CLASS 9 SCIENCE

CHAPTER 8 • SOUND

NUMERICAL PROBLEMS • Practice + Answers

Formula Sheet: ν = number of oscillations/time | $T = 1/\nu$ | $v = \lambda\nu$ | $\lambda = v/\nu$ | distance = speed × time | Echo/SONAR one-way distance = vt/2

1. A sound source makes 10 oscillations in 2 s. Calculate its frequency and time period.

Answer: Frequency $\nu = 10/2 =$ **5 Hz**. Time period $T = 1/\nu =$ **0.2 s**.

2. A sound source vibrates at 20 Hz. How many oscillations does it complete in 1 minute?

Answer: Number of oscillations = 20 × 60 = **1200 oscillations**.

3. A sound wave has a frequency of 50 Hz. Calculate its time period.

Answer: $T = 1/\nu = 1/50 =$ **0.02 s**.

4. A sound wave has a time period of 0.005 s. Find its frequency.

Answer: $\nu = 1/T = 1/0.005 =$ **200 Hz**.

5. The frequency of a sound wave is 250 Hz. How many oscillations occur in 4 s?

Answer: Number of oscillations = $\nu t = 250 \times 4 =$ **1000 oscillations**.

6. A sound wave travels at 344 m/s and has a frequency of 20 Hz. Calculate its wavelength.

Answer: $\lambda = v/\nu = 344/20 =$ **17.2 m**.

7. A sound wave travels at 344 m/s and has a frequency of 20000 Hz. Calculate its wavelength in metres and centimetres.

Answer: $\lambda = 344/20000 = 0.0172$ m = **1.72 cm**.

8. A sound wave has wavelength 2 m and frequency 170 Hz. Calculate its speed.

Answer: $v = \lambda\nu = 2 \times 170 =$ **340 m/s**.

9. A sound wave travels at 340 m/s and has wavelength 0.5 m. Find its frequency.

Answer: $\nu = v/\lambda = 340/0.5 =$ **680 Hz**.

10. A sound wave has speed 1500 m/s in water and frequency 500 Hz. Find its wavelength.

Answer: $\lambda = v/\nu = 1500/500 =$ **3 m**.

11. A sound wave has wavelength 0.25 m and speed 5000 m/s in steel. Find its frequency.

Answer: $\nu = v/\lambda = 5000/0.25 =$ **20,000 Hz**.

12. A sound wave has frequency 100 Hz. Find its time period and the number of oscillations completed in 30 s.

Answer: $T = 1/100 =$ **0.01 s**. Oscillations $= 100 \times 30 =$ **3000**.

13. A lightning flash is seen 5 s before thunder is heard. Take the speed of sound as 340 m/s. Estimate the distance of the lightning strike.

Answer: Distance $= vt = 340 \times 5 = 1700$ m = **1.7 km**.

14. An echo is heard 0.5 s after a clap. If the speed of sound is 340 m/s, calculate the distance of the reflecting wall.

Answer: Sound travels to the wall and back. Distance $= vt/2 = 340 \times 0.5/2 =$ **85 m**.

15. An echo is heard 0.8 s after a sound is produced. Take speed of sound as 340 m/s. Find the distance of the reflecting surface.

Answer: Distance $= vt/2 = 340 \times 0.8/2 =$ **136 m**.

16. What minimum distance from a reflecting surface is needed to hear an echo if the minimum time gap is 0.1 s and the speed of sound is 340 m/s?

Answer: Distance = vt/2 = 340×0.1/2 = **17 m**.

17. An experiment requires an echo to arrive at least 0.2 s after the sound is emitted. If the speed of sound is 343 m/s, find the minimum distance of the reflecting surface.

Answer: Distance = vt/2 = 343×0.2/2 = **34.3 m**.

18. A sonar signal sent into seawater returns after 4 s. If sound travels at 1500 m/s in seawater, calculate the depth of the ocean.

Answer: The 4 s is for the journey down and back. Depth = 1500×4/2 = **3000 m** = 3 km.

19. A sonar signal returns after 0.90 s. If the speed of sound in seawater is 1530 m/s, find the distance of the object from the source.

Answer: One-way time = 0.90/2 = 0.45 s. Distance = 1530×0.45 = **688.5 m**.

20. A sound wave travels 1020 m in 3 s. Calculate its speed.

Answer: v = distance/time = 1020/3 = **340 m/s**.

21. A sound wave travels at 340 m/s for 2.5 s. Calculate the distance travelled.

Answer: $d = vt = 340 \times 2.5 =$ **850 m**.

22. A sound wave has wavelength 50 m and travels through steel at 5000 m/s. Find its frequency and time period.

Answer: $\nu = v/\lambda = 5000/50 =$ **100 Hz**. $T = 1/100 =$ **0.01 s**.

23. Sound travels at 1500 m/s in water and 340 m/s in air. Find the ratio of its speed in water to its speed in air.

Answer: Ratio = 1500/340 = **75:17** ≈ **4.41:1**.

24. Sound travels at 5000 m/s in steel and 1500 m/s in water. Find the ratio of its speed in steel to its speed in water.

Answer: Ratio = 5000/1500 = **10:3** ≈ **3.33:1**.

25. A sound wave has frequency 500 Hz and speed 340 m/s. Calculate its wavelength and time period.

Answer: $\lambda = v/\nu = 340/500 =$ **0.68 m**. $T = 1/500 =$ **0.002 s**.

ANSWER CHECKLIST

Chapter 8 • Sound

Problem	Final Answer	Problem	Final Answer
1	Frequency ν = 10/2 = 5 Hz. Time period T = 1/ν = 0.2 s.	13	Distance = vt = 340 × 5 = 1700 m = 1.7 km.
2	Number of oscillations = 20 × 60 = 1200 oscillations.	14	Sound travels to the wall and back. Distance = vt/2 = 34
3	T = 1/ν = 1/50 = 0.02 s.	15	Distance = vt/2 = 340×0.8/2 = 136 m.
4	ν = 1/T = 1/0.005 = 200 Hz.	16	Distance = vt/2 = 340×0.1/2 = 17 m.
5	Number of oscillations = νt = 250 × 4 = 1000 oscillations.	17	Distance = vt/2 = 343×0.2/2 = 34.3 m.
6	λ = v/ν = 344/20 = 17.2 m.	18	The 4 s is for the journey down and back. Depth = 1500
7	λ = 344/20000 = 0.0172 m = 1.72 cm.	19	One-way time = 0.90/2 = 0.45 s. Distance = 1530×0.45 =
8	v = λν = 2 × 170 = 340 m/s.	20	v = distance/time = 1020/3 = 340 m/s.
9	ν = v/λ = 340/0.5 = 680 Hz.	21	d = vt = 340×2.5 = 850 m.
10	λ = v/ν = 1500/500 = 3 m.	22	ν = v/λ = 5000/50 = 100 Hz. T = 1/100 = 0.01 s.
11	ν = v/λ = 5000/0.25 = 20,000 Hz.	23	Ratio = 1500/340 = 75:17 ≈ 4.41:1.
12	T = 1/100 = 0.01 s. Oscillations = 100 × 30 = 3000.	24	Ratio = 5000/1500 = 10:3 ≈ 3.33:1.
25	λ = v/ν = 340/500 = 0.68 m. T = 1/500 = 0.002 s.		

Source alignment: For the 2026–27 Class 9 Science syllabus, Chapter 8 is Sound and includes wavelength, frequency, time period, amplitude, intensity, speed, graphical analysis, reflection/echo and echolocation. ■filecite■turn220file8■L564-L606■ The supplied textbook chapter gives numerical examples on frequency/time period, wavelength, speed, lightning distance, echo distance, and SONAR distance, which this practice set follows. ■filecite■turn220file1■L85-L100■ ■filecite■turn220file6■L402-L435■ ■filecite■turn220file7■L464-L505■ ■filecite■turn220file2■L141-L173■ ■filecite■turn220file0■L25-L30■