



Octahedral classes, kharadi
2nd floor, yashwant plaza, near bank of India,

CLASS 09 - SCIENCE

Sound 1

Time Allowed: 1 hour and 30 minutes

Maximum Marks: 85

Section A

1. Why are roofs and walls of an auditorium/hall generally covered with sound absorbent materials? [1]
2. What kind of waves are produced in an earthquake before the main shock wave begins? [1]
3. Among air, water and steel, in which medium, the sound wave will travel faster? [1]
4. What do you mean by a wave? [1]
5. A stone is thrown in a pond. 12 Full ripples are produced in 1 second. If the distance between a crest and a trough is 10 cm, calculate the wavelength and velocity of the wave. [1]
6. What is intensity of sound? [1]
7. Which characteristic of the sound helps you to identify your friend by his voice while sitting with others in a dark room? [1]
8. Guess which sound has a higher pitch: guitar or car horn? [1]
9. What is one complete oscillation? [1]
10. What is the range of frequencies associated with [1]
 - (a) Infrasound?
 - (b) Ultrasound?
11. When vertically jerk is given to a string, transverse waves are formed. Give three features of these waves. [3]
12. Kanika carried out an experiment on determination of speed of sound in air using resonance tube apparatus and obtained absurd results. She should [3]
 - a. record the result as such.
 - b. manipulate the result and report the answer nearer to actual value of velocity of sound in air.
 - c. copy the result obtained by another student.
 - d. report the result as such and discuss the matter with the teacher to find out the reasons for wrong results.

Answer the following questions based on the above information:

 - i. Which is the most appropriate option for Kanika?
 - ii. What values will Kanika be promoting through preferring this option?
 - iii. Give one more example of promoting such values in real life situations.
13. Give two practical applications of reflection of sound waves. [3]
14. A person is listening to a tone of 500 Hz sitting at a distance of 450 m from the source of the sound. What is the time interval between successive compressions from the source? [3]

15. A person has hearing range of 20 Hz to 20 kHz. Calculate the wave lengths of sound waves in air corresponding to above frequencies? Take speed of sound in air as 340 ms^{-1} . [3]
16. Explain how bats use ultrasound to catch their prey. [3]
17. Cite an experiment to show that sound needs a material medium for its propagation. [3]
18. Two children are at the opposite ends of a long iron pipe. One of them strikes the end of iron pipe with a stone. Find the ratio of time taken by the sound waves in air and in iron to reach the other child. (Speed of sound in air = 340 ms^{-1} and speed of sound in iron is 5130 ms^{-1}). [3]
19. Describe with the help of a diagram, how compressions and rarefactions are produced in air near a source of sound. [3]
20. A girl is sitting in the middle of a park of dimension $12 \text{ m} \times 12 \text{ m}$. On the left side of it there is a building adjoining the park and on the right side of the park, there is a road adjoining the park. A sound is produced on the road by a cracker. Is it possible for the girl to hear the echo of this sound? Explain your answer. [3]
21. Sound requires a medium to travel? Justify experimentally. [3]
22. Flash and thunder are produced simultaneously. But thunder is heard a few seconds after the flash is seen, why? [3]
23. A human heart on an average is found to beat 75 times a minute. Calculate its frequency. [3]
24. Two children are at opposite ends of an aluminium rod. One strikes the end of the rod with a stone. Find the ratio of times taken by the sound wave in air and in aluminium to reach the second child. [3]
25. How is ultrasound used for cleaning? [3]
26. Reena's grandmother took her mother to a doctor as she was four months pregnant for ultrasonography. But she showed her interest in determining whether the child is a boy or a girl. The doctor was annoyed and refused to disclose the gender of the child. [3]
 - a. What is ultrasonography?
 - b. On what principle does it work?
 - c. Why do you think the doctor refused to determine the gender of the child?
 - d. What values are promoted by the doctor?
27. A submarine emits a sonar pulse, which returns from an underwater cliff in 1.02 s. If the speed of sound in salt water is 1531 m/s , how far away is the cliff? [3]
28. When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remains the same. Do you hear echo sound on a hotter day? [3]
29. A sound wave of wavelength 0.332 m has a time period of 10^{-3} s . If the time period is decreased to 10^{-4} s , calculate the wavelength and frequency of new wave. [3]
30. A longitudinal wave of wavelength 1 cm travels in air with a speed of 330 m/s . Calculate the frequency of the wave. Can this wave be heard by a normal human? [3]
31. A submarine emits a sonar pulse, which returns from an underwater cliff in 1.02 s. If the speed of sound in salt water is 1531 ms^{-1} , how far away is the cliff? [3]
32. A sound wave travels at a speed of 339 ms^{-1} . If its wavelength is 1.5 cm , what is the frequency of the wave? Will it be audible? [3]

33. A sound wave has a frequency 2 kHz and wavelength 40 cm. How long will it take to travel 1.6 km? **[3]**
34. Kunal and Abhimanyu were waiting to go across a railway crossing. Kunal jumped over the barrier and curiously put his ear on the railway track. Abhimanyu opposed Kunal and pulled him away from the railway track. **[3]**
- a. Why did Kunal put his ear on the railway track?
 - b. Can sound travel faster through (i) copper (ii) water?
 - c. Why did Abhimanyu pull Kunal away from the railway track?
35. Why are sound wave called mechanical waves? **[3]**