OBJECTIVE TYPE QUESTIONS & ANSWERS

Q2. Give short Answers.

1. How sound is produced?

Answer

Sound is form of energy, which is produced by a vibrating body.

Whenever a sound is produced, the vibrations of the sounding body can be observed.

2. What is tuning-fork?

Answer

Tuning fork is used in the laboratory for producing sounds of a particular frequency.

A tuning fork has U- shaped prongs with a stem at the bottom when we strike a tuning fork on a rubber pad a sound 13 heard and prongs of the tuning fork start vibrating

3. What is the nature of sound?

Answer

Vibrating bodies produced sounds. During vibratory motion, the vibrating body moves to and fro around its rest position and produces compressional waves in

the surrounding. These compressional waves are called sound waves. These waves travel from one place to another.

4. Do sound waves need material medium for their propagation?

Answer

Yes, sound waves need material medium for their propagation. Sound waves can travel through air, gases water and solids. It means that a material medium is necessary for the propagation of sound waves.

5. In a humid day, a louder sound is heard. Why?

Answer

In a humid day, water vapors are greater in air. Sound travel with greater speed in liquids than gases, that's why a louder sound is heard in a humid day.

6. What is the main function of eardrum?

Answer

The external ear collects the sound waves and directs them to the eardrum. The sound waves reach the eardrum and starts vibrating. The eardrum also separates the outer and middle ear.

7. Does loudness of a sound depend on the physical condition of the ear?

Answer

Loudness of a sound also depends on the physical condition of the ears of the listener.

A sound appears to be louder to a person with sensitive ears than to a man with defective ear.

8. Differentiate between loudness and intensity of sound.

1.	The characteristics of sound by which a loud and a faint sound can be distinguished is called loudness of sound.	1.	Sound energy flowing per second through a unit area held perpendicular to the direction of sound waves is called intensity of sound
2.	It is not a physical quantity.	2.	It is a physical quantity.
3.	It cannot be measured.	3.	It can be measured accurately.
4.	It depends on the physical condition of the ear.	4.	It independent of the ear.
5.	It does depend upon the intensity of sound.	5.	It does not depend upon the loudness.
6.	It has no unit.	6.	Its unit is Wm^{-2}.

9. Find the intensity level of faintest-audible sound?

Answer

In this case, $I = 10^{-12} Wm^{-2}$ $I_o = 10^{-12} Wm^{-2}$

$$\text{Intensity level} = k \log \frac{I}{I_o}$$

$$\text{Intensity level} = 10\log\frac{10^{-12}}{10^{-12}}$$

$$\text{Intensity level} = 10\log I = 10\times 10$$

$$\text{Intensity level} = 0$$

10. Find the intensity level of whispering sound?

Answer

In this case, $I = 10^{-10} Wm^{-2}\ I_o = 10^{-12} Wm^{-2}$

Intensity level $= k\log\frac{I}{I_o}$

Intensity level $= 10\log\frac{10^{-10}}{10^{-12}}$

Intensity level $= 10\log 100 = 10\times 2$

Intensity level $= 20dB$

11. Define sound.

Answer

Sound is the form of energy, which is produced by a vibrating body.

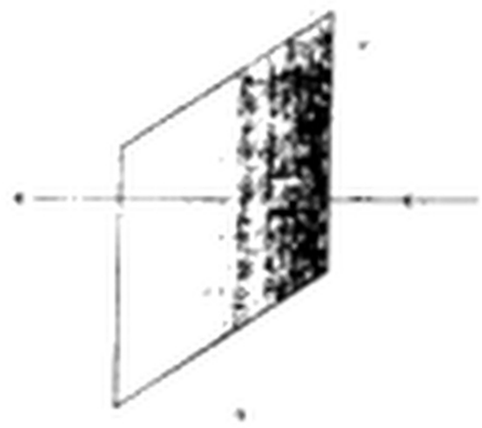
12. What is intensity of sound? Give its unit.

Answer

Intensity of sound

"Sound energy flowing per second through a unit area held perpendicular to the direction of sound waves is called intensity of sound." It is denoted by I.

Unit: SI unit of intensity of sound is watt per square metre (Wm^{-2}).



Mathematically:

$$\text{Intensity} = \frac{\text{Energy}}{\text{Area} \times \text{time}}$$

13. What is pitch of sound?

Answer

The characteristics of sound by which a shrill sound can be distinguished from a grave one is called the pitch of a sound:

Example: the voice of ladies is of higher pitch than of men.

14. What is loudness of sound?

Answer

The characteristics of sound by which a loud and a faint sound can be distinguished is called loudness of sound.

15. State Weber-Fechner law.

Answer

Weber—Fechner law states that:

"The loudness of a sound is directly proportional to the logarithm of intensity."

$$L \propto \log I$$

$$L = cons\tan t \times \log I$$

$$L = k \log I$$

k = constant of proportionality

Where k = constant of proportionality.

16. What is intensity level? Find its relation.

Answer

The difference in loudness of two sounds is called intensity level.

If I and 10 represents the intensities of two sounds waves having loudness L and Lo respectively, then according to Weber—Fechner law

$$L = k \log I$$

And $$L_o = k \log I_o$$

$$\text{Intensity level} = L - L_o$$

$$\text{Intensity level} = k \log I - k \log I_o$$

$$\text{Intensity level} = k(\log I - \log I_o)$$

$$\text{Intensity level} = k \log \frac{I}{I_o}$$

17. Differentiate between ultrasonic and infrasonic.

Answer

The sounds of frequency higher than 20,000 Hz are called ultrasonic.

The sounds of frequency less than 20 Hz are called infrasonic.

18. One what factors the loudness of a sound depends?

Answer

The loudness of a sound depends upon the following factors:

- Amplitude of vibrating body.
- Area of harming body.
- Distance from vibrating body.

19. On what factors the pitch of the sound depends?

Answer

The pitch of the sound depends on the frequency of the sound.

Greater the frequency higher will be the pitch.

0 The voice of woman and children are shriller because of their higher pitch.

20. What is quality of sound?

Answer

It is the property of sound by which we can differentiate between the sounds of the same pitch and intensity coming from different sources.

Example

We can differentiate between sounds coming from violin and piano.

21. Differentiate between noise and musical sound.

Answer

Noise:

A sound, which produces a displeasing effect in the ear, is called a noise.

These sounds have no regular frequency and amplitude.

Examples:

- Sound produced from factories.
- Sound produced from vehicles.

Musical sound:

A sound, which produces a pleasing effect in the ear, is called musical sound.

These sounds have regular frequency and amplitude.

Examples:

Sound of violin and flute.

22. What is resonance?

Answer

The phenomenon, in which there is remarkable increase in the amplitude and loudness of sound when the frequency of air column becomes equal to that of the tuning fork, is called resonance.

23. What is audible frequency range?

Answer

The sound of frequencies above 20 Hz and below 20.000 Hz is only audible.

24. Give some properties of ultrasonic.

Answer

- Ultrasonic waves carry more energy than the ordinary sound waves of the same amplitude.
- Ultrasonic waxes have very high frequency and the particle vibrate with the larger speed.
- These waves can be focused into narrow-beam.
- These waves travel through solids and liquids with very little loss of energy.

25. Why does the sound produced by a tuning fork die out when it is touched by hand?

Answer

When the prongs of' vibrating tuning fork are touched by hand, then these stop their vibrations, so sound produced dies out.

26. Write some uses of ultrasonic.

Answer

Ultrasonic waves are used:

- To diagnose and treat different ailments.
- To find the' sex of a body and its abnormalities before birth.
- To remove blood clots formed in the arteries.
- For the scaling of teeth.
- To crush the kidney stone and remove it.
- To destroy germs and bacteria present in the liquid.

27. How ultrasonic are helpful in industry?

Answer

A power beam of ultrasonic is allowed to pass through the defective parts, while passing, these waves are reflected by the surface of these cracks, which indicates the presence of cracks.

28. How can determine the depth of the ocean be the help of ultrasonic?

Answer

The depth of an ocean can be determined by using ultrasonic. An ultrasonic pulse is sent down towards the ocean bed from the bottom of a ship. This pulse after reflection from the ocean bed reaches the ship, where it is detected. The time taken by the ultrasonic pulse in travelling from the ship to the ocean bed and back is noted. Using this time and the speed of sound in water, the depth of the ocean can be easily determined.

29. What is difference between the sounds produced by tuning fork and violin?

Answer

Violin produces a musical sound. It is observed that both produce the sounds of equal loudness and pitch but these are identified due the difference in their quality.

30. Name the moveable bones of the middle ear?

Answer.

The bones of the middle ear:

1) Hammer **2)** Anvil **3)** Stirrup

31. What are the things necessary for production and propagation of sound?

Answer

Three things are necessary for the production and propagation of sound.

- A vibrating body.
- A material medium.
- Receiver like ear.

32. We cannot hear nuclear explosions occurring on sun. Why?

Answer

We do not hear nuclear explosions because there is no material medium between the sun and the earth. There is a vacuum between the sun and the earth.

33. Can sound waves pass through water?

Answer

Sound waves are longitudinal in nature and can pass through a material medium only and. not through vacuum. -As water is a material medium, sound waves can pass through it.

34. Do the loudness of a sound depends on the amplitude of vibration of the sounding body?

Answer

The loudness of a sound depends on the amplitude of vibration of the sounding body.

- The sound will be loud if the amplitude of vibration is large.
- The sound will be faint or low if the amplitude of vibration is small.

35. On what factors the speed of sound waves depends?

Answer

The speed of sound waves depends on the following two factors:

- The compressibility i.e. elasticity of the medium.
- Inertia i.e. density of the medium.

36. Why Sound waves travel more slowly in gases than in solids?

Answer

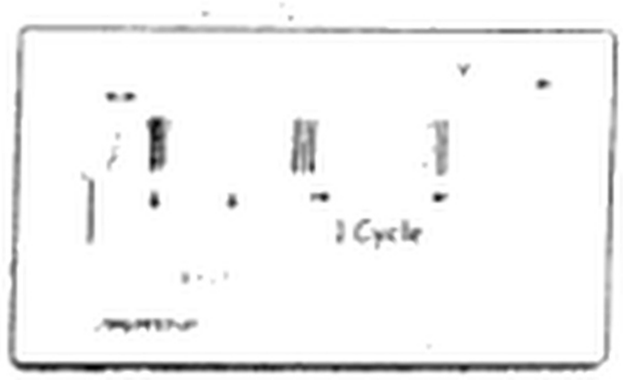
Sound travel more slowly in gases than in solids because gases are more compressible due to smaller density. As a result, the solids have greater elasticity than

37. Differentiate between compression and rarefaction?

Answer

The portion of the wave where crowding of the particles of the medium is maximum is called compression.

The portion of the wave where crowding of the panicles of the medium is minimum called rarefaction.



Funning Fork

38. We see a pendulum vibrating but no sound is heard. Why?

Answer

Sound waves are produced by a vibrating body but are not heard but their frequency is less than 20 Hz. Therefore, the sound wave produced by a vibrating pendulum are not heard.

39. How does the change in temperature affect the velocity of sound?

Answer

Velocity of sound increases by 0.61 ms^{-1} for every 1°C rise in temperature.

40. On what factors the quality 01' sound depends?

Answer

The quality of sound depends on the following factors.

- Number of harmonics and
- Their relative intensities (loudness) present in sound.

41. Differentiate between audible and inaudible sounds.

Answer

Audible sounds:

Those sounds, which can be heard by our ears, are called audible sounds.

Their frequency range is between 20 Hz to 20,000 Hz.

Inaudible sounds:

Those sounds, which cannot be heard by our ears are called in audible sounds.

The sound of frequency below 20 Hz and greater than 20,000 Hz are inaudible sound.

42. What is decibel scale?

Answer

A scale, which is used for measuring the intensity level of sound is known as decibel scale.

43. What is the main use of silent whistle?

Answer

Some people use silent whistle to call dogs whose frequency lies between 20,000 Hz to 25.000 Hz. it is silent for humans but not for dogs because their audible frequency range Is much more than humans.

44. On a humid day, a louder sound heard. Why?

Answer

On a humid' day, water vapors are greater in air. Sound travels with greater speed in liquids than gases, that's why a louder sound is heard on humid day.

45. How do we hear a sound?

Answer

The sounding body causes vibrations in the surrounding air. These vibrations reach our ear in the form of compressional waves and in turn set the eardrum into vibrations. Eardrum transfers these vibrations to the inner ear through three bones (hammer, anvil and stirrup). In the inner ear, these vibrations cause changes in the pressure of the, fluid in the cochlea. The hair like endings of the auditory nerve respond to these pressure variations and send this message to brain where it is interpreted as sound.

46. Enumerate the factors that determine loudness 01' a sound.

Answer

The factors that determine the loudness, of sound are:

i) Amplitude of the vibrating body.

ii) Surface area of the vibrating body.

iii) Distance from the vibrating body.

iv) Direction of wind.

v) Moisture in air.

47. Differentiate between intensity and intensity level of a sound.

Answer

Difference between Intensity and Intensity level of a Sound:

	Intensity		Intensity Level
1.	The sound energy per second per unit area held perpendicular to the direction of sound waves is called the intensity of the sound.	2.	The difference between the loudness of one sound and the loudness of the faintest audible sound is called the ntensity level of that sound.
2.	The unit of intensity is watt per square meter (W/m^2).	2.	The units are Bet and decibel.
3.	For example, the intensity of threshold Of pain is I W/m^2 .	3.	For example, the intensity level of threshold of pain is I20dB or 12 Bel.

48. Differentiate between pitch and quality of a sound.

Answer

Difference between Pitch and Quality of a Sound:

1.	The characteristics by virtue of which a shrill sound pan be distinguished from c grave one is called pitch of sound.	1.	The characteristics by virtue of which two sounds & of same loudness and pitch cci be distinguished from each other is called quality of the sound.

2.	Pitch of a sound depends upon its frequency.	2.	Quality of a Fund depends upon the fundamental frequency and the overtones present in the sound.
3.	The voices of women and children are shrill because of high pitch and that of men are grab due to low pitch.	3.	Two notes of same loudness and pitch play separately on a flute and on a piano can be distinguished from each other without actually looking at the instruments due to their quality.

49. What is the relation of a sound with its frequency?

Answer

A sound of high frequency has high pitch and. therefore, it is shrill. Similarly, a sound of low frequency has low pitch and is grave.

50. Give the industrial use of ultrasonic.

Answer

One of the industrial uses of ultrasonic is to determine cracks in the moving parts of heavy-duty machines and engines.