



## INDIAN SCHOOL AL WADI AL KABIR



<b>Class: VIII</b>	<b>Department: SCIENCE</b> <b>2022-2023</b>	<b>Date of submission:</b> <b>15-01-2023</b>
<b>WS. NO. 14</b> <b>WITH ANSWERS</b>	<b>Topic: SOUND</b>	<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### I. VERY SHORT ANSWER TYPE QUESTIONS (1M):

1. What is vibration? **[Hint: The rapid back and forth motion of an object.]**
2. What is the unit of frequency? **[Hint: Hertz]**
3. Which part of the ear transmits sound vibrations to the brain **[Hint: Auditory nerves ]**
4. What is the unit of loudness? **[Hint: Decibel (dB)]**
5. In which medium sound travels faster? **[Hint: Solid]**
6. What is the length of vocal cords in men? **[Hint: 20 mm]**
7. A vibrating body should oscillate minimum how many times per second to make an audible sound for humans? **[Hint: 20 times]**
8. Which type of sound is called music? **[Hint: A sound which is pleasant to ears is called music.]**
9. On a stormy day, why lightning is seen first and thunder is heard later? **[Hint: in air, the speed of light is faster as compared to the speed of sound.]**
10. Why astronauts fail to hear the sound of each other on the surface of the moon?  
**[Hint: There is no air present on the surface of the moon and we know that sound cannot travel through vacuum. It needs a medium to travel.]**

*For question numbers 11-13, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below -*

- i) Both A and R are true and R is the correct explanation of the assertion.**
- ii) Both A and R are true but R is not the correct explanation of the assertion.**
- iii) A is true but R is false.**
- iv) A is false but R is true**

**11.Assertion(A):** Trees planted along roadside help in the reduction of noise pollution.

**Reason(R):** Plants absorb sound and so help in minimizing noise pollution.

**Ans:(i) Both A and R are true and R is the correct explanation of the assertion.**

**12.Assertion(A):** The frequency determines the shrillness or pitch of a sound.

**Reason (R):** The loudness of sound depends on its amplitude.

**Ans:(ii) Both A and R are true but R is not the correct explanation of the assertion.**

**13.Assertion(A):** Sound does not need a medium to travel, it can travel in a vacuum.

**Reason(R):** Sound propagates by causing the particles in the medium to vibrate.

**Ans:(iv) A is false but R is true**

## **II. PASSAGE BASED QUESTIONS:**

Sound plays an important role in our life. It is a form of energy which makes us hear. Vibrating objects produce sound. Vibration is the to and fro or back and forth movement of an object. Sound needs a medium to travel. Hence, it cannot travel in a vacuum. Human beings have a voice box or larynx which is present in their throat on the upper side of the windpipe. The larynx has two vocal cords which have a narrow slit between them so that air can pass through it. As the lungs throw the air out of the windpipe, it passes through the slit and hence allows the production of sound as the vocal cords start vibrating. Since sound travels in the form of waves, it is important to study about characteristics of waves. The three main properties of waves are **Amplitude, frequency, and time period**. The magnitude of disturbance in the medium on either side of the mean value is called as **Amplitude(A)**. Larger the amplitude, louder the sound. The number of oscillations/vibrations per second is called **frequency**, which is expressed in Hertz (**Hz**). Time taken for one complete oscillation/vibration is the **time period**.

a. Which part of the human throat is responsible for the voice produced by a human?

**[Hint: Larynx ]**

b. The form of energy which enable us to hear:

**[Hint: Sound]**

c. The rapid to and fro or up and down movement of an object from its mean position:

**[Hint: Vibration ]**

d. The maximum displacement of a vibrating object from its mean position:

**[Hint: Amplitude ]**

e. The time taken by a vibrating object to complete one vibration :

**[Hint: Time period]**

f. The number of vibrations in one second:

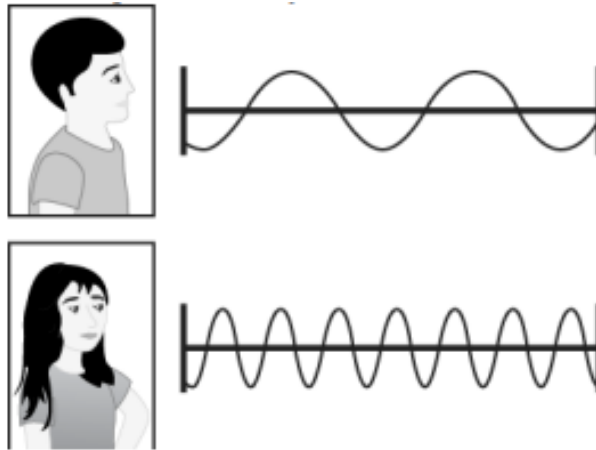
**[Hint: Frequency]**

### **III. CASE STUDY BASED QUESTIONS:**

a. Two students are at two ends of a room. One of the students claps softly but other student is unable to hear the sound. The student takes a long metal rod and asks his friend to put the ear on the rod at the other end. The student taps the metal rod with the same intensity and the sound is heard by his friend. What can be concluded by this observation?

**[Hint: Particles in a solid substance are closer to one another so the sound travels faster.]**

b. A student learns that the sound travels in a waveform. The image shows the sound waves produced by a man and a woman.



What can be concluded from the image?

**[Hint: closer the waves, greater will be the frequency]**

c. Mention your experience when you touch a sound producing school bell?

**[Hint: We feel the vibration in it ]**

### **IV a) SHORT ANSWER TYPE QUESTIONS: (2M)**

1. Name one musical instrument each in which the sound is produced:

a. By vibrating a stretched string.

c. By vibrating a stretched membrane.

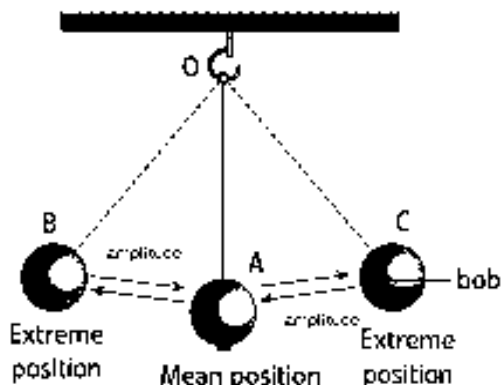
b. By vibrating air enclosed in a tube.

**[Hint: a. Guitar b. flute c. tabla ]**

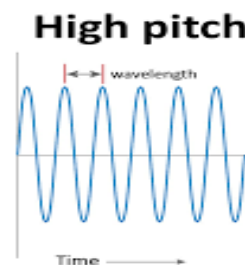
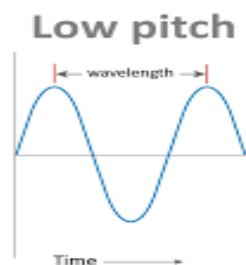
2. How does eardrum help us to hear sound? **[Hint: The eardrum is like a stretched rubber sheet .Sound vibrations travel down the ear canal and make eardrum vibrate. The eardrum sends vibrations to the inner ear. From there, the signal goes to the brain]**

- Distinguish between - Audible and inaudible sound. [Hint: Audible sound- The sound that can be heard. Range of audible sound is from 20 Hz-20,000 Hz. Inaudible sound - The sound that cannot be heard. Human beings cannot hear sounds having frequency less than 20 Hz and more than 20,000Hz.]
- With the help of a diagram explain how a pendulum completes one oscillation. Also mark its mean position and amplitude.

A simple pendulum has a small bob attached to a fixed support with the help of a string. If the bob is pulled to one side and then released, it will show the positions as shown in the figure. The position OA is known as the **mean position** of the pendulum. The pendulum is at this position initially and also comes to rest at this position. When a pendulum moves from position A to B, then B to C, and from C back to A, it is said to complete **one oscillation**.



- Draw a diagram to represent sound of (i) Low pitch



- (ii) High pitch of some loudness.

#### IV. b) SHORT ANSWER TYPE QUESTIONS: (3M)

- Explain how sound is produced in human beings. [Hint-Sound is produced by the larynx located at the upper end of the windpipe. Two vocal cords are stretched across the larynx leaving a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate, producing sound.]
- A simple pendulum makes 10 oscillations in 20 s. What is the time period and frequency of its oscillations?

[Hint- number of oscillations = 10, Time taken = 20 s

Time period= Total time taken/ Number of oscillations = 20/10 = 2seconds

As, we know that the number of oscillations per second is frequency.

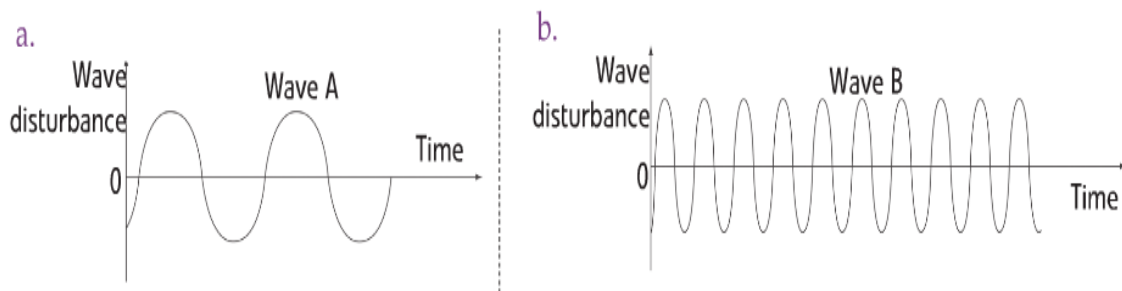
$$\therefore \text{Frequency} = \frac{\text{Number of oscillations}}{\text{Time taken}} = \frac{10}{20} = 0.5 \text{ Hz}$$

3. How is pitch of a sound related to its frequency? [**Hint: Low frequency vibration- low pitch sound, high frequency vibration- high pitch sound**]
4. A pendulum makes 20 oscillations in one second. Calculate its frequency in Hz. [**Hint- Number of oscillations made by pendulum in one second is called frequency. Thus, frequency= 20 Hz**]
5. How is noise different from music? [**Hint: Noise- A sound which is unpleasant to our ears. It is produced due to irregular or non-periodic vibrations. Music- A sound which is pleasant to our ears. It is produced due to regular or periodic vibrations.**]
6. Suggest any four measures to control noise pollution.  
[**Hint: Vehicles exceeding noise limits should be penalized. Restricting the use of loudspeakers in public places. Meeting and gathering should be held without causing disturbance to others. Creating silent zones around schools' hospitals and homes of Senior citizens.**]
7. Why is it harmful to get exposed to loud noise for long periods of time?  
[**Hint: Presence of excessive noise in the surroundings may cause many health-related problems. Lack of sleep, hypertension (high blood pressure), anxiety and many more health disorders may be caused by noise pollution. A person who is exposed to a loud sound continuously may get temporary or even permanent impairment of hearing.**]
8. The sound from an insect is produced when it vibrates its wings at an average rate of 500 vibrations per second.
  - a) What is the frequency of the vibrations in hertz? [**Hint: 500hertz**]
  - b) What is the time period of the vibrations?  
[**Hint: Time period = 1/ frequency = 1/500 = 0. 002second**]
  - c) Can we hear this sound? Why or why not?  
[**Hint: Yes, because its frequency is within the hearing range of humans.**]
9. Give reason-
  - a) We shouldn't put a sharp pin or pencil in our ears. [**Hint: It can damage the eardrum leading to hearing impairment.**]
  - b) Sound produced by every vibrating body cannot be heard by us. [**Hint: Range of frequency of every vibrating body is different. We can hear the vibrations whose frequencies lie in the range of 20- 20,000 hertz**]
10. The moment you hear a sound does any part of your body vibrate? If yes name the part.  
[**Hint: Yes, our ear drum will vibrate and then sends vibrations to the inner ear when we hear any sound**]

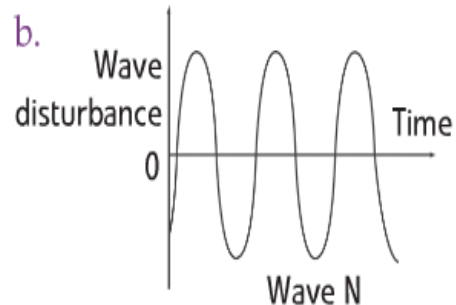
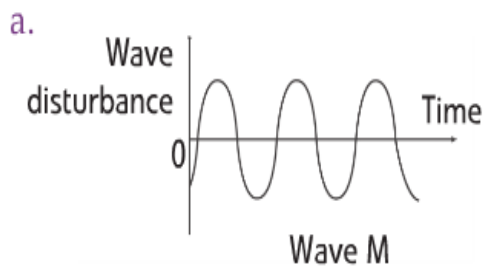
**V. LONG ANSWER TYPE QUESTIONS. (5M)**

1. When we put our ear onto a railway line, we can hear the sound of an approaching train even when the train is far off but its sound cannot be heard through the air. Why? [**Hint: Sound travels slowest in gases and fastest in solids. Sound travels about 15 times faster in steel than in air**]

2. We cannot hear the sound of the exploding meteors in the sky, though we can see them. Why? **[Hint: Sound cannot travel through vacuum. In space there is vacuum. Light can travel through vacuum, so we can see the exploding meteor but cannot hear the explosion.]**
3. Explain why, if we strike a steel tumbler with a metal spoon lightly, we hear a feeble sound but if we hit the tumbler hard, a loud sound is heard? **[Hint: Larger the amplitude of vibration, the louder is the sound. When we strike tumbler lightly, amplitude of vibration is small and feeble sound is heard. On striking tumbler hard, amplitude of vibration is large and loud sound is heard.]**
4. Boojho saw a cracker burst at night at a distance from his house. He heard the sound of the cracker a little later after seeing the cracker burst. Give reason for the delay in hearing the sound. **[Hint: The light travels faster than sound. So, the light from the cracker reaches faster than that of sound of the cracker.]**
5. Why do we hear the sound produced by the humming birds, while the sound of vibration of pendulum is not heard? Why? **[Hint: The frequency of vibration of a pendulum is below 20Hz. We cannot hear infra sound but humming bird produces audible sound that can be heard by human beings)**
6. The town hall building is very close to Vipin's house. There is a clock on the top of the town hall building, which rings the bell every hour. Vipin noticed that the sound of the bell appears to be much clearer at night. Why? **[Hint: Speed, pitch, loudness is initiated with vibration. During day time there are number of vibrations around us. The sound coming from the clock is disturbed and amplitude of vibration decreases. During night time, the vibrations are less in the environment. Hence the sound is clearer. Also, at night moisture level increases at night which increases speed of sound.]**
7. a) Which of the following waves has a higher pitch ?



b) Which of the following waves has lower pitch?



[Hint: a. B has higher pitch. 2. Both have the same pitch.]

c) The deepest part of the oceans in the world is the Mariana Trench in the Pacific Ocean. It is 11000 m deep. How long will it take for sound transmitted by a ship from above the trench to be reflected? Speed of sound in water is about 1480 m/sec

[Hint: Speed of sound in water is about 1480 m/sec

Speed = Distance travelled /Time taken

Time= Distance travelled /Speed

Distance = 11000 m x 2=22,000 m (as it has to travel back)

Time taken= 22000/1480= 14.86 sec approx.]

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CHECKED BY HOD - SCIENCE