

Formula Sheet

Unit no: 01 Measurements

Main system of units:-

C-G-S system (centimeter, gram, second system)

F-P-S system (foot, pound, second system)

M-K-S system (metre, kilogram, second system)

S-I (System International) In science it is used all over the world.

Point →

Second is the unit common among all the system of units.

Radian: (Plane angle 2D)

No. of radians $\theta = \frac{\text{Arc length}}{\text{Radius of circle}}$

$\theta = \frac{s}{r}$ (1 rev = 2π radians)

Steradian: (Solid angle 3D)

No. of steradian = $\frac{\text{Area of sphere}}{r^2}$

(1 rev = 4π)

(Sphere or closed area has 4π (12.56 sr)).

Base Quantities

- Length → l, r, x
- mass → m
- Time → t
- Electric current → I
- Thermodynamic temperature → T
- Intensity → I_v
- Amount of substance → n

Base unit

- metre → m
- kilogram → kg
- second → s
- ampere → A
- Kelvin → K
- mole → mol
- candela → cd

→

$1 \text{ rad} = 57.3^\circ$

→

$1^\circ = 0.01745 \text{ rad}$

Scientific notation:- Number = mantissa × 10^{Power}

- ◆ Denote prefix symbol
- Not a prefix

Prefixes:- Young Zoey Earn: Penies That Got Mighty King
Henry's Daughter **Beth**. **Beth** Drinks Cold Milk **Until** Nine
Pm for a Zillion Years

Fundamental dimensions

- Length → [L]
- Mass → [M]
- Time → [T]
- Electric current → [I]
- Temperature → [Θ]
- Amount of substance → [N]
- Intensity → [J]

Uncertainties:- Doubt in measurement.

Measurement = Best estimate ± uncertainty

Types:-

(%)	Percentage uncertainty
Relative uncertainty	Absolute. $v \times 100$
$\epsilon = \text{Absolute. } v$	Measurement
Absolute unces	Measurement
Least count	

Non-SI unit of length:- light year

$s = ct$
 $s = 3 \times 10^8 \text{ m/s}$ | $s = 3 \times 10^8 \text{ V} (3.1536 \times 10^7 \text{ s})$
 $s = 9.4607 \times 10^{15} \text{ m} = 1 \text{ ly}$

- * Angstrom (Å) = $1 \times 10^{-10} \text{ m}$ or 0.1 nm.
- * Micron (μ) obsolete name of micrometre.

Significant figures:- In addition rule

Add/Subtract rule:- Answer will have the least decimal places according to data.

Multiply/divide rule:- Answer will have the least no. of significant figures according to data.

Multiply/divide = % uncertainties are added.

Power = % uncertainties are multiplied by power factors.

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

Cases:-

Add/subtract = Uncertainties are added

While deriving dimensions magnitude are dropped (⊙)