



**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  $340 \text{ ms}^{-1}$ . [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 =  $340 \text{ ms}^{-1}$  and speed of sound in iron is  $5130 \text{ ms}^{-1}$ ). [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  $1531 \text{ ms}^{-1}$ , how far away is the cliff? [3]
32. A sound wave travels at a speed of  $339 \text{ ms}^{-1}$ . 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]**