



# PHYSICS

## BOOKS - MBD

### SOUND

#### Example

1. How does the sound produced by the vibrating object in a medium reach your ear ?



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2. Explain how sound is produced by your school bell ?



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3. Why are sound waves called mechanical waves ?



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



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5. Which wave property determines: Loudness.



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6. Which wave property determines: pitch.



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7. Guess, which sound has a higher pitch :  
guitar or a car horn ?



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8. What are wavelength, frequency, time period  
and amplitude of a sound wave?



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



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10. Calculate the wavelength of a sound wave whose frequency is 220 Hz and speed is  $440\text{ms}^{-1}$  in a given medium.



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**11.** A person is listening to a tone of 500 Hz sitting at a distance of 450 m from the source of sound. What is the time interval between successive compressions from the source ?



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**12.** Distinguish between loudness and intensity of sound.



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



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**14.** An echo returned in 3 s. What is the distance of reflecting surface from the source ? Given that the speed of sound is  $342\text{ms}^{-1}$ .



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**15.** Why are the ceilings of concert halls curved?



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**16.** What is the audible range of average human ear?



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**17.** What is the range of frequencies associated with : infrasound ?





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**18.** What is the range of frequencies associated with: ultrasound?



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**19.** A submarine emits a sonar pulse, which returns from underwater cliff in 1.02 s. If the speed of sound in salt water is  $1531\text{ms}^{-1}$  how far away is the cliff ?



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**20.** What is sound and how is it produced ?



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**21.** Describe with the help of diagram, how compressions and rarefactions are produced in air near a source of sound ?



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22. Cite an experiment to show that sound need a material medium for its propagation?



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23. Describe an experiment to show that sound need a material medium for its propagation



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**24.** Describe an activity to show that sound is a mechanical wave and need a material medium for its propagation.



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**25.** Why is sound wave called longitudinal wave?



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**26.** Which characteristic of the sound help you to identify your friend by this voice while sitting with others in a dark room.



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**27.** Which characteristic of the sound help you to identify your friend by this voice while sitting with others in a dark room.



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**28.** Flash and thunder are produced simultaneously. But thunder is heard a few seconds after the flash is seen. Why?



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**29.** A person has a hearing range from 20 Hz to 20 KHz. What is the typical wavelength of sound waves in air corresponding to these frequencies ? Take the speed of sound in air as  $344\text{ms}^{-1}$ .



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**30.** Two children are at opposite ends of an aluminium rod. One strikes the end of the rod with a stone. Find the ratio of times taken by the sound wave in air and in aluminium to reach the second child.



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**31.** The frequency of source of sound is 100 Hz. How many times does it vibrate in a minute ?



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



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**33.** When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remains the same. Do you hear echo sound on a hotter day ?





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**34.** Give two practical applications of reflection of sound waves.



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**35.** A stone is dropped from the top of a tower 500 m high into a pond of water at the base of the tower. When is the splash heard at the top

? Given,  $g = 10ms^{-2}$  and speed of sound =  $340ms^{-1}$ .



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**36.** A sound wave travels at a speed of  $339ms^{-1}$ . If its wavelength is 1.5 cm, what is the frequency of the wave ? Will it be audible ?



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**37.** What is reverberation ? How can it be reduced ?



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**38.** What is loudness of sound ? What factors does it depend on ?



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**39.** Explain how bats use ultrasounds to catch a prey ?



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**40.** How is ultrasound used for cleaning ?



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**41.** Explain the working and applications of SONAR.



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**42.** Write the full name of SONAR. How will you determine the depth of a sea using echo ranging ?



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**43.** Write full form of SONAR. List any two purposes for which, it is used and explain its working for any one such purpose.





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**44.** A sonar device on a submarine sends out a signal and receives an echo 5s later. Calculate the speed of sound in water if the distance of the object from submarine is 3,625 m.



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**45.** Explain how defects in a metal block can be detected using ultrasound ?



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**46.** Explain how the human ear works.



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**47.** Name two different types of waves. Give an experiment to explain the formation of transverse waves.



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**48.** Define transverse waves.



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**49.** What should be the conditions for the production of transverse waves?



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**50.** Give examples of transverse waves.



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**51.** Define crest and trough.



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**52.** Define longitudinal wave.



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**53.** Arrange an experiment to demonstrate the formation of longitudinal wave.



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**54.** In reference to longitudinal wave, define compressions and rarefactions.



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**55.** Establish the relation between wave velocity, wavelength and frequency of a wave.



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**56.** Distinguish between sound waves and light waves.



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**57.** Explain the classification of sound waves on the basis of frequency range.



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**58.** What are the laws of reflection of sound ?

How will you prove these laws experimentally ?



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**59.** List the three characteristics of sound waves. State the factors on which each of these characteristics depends.



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**60.** What is periodic motion ? Give three examples.



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**61.** Define oscillatory motion. Give examples.



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**62.** Differentiate between transverse waves and longitudinal waves.



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**63.** How is sound propagated ? Can it be propagated through vacuum ? out of solid, liquid and gas in which medium speed of sound is maximum and in which it is least minimum ?



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**64.** What are applications of ultrasound ?





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**65.** Define the terms wave and wave motion.



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**66.** Distinguish between a wave pulse and a periodic wave.



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**67.** What are mechanical or elastic waves ? Give examples.



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**68.** Explain in brief the dependence of speed of sound on nature of material medium and temperature.



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**69.** Define the terms time period and frequency of an oscillating body. Give their units and write the relation between them.



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**70.** Give two practical applications of reflection of sound waves.



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71. Distinguish between the terms music and noise.



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72. How can bats ascertain distances, directions, nature and size of the obstacles without eyes ?



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**73.** It is observed that some animals get disturbed before earthquake. How ?



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**74.** What will be the frequency of Mohan's heart when it beats 75 times in 1 minute ?



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**75.** A boat strikes waves of ocean having crest 100 m away. The wave velocity of crest is  $20\text{ms}^{-1}$ . What is the frequency of waves striking the boat ?



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**76.** A source of wave produces 40 crests and 40 trough in 0.4 s. Find the frequency of wave.



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77. A source produces a sound of wavelength  $1.7 \times 10^{-2}m$ . If its velocity is  $343.4ms^{-1}$ , then find frequency of sound.



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78. What will be the frequency of the wave, if its time period is  $0.05\text{ s}$  ?



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**79.** Longitudinal waves is produced on a spring. This wave travels with a velocity of  $30\text{cm/s}$  and its frequency is 20 Hz. What is the minimum distance between two consecutive compression?



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**80.** A message was transmitted from boat which returned to the sender after reflection from the bottom of the sea in 0.8 s. If the

velocity of sound in water is  $1500\text{ms}^{-1}$  then  
find the depth of sea.



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**81.** The frequency of a tuning fork is 600 Hertz.  
What will be its time period ?



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**82.** A stone is dropped in a 44.1 m deep well. If  
the sound produced by striking of stone with

the water surface is heard after 3.13 s then find the velocity of wave in air.



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**83.** A man claps near a cliff and echo is heard after 5 s. If the velocity of sound is  $346\text{ms}^{-1}$ , then what will be the distance between the man and the cliff ?



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**84.** A ship produces ultrasonic sound which is collected in 3.42 s after reflection from the surface of sea. If the velocity of ultrasonics is  $1531\text{ms}^{-1}$ , then what is the distance of sea surface from sea ?



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**85.** What is sound ?



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**86.** In which medium the velocity of sound is more — solids or Gases ?



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**87.** What is the audible range of average human ear?



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**88.** What is the nature of sound Longitudinal wave or Transverse wave ?



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**89.** What should be the properties of the medium for producing sound waves ?



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**90.** What is the relation between frequency, wavelength and wave velocity ?



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**91.** What is the unit of frequency ?



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**92.** What is the relation between frequency ( $f$ ) and time period ( $T$ ) ?



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**93.** On dropping a pebble in still water, what type of waves are produced on the surface of water?



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**94.** What kind of sound waves are produced in air ?



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**95.** What is the full form of SONAR ?



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**96.** What is seismograph for ?



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**97.** Which scale measures the intensity of earthquake measured ?





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**98.** Earthquake of what intensity is considered safe on Richter Scale.



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**99.** What is the cause for production of sound ?



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**100.** What is the time for persistence of hearing ?



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**101.** What is the velocity of sound on moon ?



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**102.** Which animal can hear infrasonics ?



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**103.** What is audible range for human beings ?



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**104.** What is the minimum distance of the obstacle from the source of sound for hearing distinct echo ?



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**105.** Which has a higher pitch, whistle or a drum ?



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**106.** Explain why (or how): A violin note and sitar note may have the same frequency, yet we can distinguish between the two notes,



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