



ACOUSTICS



Learning Objectives



By the end of this section, the students will be able to:

- ◆ Understand how sound is produced and transmitted.
- ◆ Relate the speed of sound, its frequency, and its wavelength.
- ◆ Know the speed of sound in various media.
- ◆ Explain the factors affecting the speed of sound in a gaseous medium.
- ◆ Demonstrate the phenomenon of reflection of sound.
- ◆ Determine the speed of sound using the method of echo.
- ◆ Understand Doppler Effect.
- ◆ Solve numerical problems related to the above topics.

INTRODUCTION

Sound plays a major role in our lives. We communicate with each other mainly through sound. In our daily life, we hear a variety of sounds produced by different sources like humans, animals, vehicle horns, etc. Hence, it becomes inevitable to understand how sound is produced, how it is propagated and how you hear the sound from various sources. It is sometimes misinterpreted that acoustics only deals with musical instruments and design of auditoria and concert halls. But, acoustics is a branch of physics that deals with production, transmission, reception, control, and effects of sound. You have studied about propagation and properties of sound waves in IX standard. In this lesson we will study about reflection of sound waves, Echo and Doppler effect.

5.1 SOUND WAVES

When you think about sound, the questions that arise in your minds are: How is sound produced? How does sound reach our ears from various sources? What is sound? Is it a force or energy? Let us answer all these questions.

By touching a ringing bell or a musical instrument while it is producing music, you can conclude that sound is produced by vibrations. The vibrating bodies produce energy in the form of waves, which are nothing but sound waves (Figure 5.1).

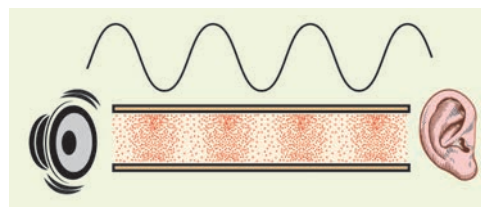


Figure 5.1 Production of sound waves

