Class 9 chapter Sound CBSE Solved Test paper-1

Solved Numerical

1. A person observes the smoke from a gun 1. 4 sec before he hears the bang. If the gun is 476 m away from the person, find the speed of sound?

Ans: the speed of sound = $\frac{476}{1.4}$= 340m/s

2. A person standing near the cliff fires the gun and heard the echo after 1.5 sec. If the speed of sound in air is 340m/sec, how far is person from the cliff?

Ans: d = $\frac{v\,t}{2}$ = $\frac{340\,x1.5}{2}$ = 255m

3. A sound wave of frequency 5000 Hz travel in air with speed of 350m/sec. Calculate the wave length.

Ans: v = n λ $\Rightarrow$ λ = $\frac{v}{n}$ = 350/5000 = 0.07m

4. If you hear thunder 7sec after you see he lightening, how far you from the lighting occurred?

Ans: d = s x t = (340 x 7) = 2380m

5. A bat emits ultrasonic wave of frequency 30 Khz..If its speed is 350m/s and bats hear its echo after 0.6 sec after emitting the , find how far is bat from obstacle and wave length of wave?

Ans: f = 30 Khz = 30000hz

d = $\frac{v\,t}{2}$ = $\frac{350x0.6}{2}$ = 105 m

λ = λ = $\frac{v}{f}$ = $\frac{350}{30000}$ = 0.01166666666 = 11.7 x 10^{-3} m

6. Meera is standing between two hills. She shouted loudly and hears first echo after 0.5 sec and second echo after 1 sec. what is distance between two hills?

Let the distance b/w nearest clif and meera = x m

and the distance b/w distant clif and meera = ym

Distance b/w two clif = (x + y) m

Total distance covered by sound to produce first echo = 2x m and time = 0.5 sec

$\Rightarrow$ 2y = 340 x 0.5 $\Rightarrow$ x = $\frac{340 \times 0.5}{2}$ = 85 m

Total distance covered by sound to produce 2nd echo = 2y m and time = 1 sec

$\Rightarrow$ 2y = 340 x x 1 $\Rightarrow$ y = $\frac{340 \times 1}{2}$ = 170 m

So, Distance b/w two clif = (85 + 170) = 255 m

7. If 2000 ripples produced in 5 sec in a pond find time period and frequency of ripples formation.

Ans: No. of ripples in 5 s = 2000 No. of ripples in 1 s = 2000 / 5 = 400

Frequency = 400 Hz

Time period = $\frac{1}{f}$ = $\frac{1}{400}$ s = 0.0025 sec

8. A man standing in a valley between two parallel mountains fires a gun and hears echo at an interval of 2 s and 3.5 s. What is (a) The distance between two mountains (b) the location of the man with respect to the mountain?

Ans: speed of sound = 340 m/sec

Let the distance b/w nearest clif and man = x m

and the distance b/w distant clif and man = y m

Distance b/w two clif = (x + y) m

Total distance covered by sound to produce first echo = 2x m and time = 2 sec

$\Rightarrow$ 2y = 340 x 2 $\Rightarrow$ x =(340 x 2)/2 = 340 m

Total distance covered by sound to produce 2nd echo = 2y m and time = 3.5 sec

$\Rightarrow 2y = 340$ x x $3.5 \Rightarrow y = (340 \times 3.5)/2 = 595$ m

So, Distance b/w two clif = (340 + 595) = 935 m

9. Calculate the wavelength of a sound whose frequency is 220 Hz and speed is 440m/s in a given medium.

Ans: v = 440 m/s ; f = 220

v = f x $\lambda \Rightarrow$ 440 = λ x 220 $\Rightarrow \lambda = \frac{440}{220} = 2$

10. A body is vibrating 6000 times is 1 minute. If the velocity of sound in air is 360 m/s, find

(i) Frequency in Hz `   (ii) wavelength of sound.

Ans: A body is vibrating 6000 times is 1 minute

$f = \frac{6000}{60} = 100$ Hz

$\lambda = \frac{v}{f} = 360/100 = 3.6$m

11. A stone is dropped from a 500 m tall building into a pond. When is sound splash heard? Given g =10 m/s^2 , speed of sound = 340 m/s.

Ans: Time taken by stone to reach pond = t

: s = ut + ½ gt$^2 \Rightarrow$ 500 = ½ x10 x t$^2 \Rightarrow$ t = 10 sec

Time taken by sound to travel 500 m = D/v = 500/340 = 1.47 sec

total time to hear splash = 10 sec + 1.47sec = 11.47 sec

12. An echo is heard in 3 sec after the emission of sound. If speed of sound in air is 342 m/s, what is the distance of the reflecting surface from the source?

Ans: d = $\frac{v \times t}{2} = \frac{342 \times 3}{2} = 513$ m

13. A source of wave produces 40 crests and 40 troughs in 0.4sec .Find the frequency of the wave.

Ans : As one crest and one trough together make a wave produces 40 crests and 40 troughs is equal to 40 waves. So the source produces 40 waves per second so 40 Hz is the frequency.

14. Water wave enter a dock at a rate of 120 crests per minute. At the dock are 2 poles 12 m apart from each other. a worker watches a particular wave crest pass from one pole to another in 4s.what is the frequency of the wave?

Ans: Frequency is the number of waves crossing a referring point,

As Water wave enter a dock at a rate of 120 crests per minute   f = 120/60 = 2

Water wave enter a dock at a rate of 120 crests per second. So the frequency is 2 Hz.

15. 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: Time taken to hear the echo, t = 5 s

Distance of the object from the submarine, d = 3625 m

Total distance travelled by the sonar waves during the transmission and reception in water = 2d Velocity of sound in water, $v = \frac{2d}{t} = \frac{2\,x\,3625}{5} = 1450$ m/s