



Date : 12th Dec 2023

General Knowledge - Waves

English

Q:1 Sound waves travel fastest in

1. solids
2. liquids
3. gases
4. vacuum

Q:2 Sound Waves fall into which one of the following types of Waves?

1. Transverse waves
2. Longitudinal waves
3. Latitudinal waves
4. Horizontal waves

Q:3 Which of the following waves are used by the common TV remote control?

1. Lasers
2. Radio waves
3. Ultrasonic waves
4. Infrared waves

Q:4 What happens when sound waves propagate from one medium to another?

1. Speed of Sound changes
2. Its wavelength changes
3. Frequency remains constant
4. All of the above

Q:5 Which among the following can hear ultrasonic waves?

1. Monkey
2. Whales
3. Elephant
4. Humans

Q:6 Which among the following is/are considered transverse waves?

1. Sound waves
2. Ultrasonic waves
3. Seismic P-waves
4. Waves on a guitar string

Q:7 In a neon laser, all the atoms emit the light waves of

1. Same frequency
2. Same amplitude
3. Same phase
4. All of the above

Q:8 The sound waves of frequency greater than 20 kHz are known as?

1. Infrasonic waves
2. Audible sound waves
3. Ultrasonic waves
4. Supersonic waves

Q:9 Who among the following Scientists is credited with the discovery of Radio Waves?

1. Robert Hooke
2. Kepler
3. Karl Landsteiner
4. Heinrich Hertz

Q:10 Indian scientists have found the first evidence of solitary electromagnetic waves on which Planet?

1. Mars
2. Saturn
3. Venus
4. Mercury



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Answer Key

1. (1)	2. (2)	3. (4)	4. (4)	5. (1)
6. (4)	7. (4)	8. (3)	9. (4)	10. (1)

Answers and Solutions

Q:1 The correct answer is **option 1** i.e. **solids**

- Sound waves travel fastest in solids. This is because the particles in a solid are densely packed and have a higher degree of interconnectedness compared to liquids and gases.
- In a solid, sound waves can propagate quickly because the particles are close together and can transmit vibrations more effectively.
- The speed of sound in a material depends on its density and the stiffness of the material, often referred to as its bulk modulus.
- Solids have higher bulk moduli compared to liquids and gases, making sound waves move most rapidly in solids, followed by liquids and then gases, where the particles are less densely packed.

Q:2 The correct answer is **option 2** i.e. **Longitudinal waves**.

There are two types of waves:

- Longitudinal waves and
- Transverse waves.

Longitudinal Waves:

A **wave** in which the particles of the medium vibrate back and forth in the 'same direction' in which the **wave** is moving. The medium can be solid, liquid, or gas. Therefore, **sound waves are longitudinal waves**.

Q:3 The correct answer is **Option 4** i.e. **Infrared waves**

Infrared waves are used by the common TV remote control.

Wavelength: 700 nanometers to 1 millimetre.

Q:4 The correct answer is **Option 4** i.e. **All of the above**

- Sound is propagated in the form of the longitudinal mechanical wave which is generated by transmission of disturbances in the form of rarefactions and compressions.
- When sound waves propagate from one medium to another, then their wavelength and speed change, but their frequency remains unchanged/constant.

Q:5 The correct answer is **option 1** i.e. **Monkey**.

- Waves of frequency higher than 20000 Hz are known as Ultrasonic waves, which can be heard by bats, dogs, cats, monkeys, etc.
- Waves of frequency lower than 20 Hz are known as infrasonic waves which can be heard by whales, and elephants.
- Sounds with frequencies 20 Hz to 20 KHz are known as audible sounds since they can be heard by humans.

Q:6 The correct answer is **Option 4** i.e. **Waves on a guitar string**

- Transverse waves are waves in which the particle of the medium vibrates perpendicular to the direction of its propagation.
- The waves on a guitar string are an example of a transverse wave because, in such waves, all the particles or medium vibrate perpendicular to the direction of propagation.

Q:7 The correct answer is **Option 4** i.e. **All of the above**

- In a neon laser, all the atoms emit light waves of the same frequency, same amplitude, and same phase.
- A laser is a device that emits or gives out light (electromagnetic radiation) through a process of optical amplification based on the stimulated emission of photons.

Q:8 The correct answer is **option 3** i.e. **Ultrasonic waves**.

- **Ultrasonic waves are sound waves of frequency greater than 20 kHz.** Ultrasonic wave is defined as "inaudible sound with high frequency for human". Ultrasonic waves are used in medical instruments and by animals such as dolphins and bats.
- **Infrasonic waves** have frequencies below those of sound waves that can be detected by the human ear—i.e., below 20 Hz.
- The audible range for a human being is 20 Hz to 20,000 Hz.
- **Supersonic** is used for objects which travel at a speed greater than the speed of sound.

Q:9 The correct answer is **option 4** i.e. **Heinrich Hertz**.

Scientists	Invention/Discovery	Other Information
Robert Hooke	Cells	He wrote an important book- Micrographia, showing the microscopic world.
Kepler	Elliptical path of planets of the solar system	He also showed that tides on the earth are caused primarily due to the moon. He also discovered the inverse square law of light intensity.
Karl Landsteiner	Human Blood Group System	He also discovered the Rh factor in blood and how the safe transfusions of blood are done. He also proved that polio is an infectious disease.
Heinrich Hertz	Radio Waves	He proved James Clerk Maxwell's theory of electromagnetism. He also discovered the photoelectric effect.

Q:10 The correct answer is **option 1** i.e. **Mars**.

Indian scientists have found the first evidence of solitary electromagnetic waves on Mars.

A) Scientists from the Indian Institute of Geomagnetism (IIG) used data from the National Aeronautics and Space Administration's Mars Atmosphere and Volatile Evolution (MAVEN) to establish the findings.

B) Scientists have identified the solitary waves in the Martian magnetosphere using high-resolution electric field data from MAVEN's recorded by Langmuir Probe and Waves instruments.