



11086CH02

CHAPTER TWO

UNITS AND MEASUREMENT

Physics with Bose Sir, Website: Physicseducour.in

2.1	Introduction
2.2	The international system of units
2.3	Measurement of length
2.4	Measurement of mass
2.5	Measurement of time
2.6	Accuracy, precision of instruments and errors in measurement
2.7	Significant figures
2.8	Dimensions of physical quantities
2.9	Dimensional formulae and dimensional equations
2.10	Dimensional analysis and its applications
	Summary
	Exercises
	Additional exercises

2.1 INTRODUCTION

Measurement of any physical quantity involves comparison with a certain basic, arbitrarily chosen, internationally accepted reference standard called **unit**. The result of a measurement of a physical quantity is expressed by a number (or numerical measure) accompanied by a unit. Although the number of physical quantities appears to be very large, we need only a limited number of units for expressing all the physical quantities, since they are inter-related with one another. The units for the fundamental or base quantities are called **fundamental** or **base units**. The units of all other physical quantities can be expressed as combinations of the base units. Such units obtained for the derived quantities are called **derived units**. A complete set of these units, both the base units and derived units, is known as the **system of units**.

2.2 THE INTERNATIONAL SYSTEM OF UNITS

In earlier time scientists of different countries were using different systems of units for measurement. Three such systems, the CGS, the FPS (or British) system and the MKS system were in use extensively till recently.

The base units for length, mass and time in these systems were as follows :

- In CGS system they were centimetre, gram and second respectively.
- In FPS system they were foot, pound and second respectively.
- In MKS system they were metre, kilogram and second respectively.

The system of units which is at present internationally accepted for measurement is the *Système Internationale d' Unites* (French for **International System of Units**), abbreviated as SI. The SI, with standard scheme of symbols, units and abbreviations, was developed and recommended by General Conference on Weights and Measures in 1971 for

Physics with Bose Sir, Website: Physicseducour.in