

PHYSICS

"Physics is the branch of science that deals with the study of mass, energy, time and space".

The two main facets of the physics are:

- i. Classical physics (deals with bodies of macroscopic size)
- ii. Modern physics (deals with bodies of microscopic size)

Other sub-branches are classical mechanics, quantum mechanics, relativistic mechanics, fluid mechanics, nuclear physics, particle physics, solid state physics, electronics, optics, acoustics, electricity, magnetism, Bio-physics, Physical chemistry etc.

MEASUREMENT

Comparing unknown quantities with standard quantities is called as measurement.

UNIT

The standard with which things are compared is called as Unit.

EXPLANATION

To communicate the result of a measurement of a certain physical quantity, a unit for the quantity must be defined. For example, if our fundamental unit of length is defined to be 1.0 meter, and someone familiar with our system of measurement reports that a wall is 2.0 meters high then we know that the height of the wall is as twice as the fundamental unit of length.

The measurement of a physical quantity is established by comparison with a standard. A standard must have the following properties.

- i. It is accessible
- ii. It is invariable

PHYSICAL QUANTITIES

DEFINITION

"Physical quantity is a quantity that can be observed, measured and laws of physics can be expressed in terms of those quantities."

Examples are mass, length, time, temperature, force, momentum etc.

Emotions, point (.) etc. are not physical quantities.

There are two types of physical quantities:

- i. Base quantities
- ii. Derived quantities

i. BASE QUANTITIES

Base quantities are those quantities which cannot be defined in terms of other

Chapter 1

Measurement

physical quantities. Or

Base quantities are the minimum number of physical quantities in terms of which other physical quantities can be defined.

The seven base quantities are:

1. Length,
2. Mass,
3. Time,
4. Temperature,
5. Electric current,
6. Luminous intensity (intensity of light),
7. Amount of substance

MEASUREMENT OF A BASE QUANTITY

The measurement of base quantities involves two steps.

- 1) The choice of standard
- 2) The establishment of procedure for comparing the quantity to be measured with the standard so that a number and a unit are determined as the measure of that quantity.

ii. DERIVED QUANTITIES

DEFINITION

Quantity which is defined in terms of base quantities is termed as Derived quantity.

EXAMPLES

Velocity, acceleration, momentum, force, work, pressure etc. are examples of derived quantities.

In CGS system

$$G = 6.674 \times 10^{-8} \text{ cm}^3 \text{ g}^{-1} \text{ s}^{-2}$$