NCERT Class IX Science - Sound (Summary)

1. Nature of Sound

· Sound is a mechanical wave that requires a medium (solid, liquid, or gas) to propagate.
· It is a longitudinal wave, meaning particles oscillate parallel to wave direction.

2. Characteristics of Sound Waves

· Frequency (f): Number of oscillations per second (Hz) · Pitch.
· Amplitude: Maximum displacement · Loudness.
· Wavelength (·): Distance between compressions/rarefactions.
· Speed (v): v = · × f (In air at 20°C · 343 m/s).

3. Audible Range

· Humans: 20 Hz to 20,000 Hz.
· Infrasonic: < 20 Hz | Ultrasonic: > 20,000 Hz

4. Reflection of Sound

· Echo: Minimum distance 17.2 m.
· Applications: SONAR, ultrasound imaging.

5. Applications of Sound

· SONAR: Uses ultrasonic waves to measure depth.
· Medical imaging: Ultrasonic waves for scanning organs.

6. Speed of Sound in Different Media

· Maximum in solids, least in gases.
· Factors: Temperature, medium density.

7. Wave Equation

· v = · × f | Sound carries energy, not matter.

8. Harmful Effects

· Noise pollution: Causes stress, hearing loss.
· Control: Plant trees, use silencers, soundproofing.