looking to enhance their understanding of Chapter 11 Sound in Class 9 Science, an important resource is available in the form of a PDF containing key questions.

By accessing the Important Questions Class 9 Science Chapter 11 PDF students can solve variety of questions that are created to reinforce their knowledge, sharpen their problem-solving skills and prepare them thoroughly for their exams. This resource is especially beneficial for those seeking clear explanations and targeted practice in mastering the concepts related to sound.

Important Questions Class 9 Science Chapter 11 PDF

Important Questions Class 9 Science Chapter 11 Sound

Here we have provided Important Questions Class 9 Science Chapter 11 Sound-

Very Short Answer Type Questions (1 Mark)

Q.1. Guess which sound has a higher pitch: guitar or car horn?

Ans: The guitar has a higher pitch than the car horn because it produces sound at a higher frequency.

Q.2. In which of the three media, air, water, or iron, does sound travel the fastest at a particular temperature?

Ans: Sound travels fastest in solids, particularly in iron, compared to water and air.

Q.3. What is the audible range of the average human ear?

Ans: The audible range for humans is from 20 Hz to 20,000 Hz.

Q.4. Which characteristic of sound helps you identify your friend by their voice while sitting with others in a dark room?

Ans: Timbre helps identify a friend's voice because it differentiates the quality of sound.

Q.5. What are the typical wavelengths of sound waves in air corresponding to frequencies of 20 Hz and 20 kHz?

Ans:

For 20 Hz: Wavelength = 17.2 m

For 20 kHz: Wavelength = 0.0172 m

Q.6. Find the ratio of times taken by the sound wave in air and in aluminum to reach the second child if two children are at opposite ends of an aluminum rod.

Ans: The sound will take 18.66 times more time to travel through air than through aluminum.

Q.7. The frequency of a source of sound is 100 Hz. How many times does it vibrate in a minute?

Ans: It vibrates 6,000 times in one minute.

Q.8. Does sound follow the same laws of reflection as light does? Explain.

Ans: Yes, sound follows the same laws of reflection as light; the angles of incidence and reflection are equal.

Q.9. When a sound is reflected from a distant object, do you hear the echo sound on a hotter day?

Ans: Yes, on a hotter day, the speed of sound increases, which may cause multiple reflections, but distinct echoes can be heard if the distance is appropriate.

Q.10. Give two practical applications of the reflection of sound waves.

Ans: Megaphones/Loudhailers: They direct sound in a specific direction.

Stethoscope: It allows doctors to listen to internal body sounds through multiple reflections.

Q.11. A stone is dropped from the top of a tower 500 m high into a pond of water at the base of the tower. When is the splash heard at the top?

Ans: The splash is heard at the top after approximately 11.47 seconds.

Q.12. A sound wave travels at a speed of 339 m/s. If its wavelength is 1.5 cm, what is the frequency of the wave? Will it be audible?

Ans: The frequency is 22,600 Hz, which is not audible to humans as it exceeds the audible range.

Q.13. What is reverberation? How can it be reduced?

Ans: Reverberation is the persistence of sound due to repeated reflections. It can be reduced by using sound-absorbent materials on walls and ceilings.

Q.14. What is the loudness of sound? What factors does it depend on?

Ans: Loudness is how loud or soft a sound seems. It depends on the intensity of sound waves, which is affected by amplitude and distance from the sound source.

Q.15. Explain how bats use ultrasound to catch prey.

Ans: Bats emit ultrasonic waves that reflect off prey, allowing them to determine the distance and location of the prey.

Q.16. How is ultrasound used for cleaning?

Ans: Ultrasound waves are passed through a cleaning solution, creating agitation that helps remove dirt from objects.

Q.17. Explain the working and application of sonar.

Ans: SONAR uses ultrasonic waves to detect objects underwater by measuring the time taken for the echo to return, used for navigation and medical imaging.

Q.18. A sonar device on a submarine sends out a signal and receives an echo 5 s later. Calculate the speed of sound in water if the distance of the object from the submarine is 3625 m.

Ans: The speed of sound in water is 1450 m/s.

Q.19. Explain how defects in a metal block can be detected using ultrasound.

Ans: Ultrasound waves are reflected back by defects in the metal block, indicating their presence.

Q.20. Explain how the human ear works.

Ans: Sound waves enter the ear canal, vibrate the eardrum, and these vibrations are transmitted to the cochlea, where they are converted into neural signals sent to the brain.

Q.21. Explain how sound is produced by your school bell.

Ans: The sound of the bell is produced by its vibrations when struck. These vibrations cause the surrounding air molecules to vibrate, creating compressions and rarefactions that travel through the air as sound waves. The vibrating bell disturbs air particles, causing them to move back and forth, which generates the sound we hear.

Q.21. Why are sound waves called mechanical waves?

Ans: Sound waves are called mechanical waves because they require a medium (solid, liquid, or gas) to propagate. Unlike electromagnetic waves, sound waves cannot travel through a vacuum. They need particles in a medium to transmit the energy, similar to other mechanical waves.

Q.22. Suppose you and your friend are on the moon. Will you be able to hear any sound produced by your friend?

Ans: No, you cannot hear sound on the moon because sound waves require a medium to travel through, and the moon has no atmosphere. The vacuum of space lacks the air necessary for sound wave propagation, making it impossible to hear any sound.

Q.23. Which wave property determines

(a) Loudness?

Ans: Loudness is determined by the amplitude of the sound wave. Higher amplitude results in a louder sound, which is measured in decibels (dB).

(b) Pitch?

Ans: Pitch is determined by the frequency of the sound wave. Higher frequencies produce higher pitches, while lower frequencies result in lower pitches.

Short Answer Questions 2 Marks

Q.1. Distinguish between loudness and intensity of sound.

Ans:

Loudness: It is the subjective perception of sound intensity by the ear and is measured in decibels (dB). It is influenced by the ear's sensitivity.

Intensity: It is the physical quantity of sound energy per unit area, measured in watts per square meter (W/m^2). Intensity is independent of the ear's ability to hear and is determined by the energy of the sound wave.

Q.2. What is sound and how is it produced?

Ans: Sound is a type of energy produced by vibrations that cause oscillations in a medium, which can be a gas, solid, or liquid. These vibrations create waves that propagate through the medium, allowing sound to be transmitted.

Q.3. Describe with the help of a diagram, how compressions and rarefactions are produced in air near a source of sound.

Ans:

Compressions occur when air molecules are pushed together, creating areas of higher pressure.

Rarefactions occur when air molecules are spread apart, creating areas of lower pressure.

Q.4. Why is a sound wave called a longitudinal wave?

Ans: A sound wave is called a longitudinal wave because the particles of the medium vibrate parallel to the direction of the wave's propagation. This means that the compressions and rarefactions move in the same direction as the wave travels.

Q.5. Differentiate between longitudinal and transverse waves.

Ans:

Property	Longitudinal Wave	Transverse Wave
Particle Movement	Particles move parallel to the wave direction.	Particles move perpendicular to the wave direction.
Polarization	Cannot be polarized.	Can be polarized.

Medium of Propagation	Can travel through solids, liquids, and gases.	Can only travel through liquids and gases.
Wave Structure	Composed of compressions and rarefactions.	Composed of crests and troughs.

Q.6. Define the terms:

Ans:

(a) Wavelength

Ans: Wavelength is the distance between two successive crests or troughs of a wave. It indicates the length of one complete wave cycle and is measured in meters. The direction of the wavelength is the same as the direction of the wave propagation.

(b) Frequency

Ans: Frequency is defined as the number of waves that pass a fixed point in a given amount of time. It is measured in Hertz (Hz), where 1 Hz is equal to one wave passing per second.

Q.7. What is an echo? Name two areas of its application.

Ans: An echo is the reflection of sound waves that produces a repetition of sound. It occurs when sound waves bounce off a surface and return to the listener, creating a lasting or far-reaching effect.

Applications of Echo:

1. **Medical Field:** Echo uses sound waves to create images of the heart's chambers, valves, and blood vessels (e.g., echocardiography).
2. **SONAR (Sound Navigation and Ranging):** Used in underwater navigation and detecting flaws in metal objects.

Q.8. Why are sound waves called mechanical waves?

Ans: Sound waves are called mechanical waves because they require a medium (solid, liquid, or gas) to propagate. Sound cannot travel through a vacuum, as it relies on the oscillation of matter (particles of the medium) to transmit energy.

Q.9. What do you understand by loud and soft sounds?

Ans: Sound is a type of vibrating pressure transmitted in waves.

- **Loud Sound:** A sound is considered loud when it has a high amplitude, meaning the pressure variation is significant, resulting in a stronger sound that can be easily heard from a distance.

- **Soft Sound:** A soft sound has a low amplitude, indicating that the pressure variation is minimal, resulting in a quieter sound that may be difficult to hear over background noise.

Q.10. What do you understand by low-pitched and high-pitched sounds?

Ans:

- **Low-Pitched Sound:** Low-pitched sounds are associated with slower oscillations and lower frequencies. These sounds are deep and resonate with a lower tone, such as a bass guitar or a drum.
- **High-Pitched Sound:** High-pitched sounds have higher frequencies and complete a large number of vibrations in a given time. They are sharp and clear, like a whistle or a flute. A frequency of around 3000 Hz is considered high-pitched.

Q.11. How does the sound produced by a vibrating object in a medium reach your ear?

Ans: Sound waves produced by a vibrating object travel through a medium (like air) as compressions and rarefactions. These waves enter the outer ear and pass through the ear canal to the eardrum. When the sound waves strike the eardrum, it vibrates, allowing the sound to be heard.

Q.12. What are the wavelength, frequency, time period, and amplitude of a sound wave?

Ans:

- **Wavelength** is the distance between two consecutive identical points of the wave, such as crests or troughs.
- **Frequency** is the number of vibrations or oscillations per second, indicating how quickly the oscillations occur.
- **Time period** is the time taken to complete one vibration or oscillation, measured in seconds.
- **Amplitude** is the maximum displacement of particles from their rest position, indicating the energy of the sound wave.

Q.13. Cite an experiment to show that sound needs a material medium for its propagation.

Ans:

The Bell-jar experiment demonstrates that sound requires a medium for propagation. An electric bell is suspended inside an airtight bell jar connected to a vacuum pump. When the pump removes air from the jar, the sound of the bell gradually becomes fainter until it is inaudible in a complete vacuum, showing that sound cannot travel without a medium.

Benefits of Important Questions Class 9 Science Chapter 11

Effective Exam Preparation: Practicing important questions is an important part of exam preparation. It familiarizes students with the exam format and the types of questions they may encounter, allowing them to approach the exam with confidence.

Identification of Weak Areas: Working through important questions helps students identify topics they find challenging. Recognizing these weak areas allows them to concentrate their study efforts where needed, leading to improved performance.

Development of Analytical Skills: Analyzing important questions promotes the development of analytical skills. Students learn to interpret information, evaluate scenarios and draw conclusions based on sound principles, which is valuable in both academic and real-world situations.

Time Management Skills: Practicing important questions can improve students' time management skills during exams.

Increased Confidence: Successfully answering important questions boosts students' confidence in their knowledge and abilities. This confidence reduces anxiety during assessments and encourages a more positive attitude toward learning.