

Date 3/4/2023 Page 1
TENDER HEART HIGH SCHOOL, SEC.-33'B, CHD.

CLASS - IX

SUBJECT - PHYSICS

CHAPTER - 1

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Good Morning students!

This lesson is for class-IX, for the subject of - Physics, Chapter - 1 'Measurements and Experimentation', which is given on Page no. - 1 of your textbook, titled - 'Concise Physics by Pelina Publications'. This lesson is submitted to you on 3rd April, 2023.

Let us understand the word Measurement and Unit:

- Measurement is the process of comparison of the given physical quantity with the known standard quantity of the same nature.

This standard quantity used to measure and express the given physical quantity is called the UNIT.

Any physical quantity is represented by:

$$\text{PHYSICAL QUANTITY} = \text{NUMERICAL VALUE} \times \text{UNIT}$$

Forexample - (1.) Mass = 20 kg (2.) Time = 20 s
(3.) Pressure = 80 Pa (4.) Force = 180 N

* Now the question arises, how should a unit be chosen
The unit chosen should have the below given properties

- 1.) The unit should be of convenient size.
- 2.) It should be possible to define the unit without ambiguity
- 3.) The unit should be reproducible
4. The value of unit should not change with space & time

TYPES OF UNITS

1. **FUNDAMENTAL (BASIC) UNIT** - A basic unit is that which is independent of any other unit or which can neither be changed nor can be related to any other fundamental unit.

For example - Mass, Length, Time, Temperature, Electric current and Amount of substance.

2. **DERIVED UNIT** - These are the units which depend on the fundamental units or which can be expressed

in terms of the fundamental units.

For example - speed can be represented as Length/Time.

DIFFERENT SYSTEM OF UNITS

DIFFERENT SYSTEM OF UNIT ↓	MASS	LENGTH	TIME
C. G. S	g	cm	s
M. K. S	kg	m	s
F. P. S	foot (ft)	pound (lb)	s

STANDARD INTERNATIONAL SYSTEM OF UNITS

According to S.I. system of units, there are 7 fundamental units and further 2 complementary units.

Physical Quantity	Unit	Symbol
Mass	Kilogram	kg
Length	metre	m
Time	seconds	s
Temperature	Kelvin	K
Electric Current	ampere	A
Luminous Intensity	candela	cd
Amount of substance	mole	mol

Angle	radian	rd	} complementary units
Solid Angle	steradian	st-rd	

Different Units of Length

- 1) $1 \text{ cm} = \frac{1}{100} \text{ m}$ $1 \text{ cm} = 10^{-2} \text{ m}$
- 2) $1 \text{ mm} = \frac{1}{1000} \text{ m}$ $1 \text{ mm} = 10^{-3} \text{ m}$
- 3) $1 \text{ }\mu\text{m} = \frac{1}{1000000} \text{ m}$ $1 \text{ }\mu\text{m} = 10^{-6} \text{ m}$
- 4) $1 \text{ nm} = 10^{-9} \text{ m}$

CHAPTER-1

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5.) ASTRONOMICAL UNIT - 1 A.U. is equal to the mean distance between the earth and the sun i.e.

$$1 \text{ A.U.} = 1.496 \times 10^{11} \text{ m}$$

6.) LIGHT YEAR - A light year is the distance travelled by light in vacuum, in one year. i.e.

$$1 \text{ ly} = 9.46 \times 10^{15} \text{ m}$$

7.) ANGSTROM (Å) = $1 \text{ Å} = 10^{-10} \text{ m}$

Different Units of Mass

1.) GRAM - 1 gram $1 \text{ g} = 10^{-3} \text{ kg}$

2.) MILLIGRAM - $1 \text{ mg} = 10^{-6} \text{ kg}$

3.) 1 quintal = 100 kg

4.) 1 metric tonne = 1000 kg (10 quintal)

5.) 1 a.m.u = $\frac{1}{12}$ th of mass of one C-12 atom

$$1 \text{ a.m.u} = 1.66 \times 10^{-27} \text{ kg}$$

Mass of largely heavenly bodies is measured in terms of solar mass where 1 solar mass is the mass of the sun.

$$1 \text{ solar mass} = 2 \times 10^{30} \text{ kg}$$

(Similarly read and learn all units of time given on Page number - 5, 6 of your Physics textbook.)

Students also study the table given on Page No-7 of derived units.

With this I come to an end of this learning session.
Thank you students!

(LAST PAGE)