QB365 Question Bank Software Study Materials

Sound Important 3 & 5 Marks Questions With Answers (Book Back and Creative)

9th Standard

Science

Total Marks : 73

3 Marks

16 x 3 = 48

1) Through which medium sound travels faster, iron or water? Give reason.

Answer : **Reason:** In solid, particles are packed closer than in liquid and gaseous. So sound waves travel easily in solid. Sound travel faster in iron.

2) Name the physical quantity whose SI unit is 'hertz'. Define.

Answer : The number of vibrations (complete waves or cycles) produced in one second is called frequency. Its SI unit is hertz.

3) What is meant by supersonic speed?

Answer : When an object travels at a speed higher than that of sound in air, it produces shock waves. These shock waves carry a large amount of energy. The air pressure variations associated with this type of shock waves produce a very sharp and loud sound called sonic bloom or supersonic speed.

4) How does the sound produced by a vibrating object in a medium reach your ears?

Answer : When object vibrate sound is produced, these vibrations cause the nearby molecules to vibrate. These vibrations are nothing but to and fro movement of particles. When these vibrations reach our ear we hear the sound.

5) You and your friend are on the moon. Will you be able to hear any sound produced by your friend?

Answer : No, he will not be able to hear the sound produced by his friend.

6) Name the device which is used to produce sound in laboratory experiments.

Answer : Tuning fork

7) What should an object do to produce sound?

Answer : An object should- vibrate to produce sound. The vibrating body causes the medium around it to vibrate.

8) Can sound travel through vacuum?

Answer : No, sound cannot travel through vacuum.

Because, sound can travel only when there are particles, which can be compressed and rarefied in the medium.

9) A pendulum oscillates 50 times in 5 seconds. Find the time period and frequency.

Answer : Time period = $\frac{t}{Numberofoscillationintimet} = \frac{5}{50}$ = 0.1s

Frequency = $\frac{1}{Timeperiod} = \frac{1}{0.1}$ = 10 Hz

Frequency is 10 Hz.

10) What is the audible hearing range of Human being?

Answer : The audible range of average human being is in the frequency range of 20 Hz to 20000 Hz.

11) Define - frequency.

Answer : The number of vibrations produced in one second is called frequency of the wave.

12) What are the factors that distinguishes sound from one another?

Answer : Sounds can be distinguished from one another in terms of the following three different factors.

(i) Loudness

(ii) Pitch

(iii) Timbre (quality)

13) On what factors does the speed and sound in gaseous medium depends on?

Answer : The speed & sound in gaseous medium depends on

(i) Pressure of the medium

(ii) Temperature of the medium

(iii) Density of the medium

(iv) Nature of gas.

14) Give the laws of reflection of sound.

Answer : (i) The angle in which the sound is incident is equal to the angle in which sound is reflected.

(ii) Direction of incident sound, direction of reflected sound and the normal are in the same plane.

15) Give some examples of Instruments where multiple reflections of sound Are used.

Answer : Megaphones, loud speakers, horns, nathaswaram, shehnai and trumpets are the instruments where multiple reflection of sound is used.

16) Define - Reverberation.

Answer : The repeated reflection of sound that results in persistance of sound is called reverberation.

5 Marks 5 x 5 = 25

17) Verify experimentally the laws reflection of sound.

Answer : The Laws of reflection of sound are:

1. The angle in which the sound is incident is equal to the angle in which sound is reflected.

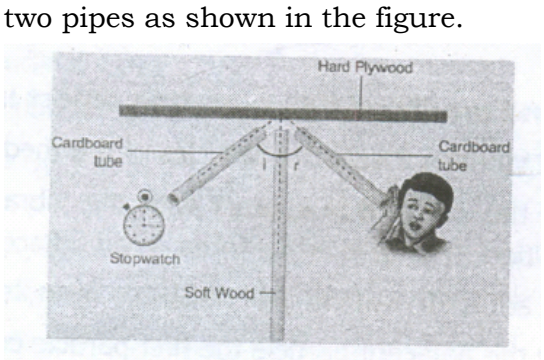
2. Direction of incident sound, direction of the reflected sound and the normal are in the same plane.

Experimental verification:

1. Take two identical pipes, the pipes can be made using chart paper also.

2. The length of the pipes should be sufficiently long.

3. Arrange them on the table near the wall or keep a hard plywood at one end of the pipes and soft wood in the middle of the two pipes as shown in the figure.



4. keep a clock near the open end of one of the pipes and try to hear the sound of the clock through the other pipe. Adjust the position of the pipes so that we can best hear the sound of the clock.

5. Now measure the angle of incidence and angle of reflection.

6. It is observed that for every angle of incidence, say 30°, 35°, 40°, the angle of reflection is same as 30°, 35° and 40°.

7. Thus it is proved that angle of incidence is equal to the angle of reflection and direction of incident and reflected sounds and normal lie in the same plane.

18) Explain how does SONAR work?

Answer : 1. SONAR stands for Sound Navigation and Ranging.

2. It is a device that uses ultrasonic waves to measure the distance, direction and speed of underwater objects.

3. It consists of a transmitter and a detector and is installed at the bottom of the boats and ships.

4. The transmitter produces and transmits ultrasonic waves.

5. These waves travel through water and after striking the object on seabed, get reflected back and are sensed by a detector.

6. The detector converts the ultrasonic waves into electrical signals which are appropriately interpreted.

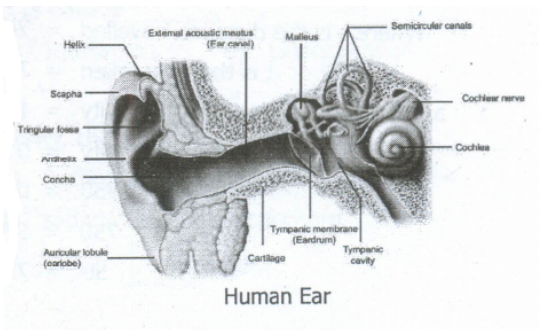
7. The distance of the object that reflected the sound wave can be calculated by knowing the speed of sound in water and the time interval between transmission and reception of the ultrasound.

8. Let the time interval between transmission and reception of ultrasound signals be 't' and the speed of sound through sea water be $2d/t = v$. This method is called echo ranging.

9. SONAR technique is used to determine the depth of the sea and to locate underwater hills, valleys, submarine icebergs etc.,

19) Explain the working of human ear with diagram.

Answer :



Human Ear

1. Sound from the surroundings is collected by the outer ear, called as 'pinna' .
2. The collected sound passes through the auditory canal.
3. At the end of the ear is eardrum or tympanic membrane.
4. When a compression of the medium reaches the eardrum the pressure on the outside of the membrane increases and forces the eardrum inward.
5. Similarly the eardrum moves outward when a rarefaction reaches it.
6. In this way the eardrum vibrates .
7. The vibrations are amplified several times by three bones called as the hammer, anvil and stirrup in the middle ear.
8. The middle ear transmits the amplified pressure variations received from the sound wave to the inner ear.
9. In the inner ear the pressure variations are turned into electrical signals by 'cochlea'
10. These electrical signals are sent to the brain via the auditory nerve and the brain interrupts them as sound.

20) Write any five applications of ultrasonic waves.

Answer : 1. Ultrasound is used in cleaning technology. Minute foreign particles can be removed from objects placed in a liquid bath through which ultrasound is passed.
2. Ultrasounds can also be used to detect cracks and flaws in metal blocks.
3. Ultrasonic waves are used to get images of the heart by the technique called as Echo 'cardiography'
4. Ultrasound is employed to break 'small stones' formed in the kidney into fine grains.
5. Animals such as bats and dolphins use ultrasound to navigate and communicate.
6. SONAR is a device uses ultrasonic waves to measure the distance, direction and speed of the underwater objects.

21) Give the application of ultrasonic waves.

Answer : (i) Ultrasound can be used in cleaning technology. Minute foreign particles can be removed from objects placed in a liquid bath through which ultrasound is passed.
(ii) Ultrasounds can also be used to detect cracks and flaws in metal blocks.
(iii) Ultrasonic waves are made to reflect from various parts of the heart and form the image of the heart. This technique is called 'echo cardiography'.
(iv) Ultrasound may be employed to break small 'stones' formed in the kidney into fine grains. These grains later get flushed out with urine.