

Measurement

The accurate quantity of a substance can only be known by measurement. Measurement can be expressed in figures and in standard measurement. We use different instruments like measuring tape or scale for the measurement of length, beam balance for measuring masses and clock for the measurement of time.

The process of comparing an unknown physical quantity with a known standard quantity of the same kind is called measurement. Measurement is essential to know the exact physical quantity of the substances in our daily life. Those substances which are available in our surrounding can be measured are known as physical quantities. Some of the examples of physical quantities are the area, mass, time, length, temperature, etc. Those things which cannot be measured are called non- physical quantity. Some of the examples of non- physical quantity are love, kindness, anger, interest, feelings etc. There are two types of physical quantities. They are discussed below:

Derived Physical Quantity: Those physical quantities, which depend on two or more fundamental quantities or power of the fundamental quantity, are called derived quantities. The units of derived quantities are called derived units. For example, an area is a derived quantity. Since $\text{area} = l \times b$, so the value of area depends on the value of length and breadth.

Fundamental Physical Quantity: Those physical quantities, which can neither be derived from other quantities nor be further resolved into simpler ones, are called fundamental quantities. The units of fundamental quantities are called fundamental units or basic units. For example, the length of a body is the fundamental quantity as it cannot be expressed in terms of another quantity.

Unit

Without measurement, we cannot estimate the total amount of physical quantity.

Fundamental unit

Those units whose value do not depend on any other units are fundamental units. For example, Length of an object i.e meter, the mass of an object i.e kilogram, time i.e second.

Here are the seven fundamental units used to measure the fundamental quantities:

Fundamental quantity	Unit	Symbol
Length	Meter	m
Mass	Kilogram	kg
Time	Second	s
Temperature	Kelvin	K
Electric current	Ampere	A
Luminous intensity	Candela	cd
Amount of substance	Mole	mol

Derived Unit

Those units whose value depend on other units are derived units. For example, To measure the velocity of a car we must know the distance traveled by car and time taken by the car to travel the distance.

S.N	Derived Quantities	Derived Units	Symbol
1.	Area	Square meter	m^2
2.	Volume	Cubic meter	m^3
3.	Density	Kilogram per cubic meter	kg/m^3
4.	Speed/Velocity	Meter per second	m/s
5.	Acceleration	Meter per second per second	m/s^2
6.	Force	Newton	N
7.	(work/energy)	Joule	J
8.	Power	Watt	W
9.	Pressure	Pascal	Pa

Some information on system of units

There are different units of fundamental quantities that combine together to form a system of units. There are four systems of unit of measurement:

A. FPS system:

The full form of this system is Foot- Pound and second system. In this system, the fundamental units of length, mass and time are foot, pound and second.

B. CGS system

The full form of this system is Centimeter- Gram- Second system. In this system, the fundamental units of length, mass and time are centimetres, gram, and second.

C. MKS system

The full form of this system is Meter- Kilogram- Second system. In this system, the fundamental units of length, mass and time are meters, kilogram and second.

D. SI system

The full form of this system is System de international Unit. This system is modified form of MKS system. This system includes seven fundamental units such as the unit of electricity- Ampere (A), unit of temperature- kelvin (K), unit of light- Intensity (I) and the unit of amount of matter- mole (mol) along with three fundamental units of MKS system i.e. meter, kilogram and second.