Definition of metre

The metre is the length of the path travelled by light in a vacuum during a time interval of 1/29,97,92,458 of a second.

Definition of kilogram

The kilogram is the mass of prototype cylinder of platinum-iridium alloy preserved at the International Bureau of Weights and Measures, at Sevres, near Paris.

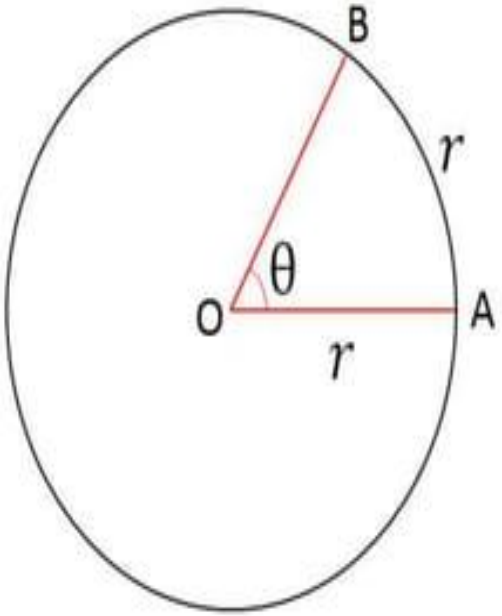
Prototype cylinder of platinum-iridium alloy

Definition of second

One second is the time taken by 9,19,26,31,770 oscillations of the light emitted by a cesium-133 atom.

Two supplementary units

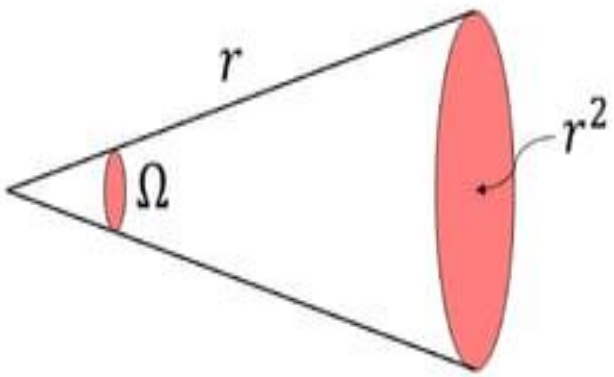
1. Radian: It is used to measure plane angle



θ = 1 radian

Two supplementary units

2. Steradian: It is used to measure solid angle



Ω = 1 steradian

Rules for writing SI units

1

Full name of unit always starts with small letter even if named after a person.

- newton
- ampere
- coulomb

not

- Newton
- Ampere
- Coulomb

Rules for writing SI units

2

Symbol for unit named after a scientist should be in capital letter.

- N for newton
- K for kelvin
- A for ampere
- C for coulomb

Rules for writing SI units

3

Symbols for all other units are written in small letters.

- m for meter
- s for second
- kg for kilogram
- cd for candela

Rules for writing SI units

4

One space is left between the last digit of numeral and the symbol of a unit.

- 10 kg
- 5 N
- 15 m

not

- 10kg
- 5N
- 15m

Rules for writing SI units

5

The units do not have plural forms.

• 6 metre		• 6 metres
• 14 kg	not	• 14 kgs
• 20 second		• 20 seconds
• 18 kelvin		• 18 kelvins

Rules for writing SI units

6

Full stop should not be used after the units.

• 7 metre		• 7 metre.
• 12 N	not	• 12 N.
• 25 kg		• 25 kg.

Rules for writing SI units

7

No space is used between the symbols for units.

• 4 Js		• 4 J s
• 19 Nm	not	• 19 N m.
• 25 VA		• 25 V A.

SI prefixes

Factor	Name	Symbol	Factor	Name	Symbol
10^{24}	yotta	Y	10^{-1}	deci	d
10^{21}	zetta	Z	10^{-2}	centi	c
10^{18}	exa	E	10^{-3}	milli	m
10^{15}	peta	P	10^{-6}	micro	μ
10^{12}	tera	T	10^{-9}	nano	n
10^{9}	giga	G	10^{-12}	pico	p
10^{6}	mega	M	10^{-15}	femto	f
10^{3}	kilo	k	10^{-18}	atto	a
10^{2}	hecto	h	10^{-21}	zepto	z
10^{1}	deka	da	10^{-24}	yocto	y

1 nm → 10^{-6} mm

1 μm → ____ m

1 m → ____ μm

(1) 1 mm → 10^{6} nm

$\frac{1}{10^{6}}$ mm → 1 nm

10^{-6} mm ⇒ 1 nm

(3) 1 m → 10^{6} μm

$\frac{1}{10^{6}}$ ← 1 μm

1 cm → 10^{7} nm

$\frac{1}{10^{7}}$ ← 1 nm

10^{-9} ← 1 nm

---

1 μm = 10^{-6} m

$= 10^{-6} \times 10^{2}$ cm

$= 10^{-4}$ cm

ছোট → বড়

বড় → ছোট

2 km $\xrightarrow{10^3}$ ~~2000 m~~

$\hookrightarrow \boxed{2 \times 10^3 \text{ m}}$

5 km → 5×10^5 cm

3.2 km → 3.2×10^6 mm

1 mm = 10^{-6} km

1 pm = ____ dm

we know,

1 pm = 10^{-12} m

$= 10^{-12} \times 10^{1}$ dm

$= 10^{-11}$ dm

Use of SI prefixes

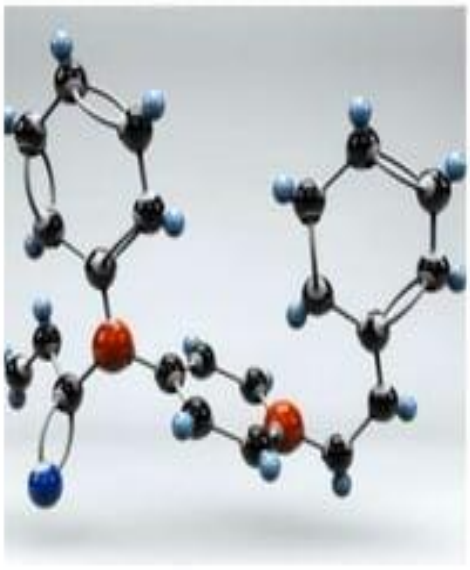
- 3 milliampere = 3 mA = 3×10^{-3} A
- 5 microvolt = 5 μV = 5×10^{-6} V
- 8 nanosecond = 8 ns = 8×10^{-9} s
- 6 picometre = 6 pm = 6×10^{-12} m
- 5 kilometre = 5 km = 5×10^{3} m
- 7 megawatt = 7 MW = 7×10^{6} W

Some practical units for measuring length

1 micron = 10^{-6} m

Bacterias

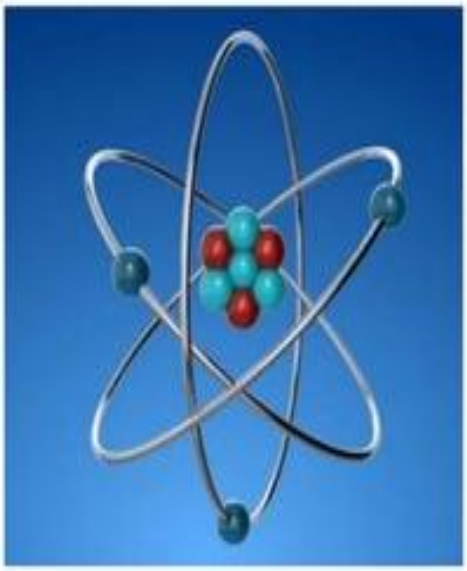
1 nanometer = 10^{-9} m



Molecules

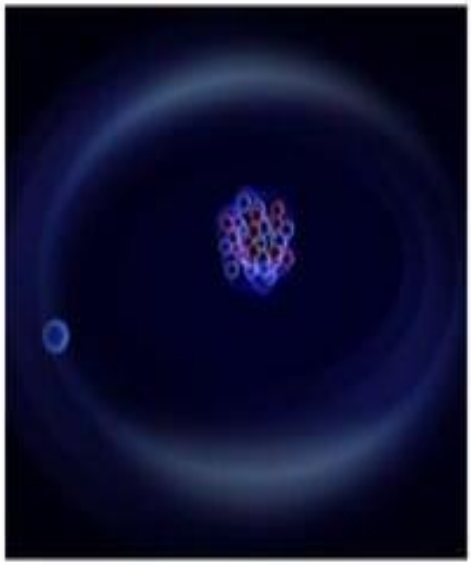
Some practical units for measuring length

1 angstrom = 10^{-10} m



Atoms

1 fermi = 10^{-15} m



Nucleus