RADIANT 2026

Physics

Measurements and Experimentation

Lecture - 01

By - Akash Shravan Sir

Topics *to be covered*

1. Need of Unit for Measurement
2. Unit
3. King of unit
4. Properties of Unit
5. Units of Length, Mass and Time

6) International System of Units || The Required SI Units with Correct Symbols are given at the End of this Syllabus

Physics → fusis

भौतिकी

→ Study of Nature → Exact Science

→ माता of Science

Basics –

→ (i) Basic Maths

→ (ii) नाप/तोल

Science of Measurement

time

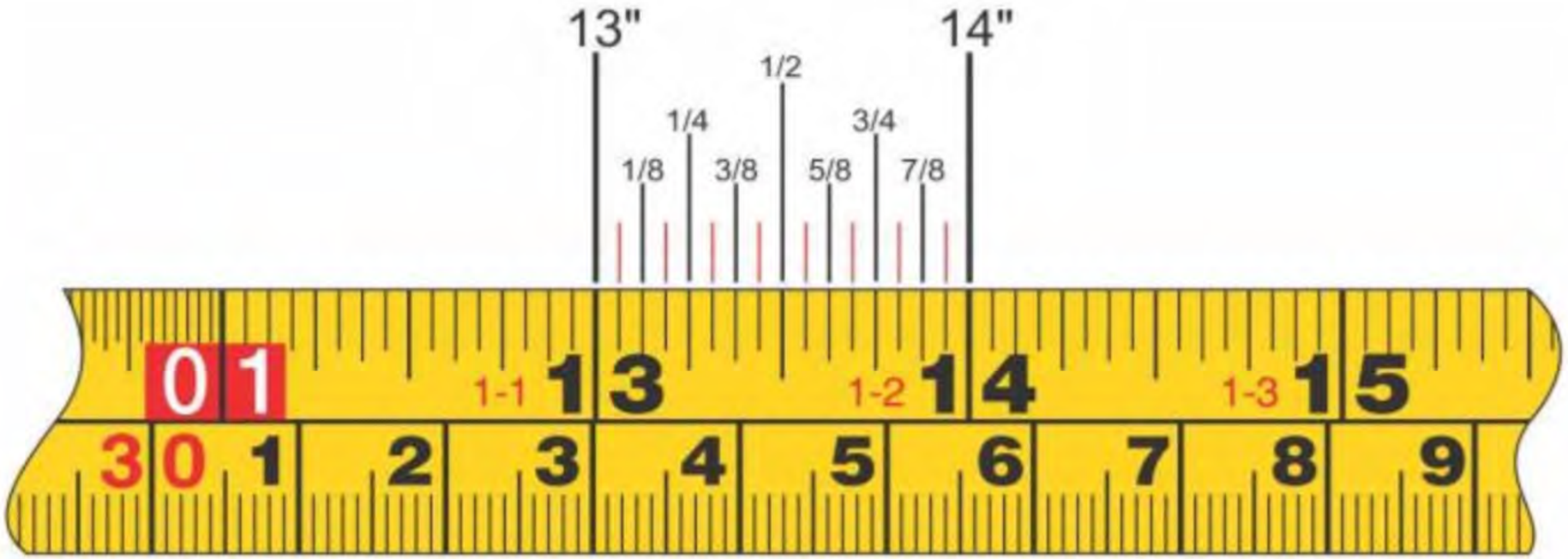
1 घंटा

2 Kg

1 धागे

6

नाश्ता:-
- 50 परांठे
- 3 liter दूध
- 7 कप चाय
- 3 कचौरी
- 15 BB



1/8 = 1 Soot

1/4 = 2 Soot

3/8 = 3 Soot

1/2 = 1/2 inch or 4 Soot

5/8 = 5 Soot

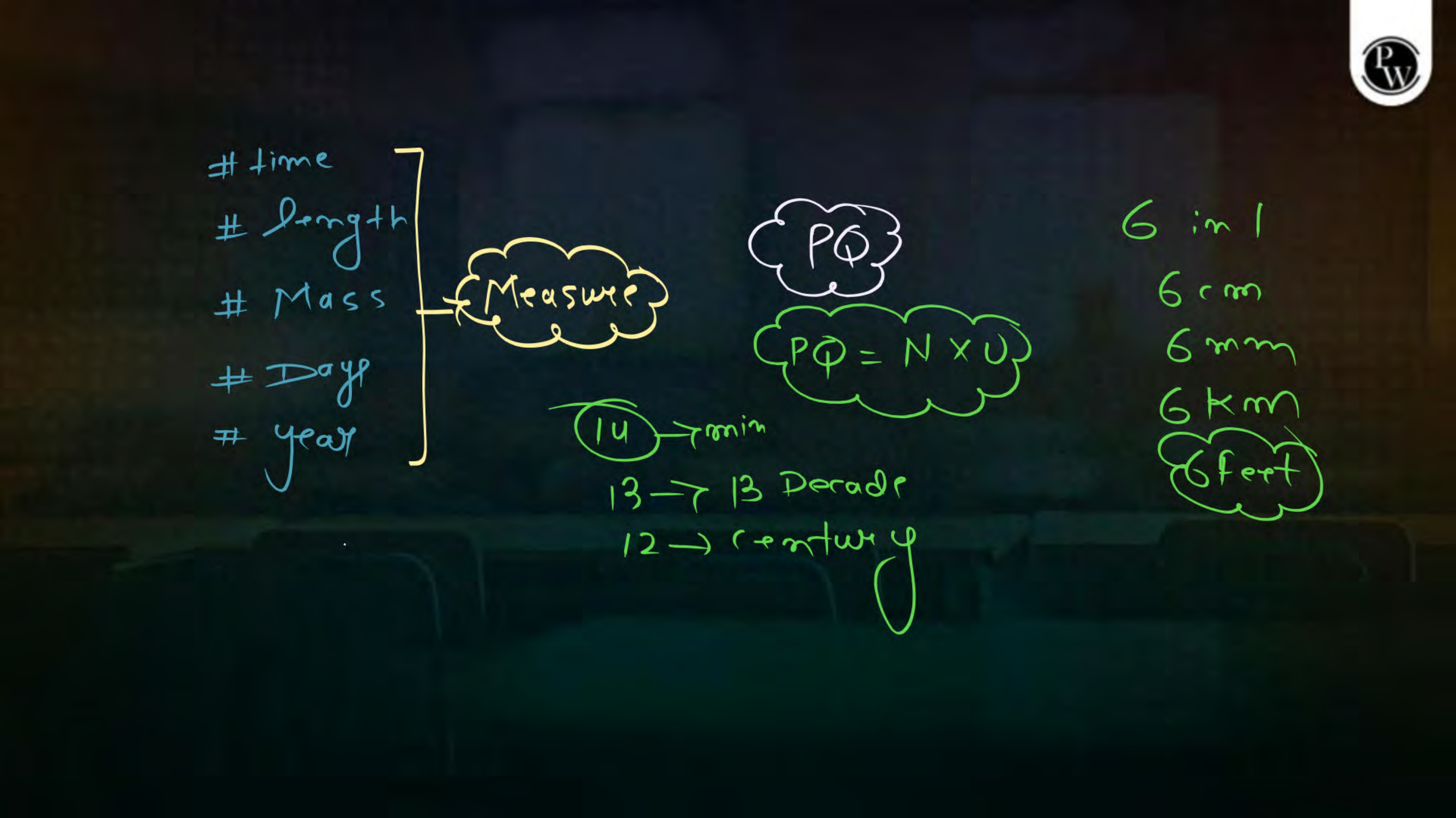
3/4 = 6 Soot

7/8 = 7 Soot

8 Soot = 1inch

Need of Unit for Measurement

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


time
length
Mass
Days
year
Measure
PQ
PQ = N x U
14 → min
13 → 13 Decade
12 → century
6 in 1
6 cm
6 mm
6 km
6 feet

Unit

Unit is the quantity of a constant magnitude which is used to measure the magnitudes of other quantities of the same nature.

$10\ m = \underline{?} \times 1\ m$

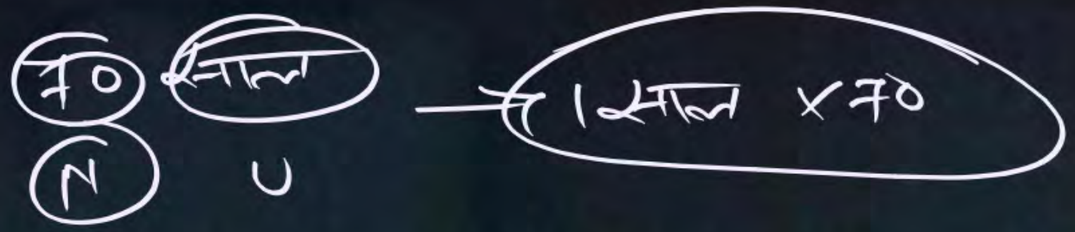
Unit

The result of measurement of a physical quantity is expressed in terms of the following two parameters:

(i) The **unit** in which the quantity is being measured, and

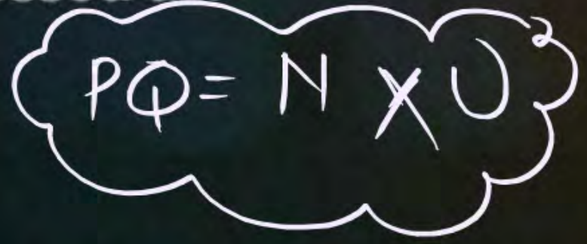
(ii) The **numerical value** which expresses, how many times the above selected unit is contained in the given quantity.

Unit

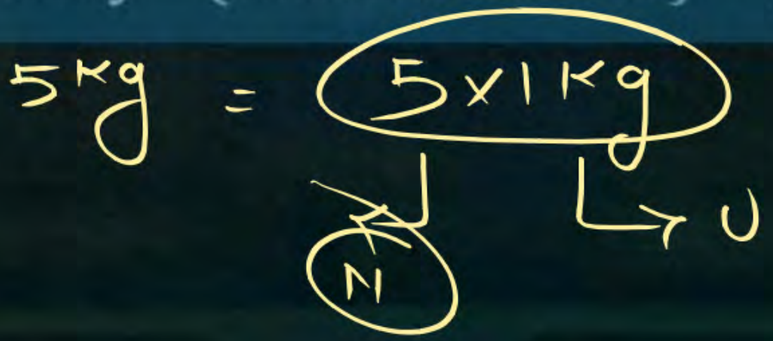


Thus the magnitude of a physical quantity is expressed as:

Physical quantity = (numerical value) × (unit)



$\omega = 70\ kg$



① cm & m

$1m = 1000 cm$

1 m बड़ा या 1 cm

$1m = 100 cm$

1 → छोटा, m → बड़ी, 100 → बड़ा, cm → छोटी

$\uparrow m \propto \frac{1}{u} \downarrow \uparrow$

② gm & kg

$1 kg = 1000 gm$

(g)

kg बड़ा या gm

$1 kg = 1000 gm$

1 → छोटा, kg → बड़ा, 1000 → बड़ा, gm → छोटा

Properties of unit

(i) The unit should be of convenient size.

(ii) It should be possible to define the unit without ambiguity (the possibility of being understood in more than one way),

(iii) The unit should be reproducible.

(iv) The value of unit should not change with space and time. (i.e., it must always remain same everywhere).

Kinds of Unit

(i) Basics or Fundamental → 7

(ii) Derived Unit

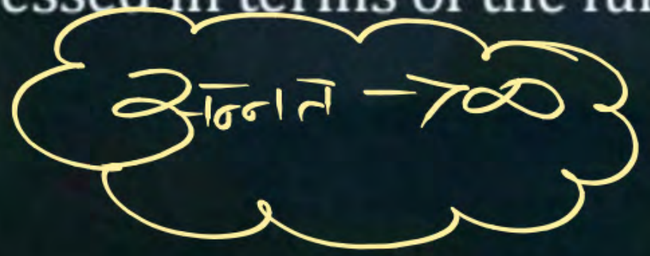
Fundamental or Basic Units

A fundamental (or 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.

(i) length → meter
(ii) Time → second
(iii) Mass → kg
(iv) Temp → Kelvin
(v) Quantity of Sub → mole
(vi) Electric current → ampere
(vii) Intensity of light → candela

Derived Units

Derived units are those which depend on the fundamental units or which can be expressed in terms of the fundamental units.



Area → $l \times b = m \times m$

$= m^2$

Volume → $l \times b \times h \rightarrow m \times m \times m = m^3$

$$\text{Speed} = \frac{d}{t} = \frac{m}{\text{sec}}$$

No. of Fundamental Units

A → 3/4

B → 7/1 = 7

C → 4+3-2

D → 7/2

No. of Derived Unit

A → 7

B → ∞

C → 7/3

D → 3/4

Systems of Unit

	L	M	T
(i) CGS	Centimeter	gram	Second
(ii) FPS	Foot	Pound	Second
(iii) MKS	Meter	Kilogram	Second
(iv) SI			

(iv) SI
- (1)
- (2)

Fundamental Quantities, Units and Symbols in SI. System

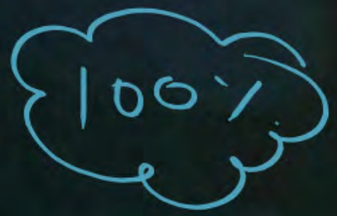
Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K
Luminous	candela	cd
Electric current	ampere	A
Amount of substance	mole	mol*
Angle	radian	rd
Solid angle	steradian	st-rd

Question

How many units are fundamental and complementary?

A 2 fundamental, 7 complementary

B 3 fundamental, 6 complementary



C 7 fundamental, 2 complementary

D 4 fundamental, 5 complementary

Question

How many units are fundamental and complementary?

(A) 2 fundamental, 7 complementary

(B) 3 fundamental, 6 complementary

(C) 7 fundamental, 2 complementary

(D) 4 fundamental, 5 complementary

Ans. **(C)** 7 fundamental, 2 complementary

Question

The fundamental unit is-

A Newton

B Pascal

C Hertz

D Second

Question

The fundamental unit is-

(A) Newton

(B) Pascal

(C) Hertz

(D) Second

Ans. **(D)** Second


Thank You