



THE SOUND

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- Sound is something that we hear using our ears.
- Without sound, we cannot talk, listen, or enjoy music.
- Sound helps humans and animals communicate.
- Examples: talking, clapping, ringing bell.

3 SOUND IS A FORM OF ENERGY

- Sound is a type of energy.
- Energy means the ability to do work.
- Sound energy travels from one place to another.
- Example: alarm sound wakes us up.

4 SOUND IS PRODUCED BY VIBRATION

- Sound is produced only when an object vibrates.
- Vibration means repeated back and forth movement.
- If vibration stops, sound also stops.
- All sounds come from vibrating objects.

5 EXAMPLES OF SOUND PRODUCTION

- Bell rings because it vibrates.
- Drum produces sound when its surface vibrates.
- Guitar string vibrates when plucked.
- Human voice comes from vibrating vocal cords.

6 WHAT IS VIBRATION?

- Vibration is a to and fro movement.
- The object moves again and again at the same place.
- It does not move forward permanently.
- Faster vibration produces different sound.

7 SOUND NEEDS A MEDIUM

- Sound needs a material to travel.
- This material is called a medium.
- Sound travels through air, water, and solids.
- Without a medium, sound cannot move.

8 SOUND CANNOT TRAVEL IN VACUUM

- Vacuum means empty space.
- There are no particles in vacuum.
- Sound needs particles to travel.
- Therefore, sound cannot travel in space.

9 SOUND TRAVELS AS WAVES

- Sound travels in the form of waves.
- These waves carry sound energy.
- The particles vibrate but do not move forward.
- Only energy travels, not the particles.

10 TYPE OF SOUND WAVES

- Sound waves are longitudinal waves.
- Particles move forward and backward.
- Movement is parallel to sound direction.
- Sound waves are not transverse waves.

|| COMPRESSION

- Compression is a region of high pressure.
- Particles are very close to each other.
- Density of particles is high.
- Sound energy is strong in compression.

12 RAREFACTION

- Rarefaction is a region of low pressure.
- Particles are far apart.
- Density is low.
- Sound energy is weak in rarefaction.

13 WAVELENGTH

- Wavelength is the distance between two compressions.
- It shows the length of a sound wave.
- Represented by the symbol λ .
- Unit is metre (m).

14 FREQUENCY

- Frequency means number of vibrations in one second.
- It tells how fast an object vibrates.
- More vibrations mean higher frequency.
- Unit of frequency is Hertz (Hz).

15 HIGH AND LOW FREQUENCY

- High frequency means more vibrations per second.
- High frequency produces sharp sound.
- Low frequency produces deep sound.
- Example: whistle – high, drum – low.

16 TIME PERIOD

- Time period is time taken for one vibration.
- It is written as T .
- Measured in seconds.
- Shorter time period means higher frequency.

17 RELATION BETWEEN FREQUENCY AND TIME PERIOD

- Frequency = $1 / \text{Time Period}$.
- If time period decreases, frequency increases.
- If time period increases, frequency decreases.
- They are inversely proportional.

18 AMPLITUDE

- Amplitude is the height of vibration.
- It shows how strong the sound is.
- More amplitude means more energy.
- Amplitude decides loudness.

19 LOUD AND SOFT SOUND

- Loud sound has large amplitude.
- Soft sound has small amplitude.
- Loud sound can damage hearing.
- Soft sound is comfortable to hear.

20 LOUDNESS

- Loudness means how loud sound feels.
- It depends on amplitude.
- Measured in decibel (dB).
- Loudness differs from person to person.

21 PITCH

- Pitch tells how high or low a sound is.
- Depends on frequency.
- High pitch means high frequency.
- Low pitch means low frequency.

22 QUALITY OF SOUND

- Quality helps identify different sounds.
- Same pitch and loudness but different sounds.
- Example: flute and violin.
- Also called timbre.

23 SPEED OF SOUND

- Speed tells how fast sound travels.
- Sound speed is different in different media.
- Depends on temperature and medium.
- Measured in metre per second.

24 SPEED OF SOUND IN DIFFERENT MEDIA

- Sound travels fastest in solids.
- Travels slower in liquids.
- Travels slowest in gases.
- Because particles are closer in solids.

25 REFLECTION OF SOUND

- Sound bounces back from a surface.
- This is called reflection of sound.
- Hard surfaces reflect sound well.
- Used in many devices.

26 ECHO

- Echo is a repeated sound.
- Occurs due to reflection.
- Heard after a short delay.
- Common in mountains.

27 CONDITIONS FOR ECHO

- Distance should be at least 17 metres.
- Surface should be hard.
- Sound should be loud.
- Listener should hear clearly.

28 REVERBERATION

- Sound continues after the source stops.
- Caused by multiple reflections.
- Makes sound unclear.
- Reduced using curtains and boards.

29 USES OF REFLECTION OF SOUND

- Megaphone directs sound forward.
- Hearing aids help weak ears.
- Loudspeakers increase sound.
- Stethoscope carries heart sound.

30 HEARING RANGE OF HUMANS

- Humans hear from 20 Hz to 20,000 Hz.
- Below 20 Hz is infrasonic.
- Above 20,000 Hz is ultrasonic.
- Normal sounds lie in this range.

3 | INFRASONIC SOUND

- Frequency less than 20 Hz.
- Cannot be heard by humans.
- Produced by earthquakes.
- Some animals can hear it.

32 ULTRASONIC SOUND

- Frequency more than 20,000 Hz.
- Used in hospitals.
- Used in machines.
- Bats use it for navigation.

33 SONAR

- SONAR uses ultrasonic sound.
- Used to measure sea depth.
- Used to find submarines.
- Used in ships.

34 HUMAN EAR

- Ear helps us hear sound.
- Converts sound waves into signals.
- Sends signals to the brain.
- Brain understands sound.

35 OUTER EAR

- Collects sound waves.
- Directs sound inside.
- Helps locate direction of sound.
- Includes pinna.

36 MIDDLE EAR

- Has three tiny bones.
- Increases sound strength.
- Passes vibrations forward.
- Helps hear soft sounds.

37 INNER EAR

- Converts vibrations into signals.
- Sends signals to the brain.
- Brain hears sound.
- Damage causes hearing loss.

38 NOISE

- Noise is unwanted sound.
- Causes stress and headache.
- Affects concentration.
- Harmful to health.

39 NOISE POLLUTION CONTROL

- Avoid loud music.
- Use silencers.
- Follow noise rules.
- Protect ears.

40 CHAPTER SUMMARY

- • Sound is produced by vibration.
- • Sound needs a medium.
- • Frequency decides pitch.
- • Amplitude decides loudness.

THANK YOU

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