Fundamental Constants

Energy

- 1 joule (J) = 1 kg $\cdot$ m^2 $\cdot$ s^{-2}
- 1 calorie (cal) = 4.184 J
- 1 V = 96.485 kJ/mol

Force

- 1 newton (N) = 1 kg $\cdot$ m/s^2

Length

- 1 meter (m) = 39.37 inches (in)
- 1 inch = 2.54 centimeters (cm)—exact
- 1 Å = 10^{-10} m

Mass

- 1 kilogram (kg) = 2.205 pounds (lb)
- 1 lb = 453.6 grams (g)
- 1 amu = 1.661×10^{-24} g

Pressure

- 1 atm = 760 mm Hg (torr) = 1.01325×10^5 Pa

Volume

- 1 liter (L) = 1000 mL = 1000 cm^3

Physical Constants

Avogadro's number	$N_{\mathrm{A}} = 6.0221 \times 10^{23}$ mol^{-1}
Electronic charge	$e = 1.6022 \times 10^{-19}$ coulomb (C)
Electron rest mass	$m_{\mathrm{e}} = 9.1094 \times 10^{-31}$ kg
Faraday constant	$\mathcal{F} = 9.6485 \times 10^4$ C $\cdot$ mol^{-1}
Gas constant	$R = 0.08206$ L $\cdot$ atm $\cdot$ mol^{-1} $\cdot$ K^{-1}
	$= 8.3145$ J $\cdot$ mol^{-1} $\cdot$ K^{-1}
	$= 1.9872$ cal $\cdot$ mol^{-1} $\cdot$ K^{-1}
Neutron rest mass	$m_{\mathrm{n}} = 1.675 \times 10^{-27}$ kg
Planck's constant	$h = 6.6261 \times 10^{-34}$ J $\cdot$ s
Proton rest mass	$m_p = 1.6726 \times 10^{-27}$ kg
Speed of light (in vacuum)	$c = 2.9979 \times 10^8$ m $\cdot$ s^{-1}

Physical Constants

Temperature

$$\begin{aligned} 0\ \text{K} &= -273.15^\circ \text{ Celsius (C)} \\ &= -459.67^\circ \text{ Fahrenheit (F)} \\ ^\circ\text{F} &= (9/5)^\circ\text{C} + 32^\circ \\ ^\circ\text{C} &= (5/9)(^\circ\text{F} - 32^\circ) \\ \text{K} &= ^\circ\text{C} + 273.15 \end{aligned}$$

SI Prefixes

- 10^{9} giga (G)
- 10^{6} mega (M)
- 10^{3} kilo (k)
- 10^{-1} deci (d)
- 10^{-2} centi (c)
- 10^{-3} milli (m)
- 10^{-6} micro (μ)
- 10^{-9} nano (n)
- 10^{-12} pico (p)