Chem. 110
General Chemistry
Text Book:
Chemistry
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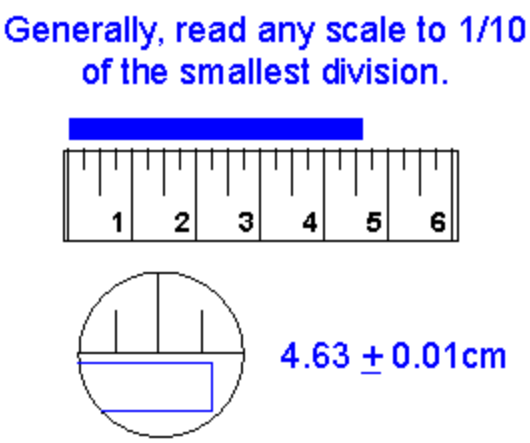
95-100	A^+	90-94	A
85-89	B^+	80-84	B
75-79	C^+	70-74	C
65-69	D^+	60-64	D
<60	F		

Exam I:	**30**
Exam II:	**30**
Final exam:	**40**
Total:	**100**



The Metric System

The metric system of measurements is used in all scientific studies.

The general conference of weights and measures

The International System of units (SI) is founded on seven base units and two supplementary units

BASE UNITS

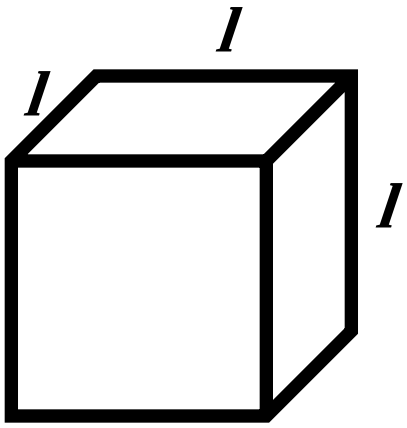
	Measurement	Unit	Symbol
1	length	meter	m
2	mass	kilogram	kg
3	time	second	s
4	amount of substance	mole	mol
5	temperature	kelvin	K
6	electric current	ampere	A
7	luminous intensity	candela	cd

SUPP. UNITS

1	plane angle	radian	rad
2	solid angle	steradian	sr

Derived units (SI):

Obtained from the base units by algebraic combination.



Volume: length × length × length = $(\text{length})^3 = m^3$

Other common unit for volume: the liter (L)

$1\ L = 1000\ mL = 1000\ cm^3 = 1\ dm^3$

Density: $\frac{\text{mass}}{\text{volume}} = \frac{\text{kg}}{\text{m}^3}$

Other common unit for density: $\frac{g}{cm^3}$

Speed: $\frac{length}{time} = \frac{m}{s}$ (ms^{-1})

Acceleration $\frac{speed}{time} = \frac{m}{s^2}$ (ms^{-2})

Force: mass × acceleration

= kg × m s^{-2} = Newton (N)

Energy: force × length

= kg m s^{-2} × m =

kg m^2 s^{-2} = Joule (J)

Pressure:

$$\frac{force}{area} = \frac{kg.m.s^{-2}}{m^2} = kg.m^{-1}s^{-2} = pascal(pa)$$

1 atmosphere (atm) = 101325 pa

Prefixes used to modify unit terms in the metric system

Prefix	Abbreviation	Factor
Tera-	T-	10^{12}
Giga-	G-	10^{9}
Mega-	M-	10^{6}
kilo-	k-	10^{3}
hecto-	h-	10^{2}
deka-	da-	10
deci-	d-	10^{-1}
centi-	c-	10^{-2}
milli-	m-	10^{-3}
micro-	μ-	10^{-6}
nano-	n-	10^{-9}
pico-	p-	10^{-12}

A common unit of length in chemistry:

the Angstrom: Å = 10^{-10}m

Unit Conversion:

Example

if the radius of Cl atom is 0.99 Å. Give the radius in meters (m).

$1\ \text{m} = 10^{10}\ \text{Å} \rightarrow \dfrac{1\text{m}}{10^{10}\ \text{Å}} = 1$ **(the conversion factor)**

$$0.99\ \text{Å} \times \frac{1\text{m}}{10^{10}\ \text{Å}} = 9.9 \times 10^{-11}\ \text{m}$$

Example

Convert 5m³ into cm³

1m = 100 cm

$1m^3 = 1.0 \times 10^6\ cm^3$

$$\frac{1.0\times10^{6}\ \mathrm{cm}^{3}}{1\mathrm{m}^{3}}\times5\mathrm{m}^{3}=5\times10^{6}\mathrm{cm}^{3}$$

Example

if a density of substance was 11 g/cm^3. what is the density in SI units?

1 g = 10^{-3} kg **1 cm^3 = 10^{-6} m^3**

$$\left(\frac{11g}{cm^3}\right)\left(\frac{1cm^3}{10^{-6}m}\right)\left(\frac{10^{-3}kg}{1g}\right)=11000kg/m^3$$