



PHYSICS

BOOKS - PEARSON IIT JEE FOUNDATION

SOUND

Very Short Answer Type Questions

1. The to and fro motion of an object is called____.

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2. s^{-1} is the unit of _____.

| 3. The time taken to perform 45 vibrations is times the time taken |
|---|
| for a single vibration. |
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| |
| 4. If a body vibrates 50 times in a second, then its frequency is |
| Watch Video Solution |
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| |
| 5. Sitar, veena and violin are some instruments. |
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| |
| 6. The sounds of frequencies greater than are called ultrasonic |
| sounds. |
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| |

| | travels much than light in a given medium. |
|------------------|---|
| Ow | atch Video Solution |
| | |
| 8. In gen | eral, the voice of a woman has a than that of a man. |
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| | |
| 9. The ve | locity of sound is in air compared to that of water. atch Video Solution |
| 9. The ve | locity of sound is in air compared to that of water. atch Video Solution |
| 9. The ve | locity of sound is in air compared to that of water. atch Video Solution are used to detect flaws inside a metal. |
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11. The vibrations of a turning fork are _____ in nature.

A. oscillatory

B. periodic

C. Both (a) and (b)

D. None of these

Answer: C

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12. The frequency of sound waves which can be heard by human is _____.

A. less than 20 Hz

B. greater than 20 kHz

C. between 20 Hz and 20 kHz

D. None of these

Answer: C

13. If the time period of a simple pendulam is 10 seconds, then its frequency ius _____Hz.

A. 10

 $\mathsf{B.}\,5$

 $\mathsf{C}.0.1$

D. 1

Answer: C

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14. A string is stretched over two rigid supports and a weight of 1 kgwt is suspended from one of its free ends and then it is plucked. If the length of string over two rigid supports is decreased and plucked again, then the frequency of sound produced A. in the first case is more.

B. in the second case is more.

C. in both the cases is equal.

D. Cannot be determined

Answer: B

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15. The principle of reflection of sound is used _____

A. in hearing echos

B. to locate shoals of fish under the sea bed

C. in the detection of insects by bats

D. All the above

Answer: D

16. The velocity of sound is maximum in _____

A. liquids

B. solids

C. gases

D. Cannot be determined

Answer: B

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17. Sound cannot travel in _____

A. air

B. glass

C. iron

D. vacuum

Answer: D



18. Bats make use of _____ waves.

A. ultrasonic sound

B. infrasonic sound

C. audible range sound

D. All the above

Answer: A



19. The frequency of vibration _____ with the increase in time period.

A. increase

B. decreases

C. remains same

D. Cannot be determined

Answer: B

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20. The order of magnitude of velocity of sound in solids, liquids and gases is _____. (V_s = velocity in solids, V_t = velocity in liquids and V_g = velocity in gases)

A.
$$V_g > V_l > V_s$$

B. $V_s > V_g > V_l$
C. $V_g < V_l < V_s$
D. $V_s = V_g = V_l$

Answer: C

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| |
| 21. Velocity of sound is minimum in |
| A. wood |
| B. vacuum |
| C. water |
| D. air |
| Answer: B |
| Vatch Video Solution |
| |

22. The maximum possible displacement of a vibrating body from its mean position during its motion is equal to

A. its amplitude

B. half its amplitude

C. twice its amplitude

D. its frequency

Answer: A

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23. Which of the following statements is correct?

A. All vibrations produce sound.

B. N/A

C. Vibrations of frequency more than 20 Hz only produce sound.

D. Vibrations of frequency between 20 Hz and 20,000 Hz only produce

sound.

Answer: A

24. The loudness of sound depends on :

A. its amplitude

B. its frequency

C. its velocity

D. All the above

Answer: A

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25. Harmonium is an example is _____

A. a stringed instrument

B. a wind instrument

C. a percussion instrument

D. None of these

Answer: B



27. The sound of loudness of sound in the range of 15 B - 16 B is

A. not audible

B. just audible

C. moderate

D. painful to the ear

Answer: D



28. Arrange the following steps of an experiment in a sequential order to determine the frequency of a simple pendulum.

(A) Start the stop watch when the bob reaches the extreme position and count the number of oscillations.(B) Suspend a simple pendulum from a cork fixed to a stand.

(C) Repeat the experiment and determine the time taken for 20 oscillations. (t_2)

(D) Pull the bob of the simple pendulum from its initial position of rest and release. (E) Stop the stop watch at the end of 20 oscillations and determine the time taken to complete 20 oscillations (t_1) .

(F) Determine the average of t_1 and t_2 as t.

(G) The time period of the oscillation is found using.

$$T=rac{t}{20}$$
 and frequency using, $f=rac{1}{T}.$

A. ADBCEFG

B. AFEDBCG

C. BDAECFG

D. BDEFCAG

Answer: C

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29. Three persons P_1 , P_2 and P_3 are at different points A, B and C, respectively as shown in the figure. Two persons P_1 and P_3 clap at the same time. Which among the following can be the minimum distance between P_2 and P_3 to hear the clap sound distinctly by P_2 ? (Take the

velocity of sound in air as $330 m s^{-1}$)



Answer: B

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 $\operatorname{Column} A$

- A. Sound
- B. Depth of ocean bed **30.**
 - C. Maximum displacement
 - D. Tabla
 - E. Bell jar experiment

Column B

- a. Percussion instrument
- b. Sound needs a medium
- c. SONAR

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- d. Amplitude
- e. Vibrating body



| | Column A | | | Column B |
|----------------------|----------------------|----|------------|---|
| A. | 1MHz | () | a. | $10^6 Hz$ |
| 21 <i>B</i> . | $340 m s^{-1}$ | () | <i>b</i> . | Decibel |
| C . | Music | () | с. | ${\rm Velocity} ~{\rm of}~{\rm sound}~{\rm in}~{\rm air}~{\rm at}20^{\circ}C$ |
| D. | Loudness of sound | () | d. | 50Hz to $80,000Hz$ |
| E. | Bats | () | e. | Pleasant sensation of hearing |
| | (atch Video Solution | | | |

| | Column A | | | Column B |
|-----------------------|----------------------------|----|------------|---------------------------|
| A. | $\operatorname{Amplitude}$ | () | a. | Vocal cords |
| 32. <i>B</i> . | Frequency | () | <i>b</i> . | Sound absorbing material. |
| C. | Human beings | () | с. | Reciprocal of time period |
| D. | Carpets | () | d. | m |
| | | | | |
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33. How is sound produced ?





43. What is a pitch ?



46. Why the oscillations of a simple pendulum are not perceived by the

human ear?

47. What is persistence of hearing ?

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48. What is the minimum distance between the reflector and the listener

to hear the echo, when the speed of sound in air is $330ms^{-1}$?

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49. What is the principle on which megaphone work?

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50. What happens to the pitch of the sound when the length of the vibrating column is increased ?



3. Explain the formation of thunder.

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4. A thunder is heard 2 s after a flash a flash of lightning is seen. If the velocity of sound in air is $330ms^{-1}$, how far away from you has lightning occurred ?

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5. Distinguish between music and noise.

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6. Why is the sound produced at one end of a metallic pipe heard twice at

the other end ?

7. state any three uses of ultrasonic sound.



11. Describe an experiment to prove that sound is produced by vibrating

bodies.

Watch Video Solution 12. Give two practical applications of reflection of sound waves. Watch Video Solution 13. What is the minimum distance required to hear an echo, when the speed of sound in air is $340ms^{-1}$? Watch Video Solution 14. Explain how sound is produced in humans.

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

your ear ?

Watch Video Solution 2. Explain how sound is produced in humans. Watch Video Solution 3. What are the different measures to be taken to reduce noise pollution ? Watch Video Solution

4. Describe an activity to show that pitch depends on the thickness of the vibrating body.



8. Describe an experiment to show that sound cannot propagate in

vacuum.



2. The maximum displacement of a bob from its mean position is called its amplitude.



3. The unit of frequency is second.





| 12. The vibratory motion of a tuning fork is in nature. |
|---|
| Watch Video Solution |
| |
| 13. The time period of a simple pendulum is independent of of oscillation. |
| Watch Video Solution |
| |
| 14. The loudness of sound is determined by its |
| Watch Video Solution |
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| 15. sound is used as a diagnostic tool in medical science. |
| Watch Video Solution |
| |

| 16. Sound needs a to travel. |
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| Watch Video Solution |
| |
| 17. Humans are sensitive to sound of loudness from to |
| Watch Video Solution |
| |
| 18. The loudness of sound with increase in the energy spent to vibrate a body. |
| Watch Video Solution |
| |
| 19. Propagation of sound can be visualized as propagation of in the medium. |
| Watch Video Solution |
| |

| 20. A frequency of 1 Hz means oscillations per second. |
|--|
| Watch Video Solution |
| |
| 21. Ultrasonic sound waves are used in |
| A. dishwashers |
| B. medical diagnostics |
| C. detection of flaws in materials |
| D. All the above |
| |
| Answer: D |
| Watch Video Solution |
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| |
| 22. The sound produced by a siren given by a company reaches a person |
| on the road at a distance of 110 m in s. (Velocity of sound in air is |
| $330 m s^{-1}$) |

A. 3

 $\mathsf{B.4}$

C.1/3

 $\mathsf{D}.\,0.5$

Answer: C

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23. The velocity of a wave is $220ms^{-1}$, the distance travelled by the wave

in 2s is _____ m

A. 440

B.247.5

C. 330

D. 880

Answer: A



24. An echo of sound produced by a person, is heard from a distant tower after an interval of 1.5 s. If the speed of sound in air is $330ms^{-1}$, then the distance of the tower from the person is _____ m.

A.495

B.247.5

C. 330

D. 500

Answer: B

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25. The flash of lightening is seen much before we hear the thunder

because

A. the speed of light is more than the speed of sound.

B. the speed of sound is more than the speed of light.

C. the speed of light is equal to the speed of sound.

D. the speed of sound is more in vacuum than in air.

Answer: A

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26. Which of the following materials is the best absorber of sound ?

A. metallic sheet

B. plywood

C. cork

D. shining water surface

Answer: C
27. The pitch of sound is determined by the _____ of vibration.

A. frequency

B. amplitude

C. velocity

D. None of these

Answer: A

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28. When two tunning forks A and B, having frequencies 512 Hz and 212

Hz, respectively, are vibrated simultaneously, the pitch of sound produced

A. by 'A' will be more.

B. by 'B' will be more.

C. by A and B will be equal.

D. Cannot be determined

Answer: A



30. The frequency of a vibrating body is 100 Hz. Its time period is _____

A. 0.01s

 ${\rm B.}\,100S$

C. $0.01s^{-1}$

D. $100s^{\,-1}$

Answer: A

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31. The velocity of sound in vacuum is _____ ms^{-1} .

A. 332

 $B.\,330$

 ${\rm C.}\,3\times10^8$

D. zero

Answer: D

32. The time taken to displace a vibrating body from its mean position to

maximum displacement is _____

A. time period

 $\mathsf{B.}\,\frac{\mathrm{time\,\,period}}{2}$

C. 2 time period

 $\mathsf{D}.\,\frac{\mathrm{time\,period}}{4}$

Answer: D

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33. Which of the following statements is wrong?

A. Galton Whistle produces frequency more than 20,000 Hz.

B. Infrasonic vibrations are used for homogenizing milk.

C. Dolphins use ultrasonic sound to locate their prey.

D. None of the above

Answer: B



35. Fog is an example of

A. stringed instrument

B. wind instrument

C. percussion instrument

D. ghana vadya

Answer: C

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36. The loudness of sound is measured in _____.

A. seconds

B. metre

C. decibels

D. hertz

Answer: C

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|---|--|--|--|--|--|
| | | | | | |
| 37. Loudness of a sound in the range of 5 dB - 8 dB is | | | | | |
| A. not audiable | | | | | |
| B. loud sound | | | | | |
| C. uncomfortable loud sound | | | | | |
| D. painful sound | | | | | |
| Answer: A | | | | | |
| Watch Video Solution | | | | | |

38. When the length of the pendulum increases, the time period of the

pendulum _____.

A. increases

B. decreases

C. remains same

D. None of these.

Answer: A



39. Write the following steps in sequential order to prove that the angle of incident sound is equal to the angle of reflected sound.

(A) Mount a smooth and hard wooden plank vertically on the surface of a

table and clamp two pipes P and Q inclined at certain angles on the table.

(B) Place a ticking clock 'S' closer to pipe 'P'.

(C) Now keep your ear to the open end of Q and adjust the position of Q

to listen to the ticking sound.

(D) Measure the angle made by the two pipes with the normal.

(E) Repeat the experiment by changing the inclination of P and

correspondingly, the inclination of Q.

Measure the angles in each case and you find the sound which is incident and reflected from the wooden plank makes equal angles with the normal.

A. ABCDEF

B. ABEDCF

C. FCADBE

D. DEABCF

Answer: A

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40. Arrange the following steps in sequential order to find the depth of the ocean bed using Sonar.

(A) The time taken (t) to receive the sound is measured.

(B) Ultrasonic sound is sent to the ocean bed whose depth (d) is to be

found from the transmitter attached to the ship.

(C) If 'v' is the velocity of sound in water, the depth can be found using, v = 2d/t.

(D) The ultrasonic sound reflected form the ocean bed is received by a suitable detector in the ship.

A. ABCD

B. ADCB

C. BADC

D. BDAC

Answer: D

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Column A

- $A. \quad \angle i = \angle r$
- *B.* Persistence of hearing ()
 - C. Dolphins
 - D. Carpets
 - E. 10Hz

Column B

 $a. \quad 0.1s$

()

()

()

()

- b. Infrasonic
- c. Law of reflection of sound
- d. Echoes
- e. Reduce noise pollution

| | | $\operatorname{Column} A$ | | | Column B |
|-----|----|---------------------------|----|------------|-----------------------|
| 42. | A. | Piano | () | a. | Percussion instrument |
| | B. | Mridangram | () | <i>b</i> . | Stringed instrument |
| | C. | Shehnai | () | с. | Reflection of sound |
| | D. | Sonar | () | d. | Ghana vadya |
| | E. | Jal tarang | () | e. | Wind instrument |
| | | | | | |
| | | | | | |

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43.

 $\operatorname{Column} A$

- A. Compressions and rarefactions (
- B. Syrinx
- C. Internal organs
- D. Sound of thunder
- E. Intensity

$\operatorname{Column} B$

- () a. Birds
- () b. Sound wave
- () c. Noise
- () d. Surface area of vibrating box
- () e. Ultrasonic sounds

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Level 2 Concept Application

1. A sound wave makes an angle $30^{\,\circ}$ with the reflecting surface. The angle

of reflection is _____.

A. 30°

B. 60°

C. 90°

D. 120°

Answer: B

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2. Which of the following statements is correct ?

A. The pitch of sound decreases with a decrease in the length of a

vibrating air column.

B. The pitch of sound increases with a decrease in the thickness of a

vibrating string.

C. The pitch of sound decreases with a decrease in the length of the

vibrating string.

D. The pitch of sound depends upon the amplitude of a vibrating

body.

Answer: B

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3. If the depth of the sea is 1.125 km, the time taken for the reflected sound to reach the sonar is ______ s.

(velocity of sound in water is $1500 m s^{-1}$)

A. 1

 $\mathsf{B}.\,1.5$

 $\mathsf{C.}\,2$

 $\mathsf{D}.\,2.5$

Answer: B

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4. A man is standing not exactly at the centre of two walls. He fires a gun and hears the first echo after 1 s and the second echo after 2 s. If the speed of the sound is $330ms^{-1}$, what is the distance between the walls ?

A. 330 m

B. 360 m

C. 420 m

D. 495 m

Answer: D

5. Three persons P_1 , P_2 and P_3 are at different points A, B and C, respectively as shown in the figure. Two persons P_1 and P_3 clap at the same time. Which among the following can be the minimum distance between P_2 and P_3 to hear the clap sound distinctly by P_2 ? (Take the velocity of sound in air as $330ms^{-1}$)



A. 330 m

B. 384 m

C. 363 m

D. 660 m

Answer: C

6. The frequency of a vibrating body is 10 Hz. The time taken by it to complete 5 vibrations is _____ s.

A. 0.5

B. 5

C. 2

 $\mathsf{D}.\,10$

Answer: A



7. A person hears the sound of the explosion of a bomb after 5 s and another person hears the sound after 6 s. The ratio of minimum and maximum possible distance between the person is _____. (velocity of sound in air is $330ms^{-1}$)

A. 1:1

B.1:2

C. 1:11

D. 5:6

Answer: C

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8. A person hears the sound of explosion of a bomb after 5 s. If the velocity of sound in air is $330ms^{-1}$, the distance between the bomb and the person is ____ km.

A. 1

 $B.\, 1.65$

C. 2.35

D. 330

Answer: B

9. If a vibrating body produces 20 vibrations in 10 second, then its frequency is ______ Hz.
A. 1
B. 2
C. 0.5
D. 20

Answer: B



10. Three persons P_1 , P_2 and P_3 are at different points A, B and C, as shown in the figure. P_1 and P_2 clap at the same time. For P_3 to hear two distinct claps, the minimum distance between P_1 and P_2 should be _____

m. (The velocity of sound in air is $330 m s^{-1}$)



11. A man is standing not exactly at the exactly at the centre, in between two parallel walls separated by a distance 990 m. He fires a gun and hears the first echo after 2 s, the time taken to hear 3rd echo after firing is _____ s. (take velocity of sound in air is $330ms^{-1}$)

| B | | 7 |
|---|---|---|
| - | ٠ | |

C. 6

D. 8

Answer: B

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12. If the same time taken for the reflected sound to reach the sonar os 2

s, the depth of the sea is _____ m. (velocity of sound in water is $1500 m s^{-1}$)

A. 1500

B. 3000

C. 750

D. 500

Answer: A



13. Which of the following statements is correct ?

A. The pitch changes with change in amplitude.

B. The frequency of vibration determines the pitch of any sound.

C. The voice of woman has low pitch when compared to that of a man.

D. A tabla produces high pitch sound when compared to that of a flute.

Answer: B

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14. The direction of an incident sound wave makes an angle of 30° with the normal of a reflecting surface The reflected sound wave makes an angle of _____ with the normal.

A. 60°

B. 30°

 $\mathsf{C}.\,90^\circ$

D. 120°

Answer: B

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15. The frequency of a tuning fork is 600 Hz. What is the number of vibrations made by the tunning fork, when the sound produced by the tuning fork travels a distance of 110 ? (Velocity of sound in air is $330ms^{-1}$

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16. Sandeep constructed a simple pendulum to find the value of 'g' at that place. He observed that the bob of a simple pendulum moves from the

mean position to one of the extreme positions in 0.5 s. Using this he determined the

(i) time period of the simple pendulum.

(ii) number of oscillations the pendulum has under - gone in four seconds

and

(iii) the frequency of oscillation of the pendulum. What are his answers ?

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17. Chanukya was eager to know the time taken by sound to travel the same distance in water and air. So, he set a body on vibration with a frequency of 250 Hz in air and the sound produced bu this is heard at a distance of 175 m. Now if the body is vibrated in water, what is the difference in the time taken by the sound to travel the same distance in water and air ?

(The velocity of sound in air and water is $350ms^{-1}$ and $1400ms^{-1}$, respectively).

18. The velocity of sound in air, in water and in a given solid is, $330ms^{-1}$, $1350ms^{-1}$ and $1500ms^{-1}$, respectively. If a vibrating tuning fork of frequency 150 Hz is placed in each of these media, then find the distance covered by the sound in air, water and solid, respectively, at the end of 50 vibrations.

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19. Dinesh, who is fond of music, vibrates a glass with a spoon. If he fills the glass with water, will there be any change in any of the characteristics of the sound produced ? Explain.

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20. A sound wave is travelling from a metallic rod to water. What changes

will occur in the velocity and frequency of the sound ?

21. Two astronauts who land on the moon cannot talk with each other. What could be the reason for this ? Suggest a method for them to talk each other.

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22. The time period of a simple pendulum is given by the formula, $T = 2\pi \sqrt{l/g}$, where T = time period, I = length of pendulum and g = acceleration due to gravity.

acceleration and to gravity.

If the length of the pendulum is decreased to 1/4 of its initial value, then what happens to its frequency of oscillations ?

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23. A police targets a thief, who is at rest at point Q. He fires a bullet from a point P which is at a distance of 990 m from Q and it reaches the point Q in 3 s. When the bullet is fired at P it produced a sound, which was heard by the theif. What is the difference in time taken by the sound and the bullet to reach point Q. Will the thief be able to escape from the bullet fired by police ? Take the velocity of sound in air as $330ms^{-1}$.



24. Why the sound is made to undergo multiple reflection in a mega phone ?

25. The flash of lightning, produced at a distance of 10 km above the ground level is seen much before hearing the thunder bolt. Find the time gap between the two events observed by a person on the ground if the time taken by the lightning to reach the surface of earth is negligible. (velocity is sound $= 330ms^{-1}$ and velocity of light $= 3 \times 10^8 ms^{-1}$.)

26. Why is the voice of children more shrill than that of adults'? Explain.

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27. A ship at rest is sending ultrasonic sound waves to detect a shoal of fish. If the time gap between the signal sent from the ship and received (reflected) signal is 0.5 s, then find the distance of the shoal of fish form the ship. (Velocity of sound in water is $1400ms^{-1}$)

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28. Why are the walls, roof, seats and steps, of a cinema theatre or auditorium covered with special material ?

29. Why are concave reflectors used in big auditoria ?



3. A student breaks a fused bulb, and then hears a sound of explosion.

What could be the reason for this ? Explain.



5. Three boys Ravi, John and Asif stand in a straight line as shown in figure. Ravi and Asif fire crackers at the same instant of time. John hears the first sound after 2 s and the second sound after 2.5 s. Determine the distance between Ravi and Asif. The velocity of sound in air is $330ms^{-1}$.



1. Assertion (A): Different musical sounds are produced from percussioninstruments by exciting the stretched membrane at different tensions.

Reason (R): Flute, bassoon, oboes are examples of drum instruments.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: C



2. Assertion (A): The musical notes produced by two musical instruments, like guitar and sitar are different even if the length and the thickness of the strings in both instruments are the same.

Reason (R) : The difference in two sounds of equal pitch and loudness can be distinguished by a characteristic property called quality of sound ro timbre.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: A



3. If the amplitude of the pendulum increases, then time period_____

A. increases

B. decreases

C. remains the same

D. None of these

Answer: C

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4. A sound wave makes an angle 30° with the reflecting surface. The angle of reflection is _____.

A. $30^{\,\circ}$

B. 60°

C. 90°

D. $120\,^\circ$

Answer: B

5. Write the following statements in a sequential order to find the depth of the ocean bed by the using sonar .

(A) The depth of the ocean bed can be found by d = $\frac{vt}{2}$.

(B) At the bottom of a ship two devices , one is transmitter which products ultrasonics and a receiver for the detection of the reflected ultrasonics from the ocean bed are fixed .

(C) The velocity fo ultrasonics in ocean water is 'v' and the time taken to receive the reflected ultrasonics from the ocean bed be 'f'.

(D) If the depth of ocean bed is 'd' , then $v=rac{d+d}{t}=rac{2d}{t}.$

A. a b c d

B.bacd

C. d a c b

D. c b a d

Answer: D



6.

1

| | Column A | | | Column B | | | |
|---|------------------------|----|------------|---|--|--|--|
| A. | Frequency | () | a. | Detect flaws inside a metal | | | |
| В. | The loudness of sound | () | <i>b</i> . | Ghatam | | | |
| C. | The angle of incidence | () | с. | Equal to the angle of reflection of sou | | | |
| D. | Ultrasounds | () | d. | Amplitude | | | |
| E. | Ghana vadya | () | e. | Ratio of the number of oscillations to | | | |
| $\begin{array}{l}A.A \to e, B \to d, C \to c, D \to a, E \to b\\\\B.A \to c, B \to e, C \to b, D \to a, E \to d\\\\C.A \to d, B \to c, C \to e, D \to d, E \to a\\\\D.A \to e, B \to c, C \to d, D \to a, E \to b\end{array}$ | | | | | | | |

Answer: A

7. Write the following steps in sequence to show that sound is propagated through solids.

(a) You will be able to hear two distinct sounds, one propagated through the metallic rod and other propagated through air.

(b) Thus, sound can be propagated through both solids and gases.

(c) Take a long metallic rod, place one end of the rod near your ear and ask your friend to hit the other end.

A. a b c

B.cba

C. a c b

D. c a b

Answer: D

Watch Video Solution

8. The sound of loudness of sound in the range of 15 dB - 16 dB is

A. not audible

B. just audible

C. moderate

D. painful to the ear.

Answer: D

Watch Video Solution

9. The velocity of sound in vacuum is _____ ms^{-1} .

A. 332

B. 330

 $\text{C.}\,3\times108$

D. zero

Answer: D
10. The more is the energy spent to set a body into vibration,

A. the louder is the sound produced.

B. the intensity (loudness) of sound produced by vibrating body

always remains constant.

C. the softer is the sound produced.

D. the amount of energy spent and loudness are not related to each

other.

Answer: A

Watch Video Solution

11. Which of the following statements is correct ?

A. All vibrations produce sound.

B. Vibrations of frequency less than 20 Hz only produce sound.

C. Vibrations of frequency more than 20 Hz only produce sound.

D. Vibrations of frequency between 20 Hz and 20,000 Hz only produce

sound.

Answer: A

Watch Video Solution

12. The maximum possible displacement of a vibrating body from its mean

position during its motion is equal to

A. its amplitude

B. half its amplitude

C. twice its amplitude

D. its frequency

Answer: A

13. Consider the following linear equations

 $ax + by + cz = 0, bx + cy + az = 0, cx + ay + bz = 0. \ Match the statement x riatebu \leq s \in the$

4 xx 4` matrix given in the ORS.

Column I

- (A) $a + b + c \neq 0$ and $a^2 + b^2 + c^2 = ab + bc + ca$
- (B) a + b + c = 0 and ($a^2 + b^2 + c^2 \neq ab + bc + ca$
- (C) $a+b+c \neq 0$ and ($a^2+b^2+c^2 \neq ab+bc+ca$

(D)
$$a + b + c = 0$$
 and (s)
 $a^{2} + b^{2} + c^{2} = ab + bc + ca$

Column II

- (p) the equations represent planes meeting only at a single point.
- (q) the equations represent the line x = y = z.
- (r) the equations represent identical planes.
 - s) the equations represent the whole of the three dimensional space.

A. Oboes

B. Veena

C. Mridangam

D. Violin

Answer: A



14. Three persons P_1, P_2 , and P_3 are at three different points A, B and C as shown in the figure. P_1 and P_2 clap at the same time. For P_3 to hear two distinct claps, the minimum distance between P_1 and P_2 should be m. (The velocity of sound in air is $330 m s^{-1}$) P P_2 B 660m > C A. 33 B. 330 C. 363

D. 660

Answer: A

15. Which of the following statements is correct ?

A. The pitch of sound decreases with a decrease in the length of a

vibrating air column.

B. The pitch of sound increases with a decrease in the thickness of a

vibrating string.

- C. The pitch of sound decreases with a decrease in the length of the vibrating string.
- D. The pitch of sound depends upon the amplitude of a vibrating body.

Answer: B

1. Assertion (A) : Rama Raju loves listening to Carnatic music played on Mridangam whereas his daughter Neeta gets irritated by it.

Reason (R) : The sound that produces pleasant effect on our ears is called music and the sound that produces an unpleasant effect on our ears is called noise.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: B

2. Assertion (A) : The pitch of the sound produced by the vibrating string can be changed.

Reason (R) : The pitch of the sound can be changed by changing the length, tension and thickness of the vibrating string.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: A

Watch Video Solution

3. When the length of the pendulum increases, the time period of the pendulum _____.

A. increases

B. decreases

C. remains same

D. none of these

Answer: A

Watch Video Solution

4. The direction of an incident sound wave makes an angle of 30° with the normal of a reflecting surface The reflected sound wave makes an angle of with the normal.

A. 60°

B. 30°

C. 90°

D. 120°

Answer: B



5. Ratan saw a flash of lightning and after sometime heard the sound of thunder. If the time gap between seeing and hearing is 3 s, then write the following steps in sequence to find the height from the ground where the lightning is produced.

(a) Consider the velocity of sound (v) as $330ms^{-1}$.

(b) Note the time gap (t) between seeing and hearing.

(c) From the formula, speed $= \frac{\text{distance}}{\text{time taken}}$, height at which lightning was produced = speed of sound \times time interval.

(d) Substitute the values in the equation (1) and find the value of the height of the lightning from the ground.

A. b a c d B. b c a d C. c b d a

D. d a b c

Answer: A



6.

 $\operatorname{Column} A$

- A. Height of the cloud
- B. Frequency, n = 10Hz ()
- C. Sound absorption
- $D. \quad \text{More than} \quad 90 dB$
- E. Syrinx

Column B

- () a. Gunny bags
 - b. Painful to humans
 - c. Time Period T = 0.1s
- () d. Speed of sound \times time interval
- () e. Ring of cartilage

A. A
ightarrow b, B
ightarrow c, C
ightarrow d, D
ightarrow e, E
ightarrow a

()

- $\texttt{B}.\, A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow a, E \rightarrow b$
- C. A
 ightarrow a, B
 ightarrow c, C
 ightarrow e, D
 ightarrow b, E
 ightarrow d
- $\mathsf{D}.\, A \to d, B \to c, C \to a, D \to b, E \to e$

Answer: D

7. Write the following steps in sequence to prove that sound travels through liquids.

(a) Place the ear against the side of the container and repeat the activity of hitting one coin with the other inside the water.

(b) Take a matallic container and fill it with water.

(c) Place two coins inside the water. Hit one of the other and observe the sound produced.

(d) Now, a clear and louder sound is heard proving that sound also travels through liquids.

A. a b d c B. c a b d C. b c a d

D. d a b c

Answer: C

8. Loudness of a sound in the range of 5 dB - 8 dB is _____.

A. not audiable

B. loud sound

C. uncomfortable loud sound

D. painful sound

Answer: A

Watch Video Solution

9. Velocity of sound is minimum in _____

A. wood

B. vacuum

C. water

D. air

Answer: B

Watch Video Solution

10. If more energy is spent to set a body into vibration, then

A. the amplitude of vibrating body is more.

B. the amplitude of vibrating body is less.

C. the amplitude of vibrating body always ramains same even after

setting it into vibration.

D. Both (b) and (c).

Answer: A



11. The time taken to displace a vibrating body from its mean position to

maximum displacement is _____

A. time period

 $\mathsf{B}.\,\frac{\mathrm{time\,period}}{2}$

C. 2 time period

D. $\frac{\text{time period}}{4}$

Answer: D



12. The instruments made of long and hollow pipes with a certain number

of holes on the sides are

A. wind or reed instruments.

B. stringed instruments.

C. drum instruments.

D. All the above

Answer: A

13. Three persons P_1 , P_2 and P_3 are at different points A, B and C, respectively as shown in the figure. Two persons P_1 and P_3 clap at the same time. Which among the following can be the minimum distance between P_2 and P_3 to hear the clap sound distinctly by P_2 ? (Take the velocity of sound in air as $330ms^{-1}$)



Answer: C

14. Which of the following statements is correct ?

A. The pitch changes with change in amplitude.

B. The frequency of vibration determines the pitch of any sound.

C. The voice of woman has low pitch when compared to that of a man.

D. A tabla produces high pitch sound when compared to that of a flute.

Answer: B

Watch Video Solution

Test Your Concepts Very Shortanswer Type Questions

1. The to and fro motion of an object is called____.



| 6. The sounds of frequencies greater than are called ultrasonic |
|--|
| sounds. |
| Watch Video Solution |
| |
| 7. Sound travels much than light in a given medium. |
| Watch Video Solution |
| |
| |
| 8. In general, the voice of a woman has a than that of a man. |
| Watch Video Solution |
| |
| |
| 9. The velocity of sound is in air compared to that of water. |
| Watch Video Solution |
| |

| 10. | are | used to | detect flaws | inside a | metal. |
|-----|-----|---------|--------------|----------|--------|
| | | | | | |



A. less than 20 Hz

B. greater than 20 kHz

C. between 20 Hz and 20 kHz

D. None of these

Answer: C

Watch Video Solution

13. If the time period of a simple pendulum is 10 seconds, then its frequency is _____Hz.

A. 10

 $\mathsf{B.}\,5$

C. 0.1

D. 1

Answer: C

14. A string is stretched over two rigid supports and a weight of 1 kgwt is suspended from one of its free ends and then it is plucked. If the length of string over two rigid supports is decreased and plucked again, then the frequency of sound produced

A. in the first case is more.

B. in the second case is more

C. in both the cases is equal.

D. Cannot be determined

Answer: B

View Text Solution

15. The principle of reflection of sound is used _____

A. in hearing echos

B. to locate shoals of fish under the sea bed

C. in the detection of insects by bats

D. All of the above

Answer: D

Watch Video Solution

16. The velocity of sound is maximum in -

A. liquids

B. solids

C. gases

D. Cannot be determined

Answer: B

17. Sound cannot travel in _____

A. air

B. glass

C. iron

D. vacuum

Answer: D

Watch Video Solution

18. Bats make use of _____ waves.

A. ultrasonic sound

B. infrasonic sound

C. audible range sound

D. All of the above

Answer: A

| Watch Video Solution |
|---|
| 19. The frequency of vibration with the increase in time period. |
| A. increase |
| B. decreases |
| C. remains same |
| D. Cannot be determined |
| Answer: B |

Watch Video Solution

20. The order of magnitude of velocity of sound in solids, liquids and gases is - (V_s = velocity in solids, V_l = velocity in liquids and V_g = velocity

in gases)

A.
$$V_g > V_l > V_s$$

B. $V_s > V_g > V_t$
C. $V_g < V_t < V_s$
D. $V_s V_g = V_t$

Answer: C



21. Velocity of sound is minimum in _____

A. wood

B. vacuum

C. water

D. air

Answer: B

22. The maximum possible displacement of a vibrating body from its mean position during its motion is equal to

A. its amplitude

B. half its amplitude

C. twice its amplitude

D. its frequency

Answer: A

View Text Solution

23. Which of the following statements is correct?

A. All vibrations produce sound.

B. Vibrations of frequency more than 20 Hz only produce sound.

C. Vibrations of frequency between 20 Hz and 20,000 Hz only produce

sound.

D. Vibrations of frequency between 20 Hz and 20,000 Hz only produce

sound.

Answer: A

Watch Video Solution

24. The loudness of sound depends upon

A. its amplitude

B. its frequency

C. its velocity

D. All of the above

Answer: A

View Text Solution

25. Harmonium is an example is _____

A. a stringed instrument

B. a wind instrument

C. a percussion instrument

D. None of these

Answer: B

Watch Video Solution

26. 1 decibel = _____ bell.

A. 10

B.1/10

C. 100

D.1/100

Answer: B



27. The sound of loudness of sound in the range of 15 B - 16 B is

A. not audible

B. just audible

C. moderate

D. painful to the ear

Answer: D



28. Arrange the following steps of an experiment in a sequential order to determine the frequency of a simple pendulum.

(A) Start the stop watch when the bob reaches the extreme position and count the number of oscillations.(B) Suspend a simple pendulum from a cork fixed to a stand.

(C) Repeat the experiment and determine the time taken for 20 oscillations. (t_2)

(D) Pull the bob of the simple pendulum from its initial position of rest and release.

(E) Stop the stop watch at the end of 20 oscillations and determine the time taken to complete 20 oscillations (t_1) .

(F) Determine the average of t_1 and t_2 as t.

(G) The time period of the oscillation is found using.

$$T=rac{t}{20}$$
 and frequency using, $f=rac{1}{T}.$

A. ADBCEFG

B. AFEDBCG

C. BDAECFG

D. BDEFCAG

Answer: C

Watch Video Solution

29. A violin player riding on a slow train plays a 440 Hz note. Another violin player standing near the track plays the same note. When the two are close by and the train approaches the person on the ground, he hears 4'0 beats per second. The speed of sound in air $= 340ms^{-1}$ (a) Calculate the speed of the train. (b) What beat frequency is heard by the player in the train ?

A. ABCDEF

B. ABDCFE

C. ADBFCE

D. BCADEF

Answer: B



30. Match the entries given in Column A with the appropriate ones in

Column B.



31. Match the entries given in Column A with the appropriate ones in Column B.



32. a radar wave has a frequency of $7.8 \times 10^9 s^{-I}$. The reflected wave from an aeroplane shows a frequency shows a frequency difference of $2.7 \times 10^3 s^{-1}$ on the higher side. Deduce the velocity of the aeroplane in the line of sight.



33. How is sound produced?

34. What is the time period of a simple pendulum ?

| Watch Video Solution |
|--|
| 35. What is the length of a simple pendulum ? |
| Watch Video Solution |
| 36. What is frequency of oscillation ? |
| Watch Video Solution |
| 37. What is meant by one oscillation of a simple pendulum ? |
| Watch Video Solution |
| |

38. What is the SI unit of frequency?



41. What is the frequency of infrasonic sound ?

42. What is loudness ?

| Vatch Video Solution |
|---------------------------------------|
| |
| 43. What is a pitch ? |
| Watch Video Solution |
| |
| 44. What is quality of sound ? |
| Watch Video Solution |
| |
| 45. What is noise pollution ? |
| Watch Video Solution |
46. Why the oscillations of a simple pendulum are not perceived by the

human ear ?



49. What is the principle on which megaphone work?

50. What happens to the pitch of the sound when the length of the

vibrating column is increased ?



2. What are stringed instruments ? Give examples.

| Watch Video Solution |
|---|
| 3. Explain the formation of thunder. |
| Watch Video Solution |
| 4. A thunder is heard 2 s after a flash of lightning is seen. If the velocity of |
| sound in air is 330 m s^{-1} , how far away from you has lightning occurred? |
| watch video Solution |
| 5. Differentiate between musical sound and noise? |

6. Why is the sound produced at one end of a metallic pipe heard twice at

the other end ?





14. On which factor the pitch of the sound depends ?



3. What are the different measures to be taken to reduce noise pollution

| ? |
|---|
| Vatch Video Solution |
| |
| |
| 4. Describe an activity to show that pitch depends on the thickness of the |
| vibrating body. |
| Watch Video Solution |
| |
| 5. Explain the propagation of sound in air. |
| Watch Video Solution |
| |
| |
| 6. What are stringed instruments ? Give examples. |
| Watch Video Solution |



10. (a) What are the higher units of frequency ?

(b) How is noise pollution determined at a given place ?





2. The maximum displacement of a bob from its mean position is called its amplitude.

| Watch Video Solution |
|--|
| |
| 3. The unit of frequency is second. |
| Watch Video Solution |
| |
| 4. The time taken to perform 30 vibrations is 30 times the time taken for |
| a single vibration. |
| Watch Video Solution |

5. If a body vibrates 20 times in a second, then its frequency is 20 Hz.

| 6. Sitar, veena and guitar are some instruments. |
|---|
| Watch Video Solution |
| |
| |
| 7. The sounds of frequencies greater than 20 kHz are called ultrasonic |
| sounds. |
| Watch Video Solution |
| |
| 8. Sound travels much faster than light in a given medium. |
| Watch Video Solution |
| |
| |
| 9. The velocity of sound is more in vacuum than in any other medium. |
| |

10. In general, the voice of a woman has a higher frequency than that of a

man.

| Watch Video Solution |
|---|
| 11. 1 kHz = Hz. Watch Video Solution |
| 12. The vibratory motion of a tuning fork is in nature. |
| Vatch Video Solution |
| 13. The time period of a simple pendulum is independent of of oscillation. |
| Vatch Video Solution |

| 14. The loudness of sound is determined by its |
|---|
| Watch Video Solution |
| |
| 15. sound is used as a diagnostic tool in medical science. |
| Watch Video Solution |
| |
| 16. Sound needs a to travel. |
| Watch Video Solution |
| |
| 17. Humans are sensitive to sound of loudness from to |
| Watch Video Solution |
| |

| 18. The loudness of sound with increase in the energy spent to |
|--|
| vibrate a body. |
| Vatch Video Solution |
| |
| 19. Propagation of sound can be visualized as propagation of in the |
| medium. |
| Watch Video Solution |
| |
| 20. A frequency of 1 Hz means oscillations per second. |
| Watch Video Solution |
| |
| 21. Ultrasonic sound waves are used in |
| A. dishwashers |

B. medical diagnostics

C. detection of flaws in materials

D. All of the above

Answer: D

Watch Video Solution

22. The sound produced by a siren given by a company reaches a person

on the road at a distance of 110 m in _____ s. (Velocity of sound in air is

 $330 m s^{-1}$)

A. 3

 $\mathsf{B.4}$

C.1/3

D.0.5

Answer: C



23. The velocity of a wave is $220ms^{-1}$, the distance travelled by the wave

in 2s is _____ m

A. 440

B. 247.5

C. 330

D. 880

Answer: A

Watch Video Solution

24. An echo of sound produced by a person, is heard from a distant tower after an interval of 1.5 s. If the speed of sound in air is $330ms^{-1}$, then the distance of the tower from the person is _____ m.

A. 495

B. 247.5

C. 330

D. 500

Answer: B

Watch Video Solution

25. The flash of lightening is seen much before we hear the thunder because

A. the speed of light is more than the speed of sound.

B. the speed of sound is more than the speed of light.

C. the speed of light is equal to the speed of sound.

D. the speed of sound is more in vacuum than in air.

Answer: A

26. Which of the following materials is the best absorber of sound ?

A. metallic sheet

B. plywood

C. cork

D. shining water surface

Answer: C

Watch Video Solution

27. The pitch of sound is determined by the _____ of vibration.

A. frequency

B. amplitude

C. velocity

D. None of these

Answer: A



28. When two tunning forks A and B, having frequencies 512 Hz and 212 Hz, respectively, are vibrated simultaneously, the pitch of sound produced

A. by 'A' will be more.

B. by 'B' will be more.

C. by A and B will be equal.

D. cannot be determined

Answer: A

| 29. | The ti | me perioo | l of a seco | onds pendul | lum is | s. |
|-----|--------|-----------|-------------|-------------|--------|----|
|-----|--------|-----------|-------------|-------------|--------|----|

A. 1 B. 2 C. 4

D. 6

Answer: B

Watch Video Solution

30. The frequency of a vibrating body is 100 Hz. Its time period is _____

A. 0.01 s

B. 100 s

C. $0.01s^{-1}$

D. $100s^{-1}$

Answer: A Watch Video Solution

| / |
|---|
|---|

A. 332

 $B.\,330$

 $\text{C.}~3\times10^8$

D. Zero

Answer: D

Watch Video Solution

32. The time taken to displace a vibrating body from its mean position to

maximum displacement is _____

A. time period

 $\mathsf{B}.\,\frac{\mathrm{time\,period}}{2}$

C. 2 time period

D. $\frac{\text{time period}}{4}$

Answer: D



33. Which of the following statements is wrong?

A. Galton Whistle produces frequency more than 20,000 Hz.

B. Infrasonic vibrations are used for homogenizing milk.

C. Dolphins use ultrasonic sound to locate their prey.

D. None of the above

Answer: B

34. As the amplitude of a vibrating body increases, the loudness of the sound produced

A. increases

B. decreases

C. remains same

D. None of these

Answer: A

Watch Video Solution

35. A tabla or a drum is an example of a

A. stringed instrument

B. wind instrument

C. percussion instrument

D. ghana vadya

Answer: C

| Watch Video Solution |
|---|
| |
| |
| 36. The loudness of sound is measured in |
| A. seconds |
| B. metre |
| C. decibels |
| D. hertz |
| |
| Answer: C |
| Watch Video Solution |
| |
| |

37. Loudness of a sound in the range of 5 dB - 8 dB is _____.

A. not audiable

B. loud sound

C. uncomfortable loud sound

D. painful sound

Answer: A

Watch Video Solution

38. When the length of the pendulum increases, the time period of the pendulum .

A. increases

B. decreases

C. Both a and b

D. None of these.

Answer: A

39. Arrange the following steps in a sequential order to verify the laws of reflection.

(A) A hard , smooth surface (AB) is mounted vertically over a horizontal board on which two tubes P and Q , point towards the surface AB.

(B) The tube Q is adjusted such that the listener would be able to hear the ticking sound clearly at the end away from AB.

(C) The sound waves from a source , like ticking clock are directed to the surface AB through the pipe P inclined at an angle to AB .

(D) By measuring the angles the tubes make with the surface AB , the laws of reflection are verified .

A. ABCDEF

B. ABEDCF

C. FCADBE

D. DEABCF

Answer: A

Watch Video Solution

40. Write the following statements in a sequential order to find the depth of the ocean bed by the using sonar .

(A) The depth of the ocean bed can be found by d = $\frac{vt}{2}$.

(B) At the bottom of a ship two devices , one is transmitter which products ultrasonics and a receiver for the detection of the reflected ultrasonics from the ocean bed are fixed .

(C) The velocity fo ultrasonics in ocean water is 'v' and the time taken to receive the reflected ultrasonics from the ocean bed be 'f'.

(D) If the depth of ocean bed is 'd' , then $v=rac{d+d}{t}=rac{2d}{t}.$

A. ABCD

B. ADCB

C. BADC

D. BDAC

Answer: D



41. Match the following Column I to Column II



42. The relationship between velocity, wavelength and frequency is



43. A tuning fork of frequency 100 Hz emits a wave of wavelength 4m. What is the temperature of the atmosphere, if the velocity of sound at $27^{\circ}C$ is 330m/s?

Watch Video Solution

Concept Application Level 2

1. A sound wave makes an angle 30° with the reflecting surface. The angle

of reflection is _____.

A. $30^{\,\circ}$

B. 60°

C. 90°

D. 120°

Answer: B

- 2. Which of the following statements is correct?
 - A. The pitch of sound decreases with a decrease in the length of a vibrating air column.
 - B. The pitch of sound increases with a decrease in the thickness of a
 - vibrating string.
 - C. The pitch of sound decreases with a decrease in the length of the

vibrating string.

D. The pitch of sound depends upon the amplitude of a vibrating body.

Answer: B

3. If the depth of the sea is 1.125 km, the time taken for the reflected sound to reach the sonar is (velocity of sound in water is 1500 m s^{-1})

A. 1

 $\mathsf{B}.\,1.5$

 $\mathsf{C}.2$

 $\mathsf{D}.\,2.5$

Answer: B



4. A man is standing not exactly at the centre of two walls. He fires a gun and hears the first echo after 1 s and the second echo after 2 s. If the speed of the sound is $330ms^{-1}$, what is the distance between the walls ?

A. 330 m

B. 360 m

C. 420 m

D. 495 m

Answer: D



5. Three persons P_1 , P_2 and P_3 are at different points A, B and C, respectively as shown in the figure. Two persons P_1 and P_3 clap at the same time. Which among the following can be the minimum distance between P_2 and P_3 to hear the clap sound distinctly by P_2 ? (Take the velocity of sound in air as $330ms^{-1}$)



A. 330 m

B. 384 m

C. 363 m

D. 660 m

Answer: C

Watch Video Solution

6. The frequency of a vibrating body is 10 Hz. The time taken by it to complete 5 vibrations is _____ s.

A.0.5

B. 5

C. 2

D. 10

Answer: A

7. A person hears the sound of the explosion of a bomb after 5 s and another person hears the sound after 6 s. The ratio of minimum and maximum possible distance between the person is _____. (velocity of sound in air is $330ms^{-1}$)

A. 1:1

 $\mathsf{B}.\,1\!:\!2$

C. 1:11

D. 5:6

Answer: C

Watch Video Solution

8. A person hears the sound of explosion of a bomb after 5 s. If the velocity of sound in air is $330ms^{-1}$, the distance between the bomb and the person is ____ km.

 $B.\, 1.65$

C. 2.35

D. 330

Answer: B

Watch Video Solution

9. If a vibrating body produces 20 vibrations in 10 second, then its frequency is _____ Hz.

A. 1

 $\mathsf{B.}\,2$

 $\mathsf{C}.\,0.5$

 $\mathsf{D.}\,20$

Answer: B



Answer: A
11. A man is standing not exactly at the exactly at the centre, in between two parallel walls separated by a distance 990 m. He fires a gun and hears the first echo after 2 s, the time taken to hear 3rd echo after firing is _____ s. (take velocity of sound in air is $330ms^{-1}$)

A. 2

B. 6

C. 7

D. 8

Answer: B

Watch Video Solution

12. If the same time taken for the reflected sound to reach the sonar os 2 s, the depth of the sea is _____ m. (velocity of sound in water is $1500ms^{-1}$)

A.1500

B.3000

C.750

 $\mathsf{D.}\,500$

Answer: A

Watch Video Solution

13. Which of the following statements is correct?

A. The pitch changes with change in amplitude.

B. The frequency of vibration determines the pitch of any sound.

C. The voice of woman has low pitch when compared to that of a man.

D. A tabla produces high pitch sound when compared to that of a

flute.

Answer: B

14. The direction of an incident sound wave makes an angle of 30° with the normal of a reflecting surface The reflected sound wave makes an angle of _____ with the normal.

A. 60°

B. 30°

C. 90°

D. 120°

Answer: B



15. The frequency of a tuning fork is 600 Hz. What is the number of vibrations made by the tunning fork, when the sound produced by the

tuning fork travels a distance of 110 ? (Velocity of sound in air is $330 m s^{-1}$

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)

16. Sandeep constructed a simple pendulum to find the value of 'g' at that place. He observed that the bob of a simple pendulum moves from the mean position to one of the extreme positions in 0.5 s. Using this he determined the

(i) time period of the simple pendulum.

(ii) number of oscillations the pendulum has under - gone in four seconds and

(iii) the frequency of oscillation of the pendulum. What are his answers ?



17. Chanukya was eager to know the time taken by sound to travel the same distance in water and air. So, he set a body on vibration with a frequency of 250 Hz in air and the sound produced bu this is heard at a

distance of 175 m. Now if the body is vibrated in water, what is the difference in the time taken by the sound to travel the same distance in water and air ?

(The velocity of sound in air and water is $350ms^{-1}$ and $1400ms^{-1}$, respectively).

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18. The velocity of sound in air, in water and in a given solid is, $330ms^{-1}$, $1350ms^{-1}$ and $1500ms^{-1}$, respectively. If a vibrating tuning fork of frequency 150 Hz is placed in each of these media, then find the distance covered by the sound in air, water and solid, respectively, at the end of 50 vibrations.

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19. Dinesh, who is fond of music, vibrates a glass with a spoon. If he fills the glass with water, will there be any change in any of the characteristics of the sound produced ? Explain.

20. A sound wave is travelling from a metallic rod to water. What changes

will occur in the velocity and frequency of the sound ?

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21. Two astronauts who land on the moon cannot talk with each other. What could be the reason for this ? Suggest a method for them to talk each other.

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22. The time period of a simple pendulum is given by the formula, $T = 2\pi \sqrt{l/g}$, where T = time period, I = length of pendulum and g = acceleration due to gravity.

If the length of the pendulum is decreased to 1/4 of its initial value, then what happens to its frequency of oscillations ?

23. A police targets a thief, who is at rest at point Q. He fires a bullet from a point P which is at a distance of 990 m from Q and it reaches the point Q in 3 s. When the bullet is fired at P it produced a sound, which was heard by the theif. What is the difference in time taken by the sound and the bullet to reach point Q. Will the thief be able to escape from the bullet fired by police ? Take the velocity of sound in air as $330ms^{-1}$.



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24. Draw a labelled diagram to show the multiple reflections of sound in a

part of the stethoscope tube.



25. The flash of lightning, produced at a distance of 10 km above the ground level is seen much before hearing the thunder bolt. Find the time gap between the two events observed by a person on the ground if the time taken by the lightning to reach the surface of earth is negligible.

(velocity is sound $\,=\,330 m s^{-1}$ and velocity of light $\,=\,3 imes 10^8 m s^{-1}$.)

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26. Why is the voice of children more shrill than that of adults'? Explain.

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27. A ship at rest is sending ultrasonic sound waves to detect a shoal of fish. If the time gap between the signal sent from the ship and received (reflected) signal is 0.5 s, then find the distance of the shoal of fish form the ship. (Velocity of sound in water is $1400ms^{-1}$)



Concept Application Level 3

1. The audible range of frequency is 20 Hz to 20,000 Hz. Determine the

corresponding range of time periods of vibrations.



2. A bat entering into a well finds it difficult to come out of it. Explain the

reason.

Watch Video Solution 3. A student breaks a fused bulb, and then hears a sound of explosion. What could be the reason for this ? Explain. Watch Video Solution 4. How are dogs made alert by the crime department ? Explain. Watch Video Solution

5. Three boys Ravi, John and Asif stand in a straight line as shown in figure. Ravi and Asif fire crackers at the same instant of time. John hears the first sound after 2 s and the second sound after 2.5 s. Determine the





Assessment Tests Test 1

1. Assertion (A): Different musical sounds are produced from percussioninstruments by exciting the stretched membrane at different tensions.

Reason (R): Flute, bassoon, oboes are examples of drum instruments.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: C

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2. Assertion (A): The musical notes produced by two musical instruments, like guitar and sitar are different even if the length and the thickness of the strings in both instruments are the same.

Reason (R) : The difference in two sounds of equal pitch and loudness can be distinguished by a characteristic property called quality of sound ro timbre.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: A

3. If the amplitude of the pendulum increases, then time period______.

A. increases

B. decreases

C. remains the same

D. None of these

Answer: C

Watch Video Solution

4. A sound wave makes an angle 30° with the reflecting surface. The angle of reflection is _____.

A. $30^{\,\circ}$

B. $60\,^\circ$

C. 90°

D. 120°

Answer: B

Watch Video Solution

5. A sonar device fixed to the ship is used to find the depth of the ocean. The ultrasonic sound produced gets reflected from the ocean bed and the time taken for the reflected sound to reach the sonar is 4 s, then write the following steps in sequence to find the depth of the ocean bed (d). (Speed of sound in ocean water is 1500 m s^{-1}) (A) Use the formula, speed = $\frac{\text{distance travelled by the sound (2d)}}{\text{Total time taken (t)}}$ (B) The distance travelled by the sound is equal to twice the depth of the ocean bed (d).

(C)Note the total time (1) taken by the reflected sound to reach the sonar from ocean bed from given data.

(D) Substitute the values in the given formula, and find the value of 'd'.

A. a b c d

B.bacd

C.dacb

D. c b a d

Answer: D

View Text Solution

6. A stone is dropped from the top of a tower 500m high into a pond of water at the base of the tower. When is the splash heard at the top ? Given, $g = 10m/s^2$ and speed of sound = 340m/s.

Watch Video Solution

7. Write the following steps in sequence to show that sound is propagated through solids.

(a) You will be able to hear two distinct sounds, one propagated through the metallic rod and other propagated through air. (b) Thus, sound can be propagated through both solids and gases.

(c) Take a long metallic rod, place one end of the rod near your ear and ask your friend to hit the other end.

A.abc B.cba C.acb D.cab

Answer: D

Watch Video Solution

8. The sound of loudness of sound in the range of 15 dB - 16 dB is

A. not audible.

B. just audible.

C. moderate.

D. painful to the ear.

Answer: D



9. The velocity of sound in vacuum is

A. 332

 $B.\,330$

 $\text{C.}~3\times108$

D. Zero

Answer: D

Watch Video Solution

10. The more is the energy spent to set a body into vibration,

A. the louder is the sound produced.

B. the intensity (loudness) of sound produced by vibrating body

always remains constant

C. the softer is the sound produced.

D. the amount of energy spent and loudness are not related to each

other.

Answer: A

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11. Which of the following statements is correct?

A. All vibrations produce sound.

B. Vibrations of frequency less than 20 Hz only produce sound.

C. Vibrations of frequency more than 20 Hz only produce sound.

D. Vibrations of frequency between 20 Hz and 20,000 Hz only produce

sound.

Answer: A

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12. The maximum possible displacement of a vibrating body from its mean

position during its motion is equal to

A. its amplitude.

B. half its amplitude.

C. twice its amplitude.

D. its frequency.

Answer: A

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13. A sound is produced by plucking a string in a musical instrument, then

A. Oboes

B. Veena

C. Mridangam

D. Violin

Answer: A

Watch Video Solution

14. Three persons P_1 , P_2 , and P_3 are at three different points A, B and C as shown in the figure. P_1 and P_2 clap at the same time. For P_3 to hear two distinct claps, the minimum distance between P_1 and P_2 should be _____ m. (The velocity of sound in air is $330ms^{-1}$)



A. 33

B. 330

C. 36.3

D. 660

Answer: A



15. Which of the following statements is correct?

A. The pitch of sound decreases with a decrease in the length of a

vibrating air column.

- B. The pitch of sound increases with a decrease in the thickness of a vibrating string.
- C. The pitch of sound decreases with a decrease in the length of the

vibrating string.

D. The pitch of sound depends upon the amplitude of a vibrating

body.

Answer: B

D View Text Solution

Assessment Tests Test 2

1. Assertion (A) : Rama Raju loves listening to Carnatic music played on Mridangam whereas his daughter Neeta gets irritated by it.

Reason (R) : The sound that produces pleasant effect on our ears is called music and the sound that produces an unpleasant effect on our ears is called noise.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: B



2. Assertion (A) : The pitch of the sound produced by the vibrating string can be changed.

Reason (R) : The pitch of the sound can be changed by changing the length, tension and thickness of the vibrating string.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. A is correct and R is incorrect.

D. Both A and R are incorrect.

Answer: A

3. When the length of the pendulum increases, the time period of the

pendulum _____.

A. increases

B. decreases

C. remains same

D. none of these

Answer: A

Watch Video Solution

4. The direction of an incident sound wave makes an angle of 30° with the normal of a reflecting surface The reflected sound wave makes an angle of _____ with the normal.

A. $60^{\,\circ}$

B. 30°

C. 90°

D. 120°

Answer: B

Watch Video Solution

5. Ratan saw a flash of lightning and after sometime heard the sound of thunder. If the time gap between seeing and hearing is 3 s, then write the following steps in sequence to find the height from the ground where the lightning is produced.

- (a) Consider the velocity of sound (v) as $330ms^{-1}$.
- (b) Note the time gap (t) between seeing and hearing.

(c) From the formula, speed $= \frac{\text{distance}}{\text{time taken}}$, height at which lightning was produced = speed of sound \times time interval.

(d) Substitute the values in the equation (1) and find the value of the height of the lightning from the ground.

A. bacd

B. bcad

C. cbda

D. d a b c

Answer: A

Watch Video Solution



6.

A. A-b, B-c, C-d, D-e, E-a

 $\mathsf{B}.\,A-c,B-c,C-d,D-a,E-b$

 $\mathsf{C}.\,A-a,B-c,C-e,D-b,E-d$

D.
$$A - a, B - c, C - e, D - b, E - d$$

Answer: D



7. Write the following steps in sequence to prove that sound travels through liquids.

(a) Place the ear against the side of the container and repeat the activity of hitting one coin with the other inside the water.

(b) Take a matallic container and fill it with water.

(c) Place two coins inside the water. Hit one of the other and observe the sound produced.

(d) Now, a clear and louder sound is heard proving that sound also travels through liquids.

A. a b dc

B. cabd

C. bcad

D. dabc

Answer: C



Answer: A



9. Velocity of sound is minimum in _____

A. wood

B. vacuum

C. water

D. air

Answer: B



10. If more energy is spent to set a body into vibration, then

A. the amplitude of vibrating body is more.

B. the amplitude of vibrating body is less.

C. the amplitude of vibrating body always remains same even after

setting it into vibration.

D. Both (b) and (c).

Answer: A



12. The instruments made of long and hollow pipes with a certain number

of holes on the sides are

A. wind or reed instruments.

B. stringed instruments.

C. drum instruments.

D. All of the above

Answer: A

Watch Video Solution

13. Three persons P_1 , P_2 and P_3 are at different points A, B and C, respectively as shown in the figure. Two persons P_1 and P_3 clap at the same time. Which among the following can be the minimum distance between P_2 and P_3 to hear the clap sound distinctly by P_2 ? (Take the velocity of sound in air as $330ms^{-1}$)



A. 330 m

B. 384 m

C. 363 m

D. 660 m

Answer: C

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14. A wave is moving in air with a velocity of 340m/s. Calculate the wavelength if its frequency is 512 vibrations/sec.

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