INDIAN SCHOOL AL WADI AL KABIR		
CLASS: VIII	**DEPARTMENT: SCIENCE** 2023-24	**DATE: 14/12/2023**
WORKSHEET NO: 14 WITH ANSWERS	**TOPIC:** SOUND	**NOTE: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

I. OBJECTIVE-TYPE QUESTIONS:

1. A person works in a factory where a lot of industrial machines run daily. What harmful effects he is likely to suffer from?

   a) Fever   b) Cataract

   c) Lack of vision   **d) Lack of hearing**

2. A student learns that the sound travels in a waveform. The image shows the sound waves produced by a man and a woman.
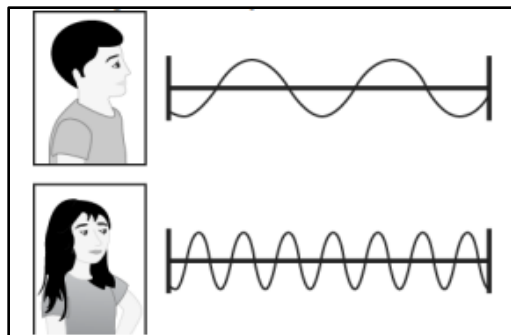
   What can be concluded from the image?

   a) The closer the waves, the greater will be the amplitude

   b) The closer the waves, the greater will be the frequency

   c) The farther the waves, the greater will be the amplitude

   d) The farther the waves, the greater will be the frequency

3. Which of the following sounds can be classified as noise for humans?

   a) Sounds that are softer than 20 dB

   b) Sounds that are louder than 80 dB

   c) Sounds that are between 40 dB and 80 dB

d) Sounds that are in between 20 dB and 40 dB

4. A person is talking on the phone. How does his eardrum work to hear a sound?

   a) The sound enters the inner ear and travels to the brain.

   b) The sound vibrates the eardrum which sends signals to the brain.

   c) The sound vibrates the eardrum which goes into the inner ear and then to the brain.

   d) The sound enters the inner ear and vibrates the eardrum which sends the signal to the brain.

5. Which of these statements proves that sound can travel through solids?

   a) We can hear the sound of the wind.

   b) We can hear the sound of lightning.

   c) We can hear a bell ringing from a distance.

   d) We can hear heartbeats by using a stethoscope.

6. A student plucks two stretched metal strings A and E of different thicknesses. The A string vibrates at the rate of 30 vibrations per second and the E string vibrates at a rate of 10 vibrations per second. How many vibrations per second should be given to string E to produce a higher frequency sound than string A?

   a) below 10 vibrations   **b) above 30 vibrations**

   c) between 10 vibrations to 20 vibrations   d) between 10 vibrations to 30 vibrations

   For question numbers 7-10, 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

7. **Assertion (A):** Trees planted along the 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.

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

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

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

9. **Assertion (A):** The sounds of frequencies less than about 20 vibrations per second (20 Hz) cannot be detected by the human ear.

   Reason (R): Any sound that is above 80 decibels is extremely harmful to human health.

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

10. **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.

    (iv) A is false but R is true.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

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

   a) By vibrating a stretched string.

   b) By vibrating a stretched membrane.

   c) By vibrating air enclosed in a tube.
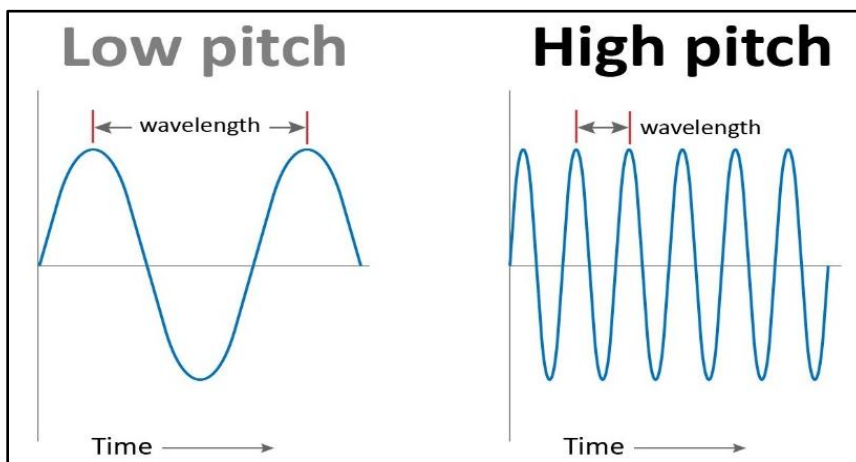
   [Hint: a) Guitar, b) Tabla, c) Flute]

2. What is vibration? **[Hint: The rapid back-and-forth motion of an object.]**

3. On a stormy day, why lightning is seen first and thunder heard later? **[Hint: In air, the speed of light is faster as compared to the speed of sound.]**

4. Draw a diagram to represent the sound of –

   a) Low pitch   b) High pitch of some loudness

5. What is the difference between noise and music? Can music become noise sometimes?

   [Hint: The type of sound which are unpleasant to listen to is known as noise whereas music is a pleasant sound, which produces a sensation. Yes, music can become noise when it's too loud.]

6. Why do 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.]**

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

8. Distinguish between - Audible and inaudible sound. **[Hint: <u>Audible sound</u>- The sound that can be heard. The range of audible sound is from 20 Hz to 20,000 Hz. <u>Inaudible sound</u> - The sound that cannot be heard. Human beings cannot hear sounds having frequencies less than 20 Hz and more than 20,000 Hz.]**

9. Which part of the ear transmits sound vibrations to the brain? A vibrating body should oscillate a minimum of how many times per second to make an audible sound for humans? **[Hint: Auditory nerves. 20 times.]**

10. How is the pitch of a sound related to its frequency? **[Hint: Low-frequency vibration- low-pitch sound, high-frequency vibration- high-pitch sound.]**

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. When we put our ears 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. 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.]**

3. 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 = 2 seconds.

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

   Frequency = Number of oscillations/ Time taken

   = 10/20

= 0.5 Hz

4. A pendulum makes 20 oscillations in one second. Calculate its frequency in Hz.

   [Hint: The number of oscillations made by the pendulum in one second is called frequency.

   Thus, frequency = 20 Hz.]

5. Suggest any four measures to control noise pollution. **[Hint: Vehicles exceeding noise limits should be penalized. Restricting the use of loudspeakers in public places. Meetings and gatherings should be held without causing disturbance to others. Creating silent zones around schools' hospitals and homes of Senior citizens.]**

6. Why is it harmful to get exposed to loud noise for long periods?

   [Hint: The 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.]

7. 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: 500 hertz]**

   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.]

8. 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: The 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 eardrum will vibrate and then send vibrations to the inner ear when we hear any sound.]

V. LONG ANSWER TYPE QUESTIONS (5M):

1. 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: The larger the amplitude of the vibration, the louder the sound. When we strike the tumbler lightly, the amplitude of the vibration is small, and a feeble sound is heard. On striking the tumbler hard, the amplitude of vibration is large, and a loud sound is heard.]**

2. 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 a 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 the sound of the cracker.]**

3. 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 appeared to be much clearer at night. Why? **[Hint: Speed, pitch, and loudness are initiated with vibration. During day time there are several vibrations around us. The sound coming from the clock is disturbed and the amplitude of vibration decreases. During nighttime, the vibrations are less in the environment. Hence the sound is clearer. Also, at night moisture level increases at night which increases the speed of sound.]**

4. a) Which of the following waves has a higher pitch?
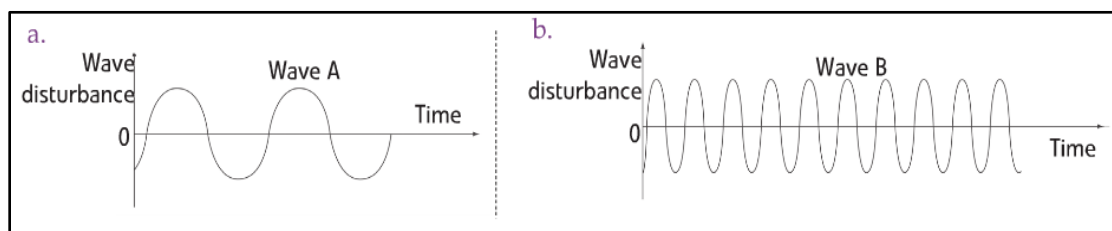
b) Which of the following waves has a lower pitch?

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

c) The deepest part of the ocean 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? The speed of sound in water is about 1480 m/sec

[Hint: The 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.]

5. Why do we hear the sound produced by the hummingbirds, while the sound of the vibration of a pendulum is not heard? Why? **[Hint: The frequency of vibration of a pendulum is below 20Hz.We cannot hear infrasound but hummingbird produces audible sounds that can be heard by human beings]**

V. CASE STUDY- BASED QUESTIONS/ PASSAGE BASED QUESTIONS:

1. Sound is a form of energy that 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). The larger the amplitude, the louder the sound. The number of oscillations/vibrations per second is called **frequency.** which is expressed in Hertz **(Hz).** The 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 that enables 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]**

g) What is the unit of frequency? **[Hint: Hertz]**

h) What is the unit of loudness? **[Hint: Decibel (dB)]**

i) Mention your experience when you touch a sound-producing school bell.

[Hint: We feel the vibration in it.]

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