PHYSICS

BOOKS - ICSE

SOUND

Solved Examples

1. A boy fires a gun and another boy at a distance of 1360 m hears the sound of firing

the gun 4 s after its smoke is seen. Find the speed of sound.

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2. During a thunderstorm, the thunder is heard 2.5 seconds after the flash of lightning is seen. If the speed of sound is $330ms^{-1}$ find the distance at which lightning took place.

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3. The thunder is heard during a thunderstorm three seconds after sound is 342 m/s, find the distance at which lightning took place.

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4. The speed of sound in water is 1500 m/s. A boat man hears an echo 3 s after sending a sound pulse into the sea. What is the depth of the sea?

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Test Yourself True Or False

1. Sound can travel in vacuum.

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2. Sound is a form of energy.

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3. Sound can only be produced by vibrating bodies

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4. Larger is the amplitude, feeble is the sound

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5. The frequency is measured in hertz

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6. Loudness of a sound depends on .....

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7. Waveforms of two different stringed instruments can be the same.

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8. Generally, a woman's voice has a higher pitch than a man's voice.

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9. A ticking clock sound is heard late when heard through a metal.

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Test Yourself Fill In The Blanks

1. Sound is produced when a body.....

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2. The number of vibrations made by a vibrating body in one second is called :

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3. Pitch depends on .....

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4. Sound can travel in.....

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5. We can hear sounds of frequency in the range of .....

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6. Sound requires a ..... for propagation.

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7. Sound travels faster in ..... than in liquids.

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8. The sound heard after reflection is.....

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9. ..... produces sensation in ears.

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Test Yourself Match The Column

1. Match the following

	Column A		Column B
(a)	Vibrations cause	(i)	absorb sound
(b)	A shriller sound is	(ii)	second
(c)	Unit of frequency	(iii)	sound
(d)	Unit of time period	(iv)	of high pitch
(e)	Curtains	(v)	hertz

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Test Yourself Select The Correct

1. We can distinguish a shrill sound from a flat sound by its :

A. amplitude

B. loudness

C. pitch

D. none of the above

Answer: C

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2. We can hear sounds of frequency in the range of .....

A. 10 Hz

B. 500 Hz

C. 100,000 Hz

D. 50,000 Hz.

Answer: B

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3. Sound cannot travel in :

A. gases

B. liquids

C. solids

D. vacuum

Answer: D

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4. What minimum distance is required between the source of sound and the reflecting surface to hear an echo ? Give reason.

A. 10m

B. 17m

C. 34m

D. 50m

Answer: B

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5. Wavelength is measured in :

A. kg

B. second

C. litre

D. metre

Answer: D

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6. The speed of sound in water is :

A. $332ms^{-1}$

B. $1500ms^{-1}$

C. $5000ms^{-1}$

D. $1000ms^{-1}$

Answer: B

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7. Sound travels the fastest in:

A. liquids

B. solids

C. gases

D. vacuum

Answer: B

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Test Yourself Short Long Answer Type Questions

1. What do you mean by a vibratory motion ?

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2. What is sound ?

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3. How is sound produced ?

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4. Describe an experiment to show that each source of sound is a vibrating body.

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5. Name two sources of sound.

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6. How do we produce sound ?

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7. The bees do not have voice-boxes but they still make sound. How ?

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8. Can sound travel through a vacuum ? Describe an experiment to explain your

answer.

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9. Describe an experiment to show that sound can travel in water.

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10. Describe an experiment to show that sound can travel in a solid.

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11. Can two persons hear each other on moon's surface ? Give reason to support your answer.

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12. What is a longitudinal wave ?

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13. Define amplitude.

Watch Video Solution

14. Define the Time period

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15. Define frequency of a vibrating body. Write its Sl unit.

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16. Write the audible range of frequency for the normal human ear.

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17. What are ultrasonics ? Can you hear the ultrasonic sound ?

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18. What are infrasonics ? Can you hear them ?

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19. How does a bat make use of ultrasonic waves to find its way?

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20. Name the two characteristics of sound which differentiate any two sounds from each other.

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21. The loudness of a sound depends upon the

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22. How does the loudness of sound produced depend on the vibrating area of the body ?

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23. The outer case of the bell in a temple is made big. Give a reason.

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24. State the factors on which the pitch of a sound depends.

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25. Differentiate between a high pitch sound and a low pitch sound.

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26. How does a man's voice differ from a woman's voice ?

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27. Name the characteristic which differentiates two sounds of the same pitch and same loudness.

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28. You recognize your friend by hearing his voice on a telephone. Explain.

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29. A musician recognizes the musical instrument by hearing the sound produced by it, even without seeing the instrument. Which characteristic of sound makes this possible ?

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30. Describe an experiment to show the production of sound having low and high pitch.

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31. How does a musician playing on a flute change the pitch of sound produced by it?

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32. Why are musical instruments provided with more than one string?

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33. How can the pitch of sound produced in a piano be changed ?

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34. Explain why you can predict the arrival of a train by placing your ear on the rails without seeing

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35. State the speed of sound in air ?

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36. Write the approximate speed of sound in water

Watch Video Solution

37. Write the approximate speed of sound in steel

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38. During a thunderstorm, the sound of a thunder is heard after the lightning is seen. Why?

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39. Describe an experiment to estimate the speed of sound in air.

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40. Can sound travel through solids and liquids? In which of these does it travel faster?

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41. What do you mean by reflection of sound?

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42. State one use of reflection of sound.

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43. What is an echo?

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44. What minimum distance is required between the source of sound and the reflecting surface to hear an echo ? Give reason.

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45. List four substances which are good absorbers of sound.

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46. List the measures that you will take when designing a sound-proof room.

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Test Yourself Numericals

1. A boy fires a gun and another boy at a distance of 1020 m hears the sound of firing the gun 3 s after seeing its smoke. Find the speed of sound.

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2. A boy on a hill A fires a gun. Another boy on hill B hears the sound after 4 s. If the speed of sound is $330ms^{-1}$, find the distance between the two hills.

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Questions Write T For True And F For False Correct The False Statements

1. Wave is a disturbance which carries energy with lots of matter.

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2. When a wave moves in the direction of the vibrating Particles, it is called a longitudinal

wave.

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3. One compression and one rarefaction makes two waves.

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4. When frequency of a vibrating object increases, its time period decreases.

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5. The SI unit of amplitude is .....

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Questions Choose The Correct Option To Fill In The Blank

1. Any sound below ..... (20,000 Hz/20 Hz) cannot be heard by human ears.

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2. Echocardiograms use ..... (ultrasonic/infrasonic) waves to look into your body.

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3. Sound cannot travel through mediums where there are ..... (more/no) particles

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4. Objects with lower pitch have ..... (low/high) frequency.

5. Loudness of a sound depends on .....

6. Fluffy materials ..... (absorb/reflect) sound.

7. Echo can be heard only if the reflected sound reach our ears ..... (after/ before) 0.1 s of the original sound.

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Exercises Section I

1. Name the following

A type of wave in which the wave travels in a

direction perpendicular to the direction of the disturbance

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2. Name the following

One compression and one rarefaction

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3. The number of vibrations made by a vibrating body in one second is called :

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4. Name the following

The time taken by a vibrating object to complete one vibration

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5. Define the following term with its unit.

Frequency

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6. What name is given to the sound waves of frequency (a) less than 20 Hz, (b) between 20 Hz and 20,000 Hz (c) above 20,000 Hz.

Which waves among the above are not audible to human ear?

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Exercises Section I Choose The Correct Option

1. In a flute, sound is produced by the vibration of:

A. Strings

B. Membrane

C. Air

D. None of these

Answer:

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2. Number of waves passing through a point in one second

A. Frequency

B. Amplitude

C. Time period

D. Wavelength

Answer:

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3. Define the following term with its unit.

Time period

A. Hour

B. Minute

C. Second

D. All of these

Answer:

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4. Ultrasound can be detected by:

A. Elephants

B. Whales

C. Giraffes

D. Bats

Answer:

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5. When the amplitude of a wave increases, its

A. pitch increases

B. frequency increases

C. intensity increases

D. frequency decreases

Answer:

6. We can hear sounds of frequency in the range of .....

A. 100 Hz

B. 20,0000 Hz

C. 10 Hz

D. 50,000 Hz

Answer:

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7. Good reflector of sound:

A. Clothes

B. Paper

C. Steel

D. Curtain

Answer:

Watch Video Solution

8. To hear an echo, the minimum distance between source and reflector in air is:

A. 330 m

B. 34 m

C. 17 m

D. 100 m

Answer:

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9. Sound cannot travel through:

A. Air

B. Solids

C. Liquids

D. Vacuum

Answer:

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Exercises Section I Write T For True And F For False Correct The False Statements

1. Sounds cannot travel through materials like stone, water, and wood .

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2. The time period and frequency are related according to the formula f =1+T

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3. The intensity of a sound is a measure of the energy the sound wave is carrying .

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4. Vibrations generated by earthquakes produce ultrasonic sound.

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5. Human beings can hear ultrasonic sound.

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6. Generally, a woman's voice has a higher pitch than a man's voice.

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7. Normal conversations is of 160 dB.

8. Sound travels with different speeds in different mediums.

9. Location of underwater objects can be determined by SONAR

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Exercises Section I Choose The Correct Option To Fill In The Blank

1. Any ..... (vibrating/hot) body is a source of sound .

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2. Violin produces sound by the vibration of .....(air/strings)

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3. A wave is a disturbance that carries ..... (energy/sound) without the transfer of matter.

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4. If there are 50 waves passing through a point in one second, then its frequency is ..... $\left(\frac{1}{50} / 50\right)$ Hz.

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5. Two waves with the same frequency ..... (can/cannot) have different amplitudes.

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6. A sound with a high pitch has a ..... (low/high) frequency.

Watch Video Solution

7. The loudness of sound is measured in ..... (amplitude/decibel)

Watch Video Solution

8. Clothes and paper .....(reflect/absorb) sound.

9. Generally sound travels ..... (faster, slower) in solids.

10. Speed of sound ..... (increases/decreases) with temperature.

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Exercises Section Ii Give Reason

1. If you strike a tuning fork and then touch water in a bowl, the water splashes.

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2. If you strike a tuning fork hard, you get a louder sound.

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3. Music recording studios use sound absorbing materials.

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4. To get an echo, the reflecting wall should be about 17 m from the source

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Exercises Section Ii Distinguish Between

1. Distinguish between Transverse and Longitudinal waves

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2. Distinguish between Compression and rarefaction

 Watch Video Solution

3. Distinguish between Frequency and time period

 Watch Video Solution

4. Distinguish between Amplitude and frequency

Watch Video Solution

5. Distinguish between Infrasonic and ultrasonic sound .

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Exercises Section Ii Short Answer Questions

1. How is sound produced? Name two sources of sound.

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2. Define frequency of a vibrating body. Write its Sl unit.

Watch Video Solution

3. Define amplitude of a vibrating body. What is its SI unit?

Watch Video Solution

4. What do you mean by ultrasonic sound? Where is it used?

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5. Name the three characteristics of sound.

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6. How is pitch related to frequency?

Watch Video Solution

7. How does loudness depend on the amplitude of vibration?

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8. What is timbre of a sound?

Watch Video Solution

9. What is an echo? How is it produced?

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Exercises Section Ii Long Answer Questions

1. Explain how sound is propagated as a longitudinal wave .

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2. Prove that sound transmits better through solids .

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3. Name the three characteristics of sound.

Watch Video Solution

4. Write an experiment to show that sound can travel through liquids.

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Exercises Section Ii Numerical Question

1. The time period of a vibrating body is 0.020. What is its frequency?

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2. Playing middle C on a piano keyboard produces a sound with a frequency 256 Hz. What is its time period?

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3. The frequency of a tuning fork is 120 Hz. What is its time period?

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4. If 500 waves pass through a point in 2 s. What is the frequency? What is the time period?

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5. If 200 waves pass through a point A in one second and 250 waves pass through another point B in 2 seconds and both have the same amplitude which one has higher frequency?

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6. If the time taken by a wave to pass through a point is 0.002 s. What is its time period and frequency.

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7. An observer stands at a distance of 660 m from a cliff and fires a gun. After what time period will he hear the echo, if the sound travels at a speed of 330 m/s?

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8. The sound of thunder is heard 3 s after flash of lightning. If the speed of sound is 340 m/s, find the height of the cloud.

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9. The speed of sound in water is 1600 m/s. A boat man hears an echo 3 s after sending an ultrasonic sound into the sea. What is the depth of the sea?

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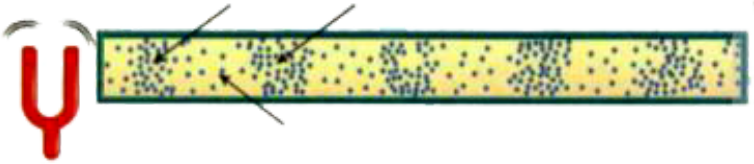
Exercises Picture Study

1. In the figure given alongside, mark compressions and rarefactions of a wave as the tuning fork is vibrating. Also mark one complete wave.



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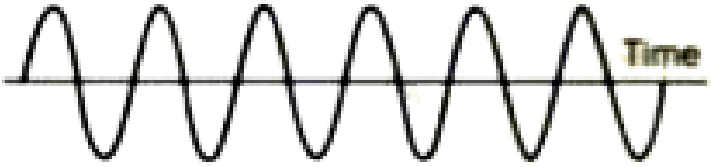
2. Copy this wave which has a frequency of 6 Hz into your notebook and draw a wave of frequency 2 Hz having the same amplitude.



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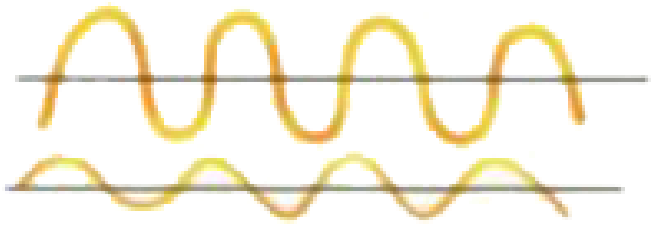
3. In the following figure find out which has a soft sound and which has a loud sound.



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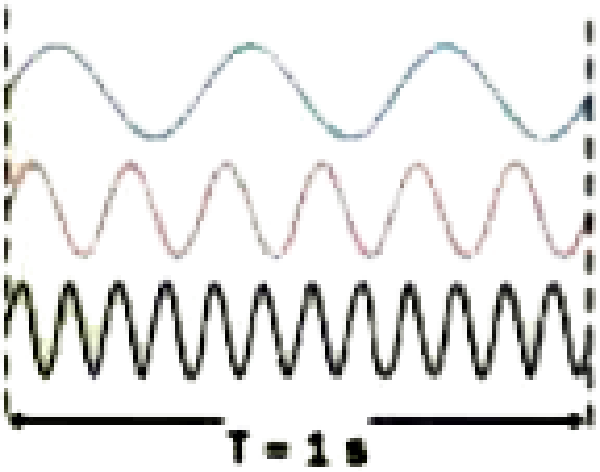
4. Find the frequency of the waves given below.



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