PHYSICS

BOOKS - TARGET PUBLICATION

STUDY OF SOUND

Exercise

1. Choose the correct alternative

In_____ waves, particles oscillate up and down about their mean positions.

A. longitudinal

B. mechanical

C. electromagnetic

D. transverse

Answer: D

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2. Choose the correct alternative

During the Propagation of sound wave

through medium, there is change in density and _____of the medium.

A. pressure

B. texture

C. state

D. volume

Answer: A

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3. Choose the correct alternative

When a sound wave transmitted through a medium, its _____is transported from one Place to another.

A. mass

B. energy

C. velocity

D. density

Answer: B

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4. Choose the correct alternative

If the time period of an oscillation is tripled, then the frequency becomes _____Of its original.

A. 3 times

B. $\frac{1}{3}rd$

C. 9 times

D. $\frac{1}{9}th$

Answer: B

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5. Choose the correct alternative

Speed of sound_____ with increase in temperature.

A. increases

B. decreases

C. doesn't change

D. changes according to the pressure

Answer: A

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6. Choose the correct alternative

For a fix temperature, the velocity of sound does not depend on the _____

A. density of the gas

B. pressure of the gas

C. volume of the gas

D. molecular weight of the gas

Answer: B

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7. Choose the correct alternative

The audible sound range for human is _____.

A. 0-20Hz

B. 20 Hz - 20000 Hz

C. 20Hz- 2000 Hz

D. 1000 Hz - 10,000 Hz

Answer: B

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8. Choose the correct alternative

Ultrasonic sounds have frequency _____.

A. below 20 Hz

B. above 10000 Hz

C. above 20000 Hz

D. below 20000 Hz

Answer: C

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9. Choose the correct alternative

A factory owner wants to detect crack in 4 machine. The sound which he can use for this purpose is

A. Ultrasound

B. Audible sound

C. Infrasound

D. None of these

Answer: A

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10. Choose the correct alternative

Bats can produce _____sounds.

A. infrasonic

B. loud

C. ultrasonic

D. low quality

Answer: C

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11. To hear an echo, the total distance covered by sound from the point of generation to the reflecting surface and back should be atleast _____

A. 36m

B. 17.2m

C. 34.4m

D. 19m

Answer: C

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12. Complete the paragraph

Complete the following paragraph by choosing correct alternatives from those given in the bracket.

(audible, 20 Hz, infra-sound, greater, 20,000 Hz, electrical signals, less, pressure)

Range of frequencies of sound which can be heard by the human ears is called _____sound. The range of audible sound is between_____to _____to . Sound of frequency less than 20 Hz is called _____Ultra sound has a frequency _____than 20,000 Hz. Human ear converts pressure variations in air into_____.

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13. Name the following

The maximum value of pressure or density.

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14. Name the following

State of matter in which velocity of sound is highest.

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15. Name the following

Technology that uses ultrasonic sound waves to generate images of internal organs of the human body.

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16. True of False.

If false , write the correct sentence

Sound is a form of energy.

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17. True of False.

If false , write the correct sentence

Vibrations can be felt but cannot be seen.

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18. True of False.

If false , write the correct sentence

In longitudinal waves, particles oscillates in a direction perpendicular to the direction of propagation of waves.

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19. True of False.

If false , write the correct sentence

Speed of sound is different in different media at same temperatures.

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20. True of False.

If false , write the correct sentence

Speed of sound increases from solids to liquids.

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21. True of False.

If false , write the correct sentence

Velocity of sound is more at 0° C as compared to room temperature.

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22. True of False.

If false , write the correct sentence

Bats, dolphins, mice have the ability to produce ultrsound but cannot hear infra sound.

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23. True of False.

Infrasound is used to establish ship to ship communication.

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24. Complete the analogy

Longitudinal wave : parallel :: transverse wave_____

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25. Complete the analogy

Higher density: compression :: lower densily:_____.

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26. Complete the analogy

Value of frequency: pitch of the sound :, value of amplitude :_____.

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27. Complete the analogy

Receiver : reflected pulse :: Transmitter: _____.

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28. Match the following

Match the parts of human ear given in column I with their functions given in column II..

	Column I		Column II
i.	Pinna	a.	Connects inner ear to the brain
ii.	Auditory nerve	b.	Generates vibrations in ear
iii.	Cochlea	c.	Collects sound waves
iv.	Ear drum	d.	Converts the vibrations into electrical signals

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29. Answer the following

Fill in the blanks and explain.

Sound does not travel through _____.

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30. Answer the following

Fill in the blanks and explain.

The velocity of sound in steel is_____ than the velocity of sound in water.

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31. Fill in the blanks and explain:

The incidence of.....in daily life shows that the velocity of sound is less than the velocity of light.

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32. Fill in the blanks and explain:

To discover a sunken ship or objects deep inside the sea,.....technology is used.

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33. Answer the following

Define time period (T) of a sound wave.

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34. Answer the following

What is amplitude of a sound wave?

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35. Answer the following

What is the relation between frequency and time period of a sound wave?

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36. Answer the following

Derive an expression for speed of sound.

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37. Answer the following

How do physical conditions affect velocity of sound in a gaseous medium?

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38. The molecular weight of oxygen gas (02) is 32 while that of hydrogen gas (H2) is 2. Prove that under the same physical conditions, the velocity of sound in hydrogen is four times that in oxygen.

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39. Answer the following

What bs the difference between frequency range of lafra-sound and audible sound?

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40. what are the uses of ultrasonic sound?

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41. Answer the following

Give one example cach of infra sound a ultrasonic sound?

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42. Answer the following

Give some examples of good as well as bad reflectors of sound.

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43. Answer the following

Classify the following as good bad reflectors of sound: paper, metal sheet, carpet, walls of a room.

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44. What is an echo? What factors are important to get a distinct echo?

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45. To hear the echo distinctly,will the distance from the source of sound to the reflecting surface be same at all temperatures? Explain your answer.

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46. When is the reflection of sound harmful?

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47. Answer the following questions:

Study the construction of the Golghumat at Vijapur and discuss the reasons for the multiple echoes produced there.

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48. Answer the following questions:

What should be the dimensions and the shape of classrooms so that no echo can be produced there?

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49. Answer the following questions:

How will you reduce reverberation in public halls or buildings?

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50. Where and why are sound absorbing materials used?

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51. Answer the following

What does SONAR stand for?

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52. Answer the following

State the application of SONAR technique.

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53. Answer the following

When and why SONAR technique was developed?

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54. Answer the following

Explain the mechanism of SONAR.

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55. Answer the following

What is sonography? Explain the technique of sonography.

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56. Answer the following

How is ultrasound used in medical science?

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57. Answer the following

How is sonography bring misused ? What is the necessary step taken to prevent it?

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58. Answer the following

What happened to the ear drum when a compression reaches it?

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59. Give reasons

Bats can trace out their path, cven in the dark nights.

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60. We cannot hear the echo produced in a classroom.

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61. The intensity of reverberation is higher in a closed and empty house.

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62. The roof of a movie theatre and a conference hall is curved.

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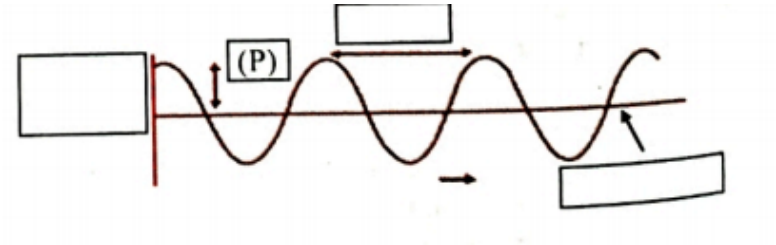
63. Question based on diagram

Label the given diagram of sound waves and redraw it. Define the term (P) in one sentence.



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64. What is the frequency of a sound wae if the time period of its oscillation is 0.05 second?

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65. Complete the following table

	υ (Hz)	λ (m)	v (m/s)
i.	4000	____	344
ii	____	0.5	600
iii.	1500	0.01	____

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66. Sound waves of wavelength1cm have a velocity of 340 m/s in air. What is their

frequency? Can this sound be heard by the human ear?

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67. Nita heard the sound of lightning after 4 seconds of seeing it. What was the distance of the lightning from her?

(The velocity of sound in air is $340 m / s$)

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68. How long will it take for a sound wave of 25 cm wavelength and 1.5 kHz frequency, to travel a distance of 1.5 km?

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69. Calculate the distance travelled by a spund wave having frequency 800 Hz and wavelength 0.14m, if it travels for 8 second in a certain medium.

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70. The speed of sound in air at 0° C is 332 m/s, If it increases at the rate of 0.6 m/s per degree, what will be the temperature when the velocity has increased to 344 m/s?

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71. Helium gas is filled in two identical bottles A and B. The mass of the gas in the two bottles is 10 gm and 40 gm respectively. If the

speed of sound is the same in both bottles, what conclusions will you draw?

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72. Hydrogen gas is filled in two identical bottles, A and B, at the same temperature. The mass of hydrogen in the two bottles is 12 gm and 48 gm respectively. In which bottle will sound travel faster? How mant times as fast as the other?

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73. Sunil is standing between two walls. The wall closest to him is at a distance of 660 m. If he shouts, he hear the first echo after 4 s and another after another 2 seconds.

What is the velocity of sound in air?

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74. Ultrasonic waves are transmitted downwards into the sea with the help of a SONAR. The reflected sound is received after 4

s. What is the depth of the sea at that place?

(Velocity of sound in seawater =$1550 m / s$)

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75. The speed of sound in air at 0° C is 332 mis. IF it increases at the rate of 0.8 m/s per degree, what will be the temperature when the velocity has increased to 352 m/s?

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76. A sound wave of wavelength 3 cm travels with a speed of 336 ms. Calculate its frequency. Will it be audible?

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77. Sunita saw the firecrackers and after 5 seconds, heard its bursting. At what distance from her the firecrackers were actually burnt? (The velocity of sound in air is 340 m/s?)

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78. Calculate the distance travelled by a sound wave having frequency 350 Hz and wavelength 0.8 m, if it tavels for 6 second in a certain medium.

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79. Helium gas is filled in two identical bottles A and B. The mass of the gas in the two boules is 15 g and 90 g respectively. If the speed of

sound is the same in both bottles, what conclusions will you draw?

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80. Hydrogen gas is filled in two identical bottles, A and B, at the same temperature. The mass of hydrogen in the two bottles is 12 g and 108 g respectively. In which bottle will sound travel faster? [low many times as fast as the other?

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81. How does the frequency velocity of sound depend on its frequency?

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82. How is the direction of the oscillation of the particles of the medium related to the direction of propagation of the sound wave?

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83. How are the frequencies of notes sa, re, ga, ma, pa, dha, ni related to each other?

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84. What is the main difference between the frequencies of the voice of a man and that of a woman?

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85. Choose the correct alternative

The amplitude of sound Wave determines its

A. Speed

B. frequency

C. strength

D. nature.

Answer:

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86. Choose the correct alternative

A man should use _____ Materials to reduce reverberation in a room.

A. refracting

B. glass

C. sound-absorbing

D. reflecting

Answer:

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87. Answer the following

State true or false. If false, write the correct sentence.

When a rarefaction reaches the ear drum, the pressure outside the membrane increases and forces the car drum outward.

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88. Answer the following

Name the following.

The part of ear which has funnel like shape.

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89. Answer the following

Find odd one out.

Pinna, Eardrum, Tympanic cavity. Eustachian tube, Probe.

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90. Give scientific reasons

Why cannot we hear the echo produced in a

classroom?

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91. Answer the following.

What is compression and rarefaction?

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92. Answer the following.

A-sound wave of wavelength 0.25 mand

frequency 320 Hz travels in forward direction,

How much distance will it travel in 10 seconds?

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93. Answer the following

Derive an expression for speed of sound.

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94. Answer the following.

Complete the following table

	υ (Hz)	v (m/s)	λ (m)
a.	5000	____	0.11
b.	____	750	0.75
c.	4500	350	____

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