



INDIAN SCHOOL AL WADI AL KABIR

Class: IX	Department: Science 2020 -2021 SUBJECT: PHYSICS	Date of Completion : 28.05.2020
Worksheet No:1(B) With answers	Topic: Sound	Note: A4 File Format
Name of student:	Class & Sec:	Roll no:

I.Objective type questions:

1.Multiple choice questions:

- a) What do dolphins, bats and porpoise use
i). Ultrasound ii). Infrasound iii). Both a and b iv). None of them
Ans - i) ultrasound
- b) To hear a distinct echo each time interval between the original sound and the reflected sound must be:
i) 0.2 s ii) 1s iii). 2s iv) 0.1 s
Ans- iv) 0.1s
- c) A wave in slinky travelled to and fro in 5 sec the length of the slinky is 5m. What is the velocity of wave?
i) 10m.s ii) 5m/s iii) 2m/s iii) 25m/s
Ans- iii) 2m/s
- d) Speed of sound depends upon
i) Temperature of the medium ii). Pressure of the medium
iii)Temperature of source producing sound iv). Temperature and pressure of medium
Ans- i) Temperature of the medium

2.In the following questions, a statement of assertion(A) is followed by a statement of reason (R). Mark the correct choice as:

- i)Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
ii)Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
iii)Assertion is true but Reason is false.
iv)Assertion is false but Reason is true.

a) Assertion: Bats move about freely even in dark nights and search out prey.

Reason: Bats send ultrasonic signals

Ans- i)

b) Assertion: Ceilings of concert hall and conference halls are made flat.

Reason: Such ceilings reflect the sound and spread it evenly across the width of the hall.

Ans- iv)

II. Very short answer type questions. (1 mark)

1. What is the range of frequencies associated with (a) Infrasound? (b) Ultrasound?

Ans-(a). 20 Hz

(b). 20,000 Hz. (20KHz)

2. What is reverberation?

Ans-Reverberation is the repeated reflection of sound waves that results in persistence of sound for some time.

3. Give one example each of transverse and longitudinal wave

Ans-Transverse wave-light wave

Longitudinal wave -Sound Wave

III. Short answer type I questions. (2 marks)

1. In which of the three media, air, water or iron, does sound travel the fastest at a particular temperature?

Ans- At a particular temperature, sound travels fastest in iron, sound travels faster in solids when compared to any other medium.

2. Suppose you and your friend are on the moon. Will you be able to hear any sound produced by your friend?

Solution:

Ans- No. Sound waves require a medium to propagate. Due to the absence of atmosphere on the moon, I will not be able to hear any sound produced by my friend.

3. Which wave property determines (a) loudness, (b) pitch?

Ans-

(a). Amplitude – The loudness of the sound and its amplitude is directly related to each other.

Larger the amplitude louder is the sound.

(b). Frequency – The pitch of the sound and its frequency is directly related to each other. If the pitch is high then the frequency of sound is also high.

4. How are the wavelength and frequency of a sound wave related to its speed?

Solution:

Wavelength, speed, and frequency are related in the following way:

Speed = Wavelength x Frequency

$$v = \lambda \nu$$

IV.Short answer type II questions. (3 marks)

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

Frequency of sound wave = 220 Hz.

Speed of sound wave = 440 m/s.

Speed = Wavelength \times Frequency

$$v = \lambda \nu$$

$$440 = \text{Wavelength} \times 220$$

$$\text{Wavelength} = 440/220 = 2$$

The wavelength of the sound wave = 2m

2. An echo is heard in 3 s. What is the distance of the reflecting surface from the source, given that the speed of sound is 342 ms⁻¹?

Solution:

Speed of sound (v) = 342 ms⁻¹

Echo returns in time (t) = 3 s

Distance travelled by sound = $v \times t = 342 \times 3 = 1026$ m

The distance of reflecting surface from the source = $1026/2 = 513$ m.

3. Does sound follow the same laws of reflection as light does? Explain.

Solution:

Yes. Sound follows the same laws of reflection as light. The angle of incidence is equal to the angle of reflection. Also, the reflected sound wave, the normal to the point of incidence, and the incident sound wave all lie in the same plane.

4. Explain how defects in a metal block can be detected using ultrasound.

Solution:

Defective metal blocks will not allow ultrasound to pass through it and reflect it back. This technique is used in detecting defects in metal blocks.

5. Flash and thunder are produced simultaneously. But thunder is heard a few seconds after the flash is seen, why?

Solution:

The speed of sound is 344 m/s whereas the speed of light is 3×10^8 m/s. The speed of sound is less when compared to that of light. Due to this reason, the thunder takes more time to reach the earth.

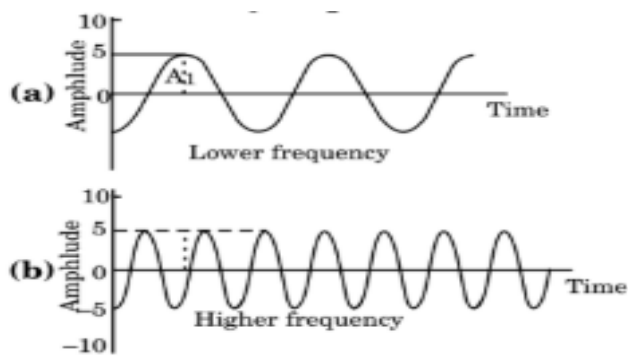
V.Long answer type questions. (5 marks)

1.Explain the working and application of sonar.

SONAR stands for SOUNd Navigation And Ranging. It is a device installed in ships and submarines. It uses ultrasonic waves to measure the distance, direction and velocity of an underwater object. It has a transmitter and a detector, the transmitter transmits the wave and after striking the object, it gets reflected back and is sensed by the detector. The detector then converts it into electrical signals which are appropriately interpreted.

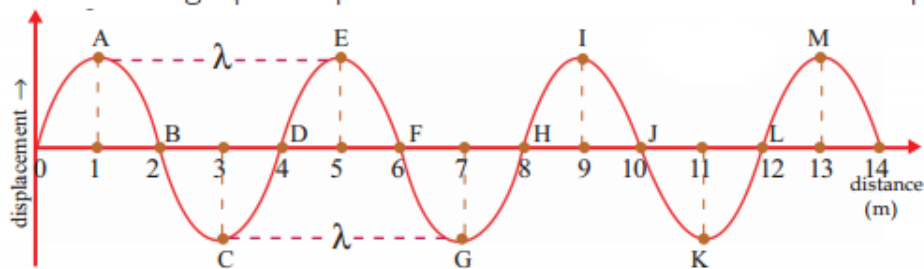
2. Represent graphically by two separate diagrams in each case

(i) Two sound waves having the same amplitude but different frequencies



3.

Observe the graphic representation of a transverse wave at a particular instant.



a) In the figure, which are the points of the highest displacement (amplitude) ?

Ans- A, C, E, G, I, K, M

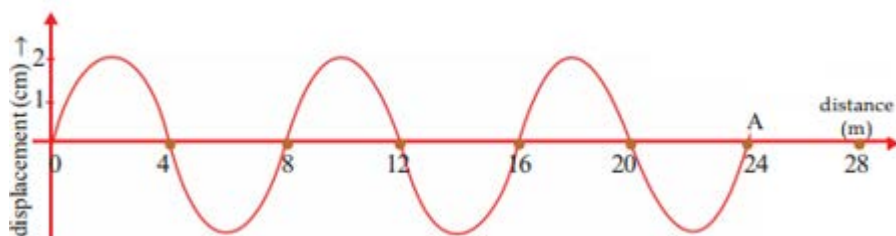
b) How many crests and troughs are there in the figure

Ans- 4 crests, 3 troughs

c) What is the wavelength of the wave shown in the figure?

Ans- 4 m

4. Observe the graphic representation of a wave motion given below.



a) What is the amplitude of the wave? (Ans-2)

b) What is the wave length? (Ans-8m)

c) Calculate the frequency of the wave if it took 0.2 to reach A (Ans- $3/0.2 = 15$ Hz)

d) Calculate the speed of the wave. (Ans- $15 \times 8 = 120$ m/s)

Prepared by-Shyni Vinod

Checked by : HOD - SCIENCE