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## Worksheet: Sound

Odisha State Board · Class 9 · Science · 16 questions · 45 marks

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 45

**Q1.** What kind of wave is sound — transverse or longitudinal? Justify your answer. [1 mark]

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**Q2.** A wave has frequency 500 Hz and wavelength 0.5 m. Find its speed. [1 mark]

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**Q3.** Differentiate pitch and loudness of sound. On which wave property does each depend? [2 marks]

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**Q4.** Classify each as audible, infrasonic, or ultrasonic for humans: (a) 10 Hz, (b) 500 Hz, (c) 25,000 Hz, (d) 18,000 Hz. [2 marks]

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**Q5.** Why do we hear an echo only when we are at least 17 m away from a wall? [2 marks]

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**Q6.** A radio station broadcasts at frequency 100 MHz. Find the wavelength. (Speed of EM waves in air =  $3 \times 10^8$  m/s) [2 marks]

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**Q7.** A SONAR device sends an ultrasonic pulse into the sea. The reflected pulse from the ocean floor is received 4 s later. If sound speed in sea water is 1500 m/s, find the depth. [3 marks]

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**Q8.** A tuning fork produces 256 vibrations per second. If sound travels at 340 m/s in air, find the wavelength of the sound. [3 marks]

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**Q9.** A man fires a gun and hears the echo from a cliff 2 s later. If the speed of sound is 340 m/s, find the distance of the cliff from the man. [3 marks]

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**Q10.** Why does sound travel faster in iron than in air? [3 marks]

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**Q11.** A boy stands between two parallel cliffs and claps his hands. He hears two distinct echoes after 2 s and 4 s respectively. Find the distance between the two cliffs. (Speed of sound = 340 m/s) [4 marks]

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**Q12.** A wave has time period 0.005 s and travels at 300 m/s in a medium. Find its frequency and wavelength. [3 marks]

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**Q13.** A sound wave has frequency 500 Hz. Find its wavelength in (a) air, (b) water, (c) steel. (Speeds: air 340 m/s, water 1500 m/s, steel 5960 m/s). *[4 marks]*

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**Q14.** Bats use ultrasonic waves for navigation. Explain how a bat can find its prey in the dark. *[4 marks]*

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**Q15.** If sound takes 6 s to travel through 2 km of water and 1.0 s in air for 340 m, calculate the ratio of speeds of sound in water and air. *[4 marks]*

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**Q16.** Give two medical and two industrial applications of ultrasound. *[4 marks]*

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