BASIC SCIENCE REFERENCES

Fundamental Physical Constants

Universal Constants

Velocity of light in vacuum	$c := 299792458 \cdot \frac{m}{sec}$
Permeability of vacuum	$\mu_0 := 4 \cdot \pi \cdot 10^{-7} \cdot \frac{newton}{amp^2}$
Permittivity of vacuum	$\varepsilon_0 := 8.854187817 \cdot 10^{-12} \cdot \frac{farad}{m}$
Newtonian constant of gravitation	$G := 6.67259 \cdot 10^{-11} \cdot \frac{m^3}{kg \cdot sec^2}$
Planck's constant (h)	$h := 6.6260755 \cdot 10^{-34} \cdot joule \cdot sec$

Electromagnetic Constants

Elementary charge	$e := 1.60217733 \cdot 10^{-19} \cdot coul$
Magnetic flux quantum	$\Phi_0 := 2.06783461 \cdot 10^{-15} \cdot weber$
Bohr magneton	$9.2740154 \cdot 10^{-24} \cdot \frac{joule}{tesla}$
Nuclear magneton	$5.0507866 \cdot 10^{-27} \cdot \frac{joule}{tesla}$

Atomic Constants

Fine structure constant	$\alpha := 7.29735308 \cdot 10^{-3}$
Rydberg constant	$R := 10973731.534 \cdot m^{-1}$
Bohr radius	$a_0 := 0.529177249 \cdot 10^{-10} \cdot m$
Hartree energy	$E_h := 4.3597482 \cdot 10^{-18} \cdot joule$
Quantum of circulation	$3.63694807 \cdot 10^{-4} \cdot \frac{m^2}{sec}$

Electron

Electron mass	$m_e := 9.1093897 \cdot 10^{-31} \cdot kg$
Electron specific charge (electron charge to mass ratio)	$-1.75881962 \cdot 10^{11} \cdot \frac{coul}{kg}$
Electron Compton wavelength	$2.42631058 \cdot 10^{-12} \cdot m$
Classical electron radius	$r_e := 2.81794092 \cdot 10^{-15} \cdot m$
Electron magnetic moment	$928.47701 \cdot 10^{-26} \cdot \frac{joule}{tesla}$

Muon

Muon mass	$m_\mu := 1.8835327 \cdot 10^{-28} \cdot kg$

Proton

Proton mass	$m_p := 1.6726231 \cdot 10^{-27} \cdot kg$
Ratio of proton mass to electron mass	1836.152701
Proton Compton wavelength	$1.32141002 \cdot 10^{-15} \cdot m$
Proton magnetic moment	$1.41060761 \cdot 10^{-26} \cdot \frac{joule}{tesla}$
Proton gyromagnetic ratio	$26751.5255 \cdot 10^{4} \cdot \frac{rad}{sec \cdot tesla}$

Neutron

Neutron mass	$m_n := 1.6749286 \cdot 10^{-27} \cdot kg$
Neutron Compton wavelength	$1.31959110 \cdot 10^{-15} \cdot m$

Physico-Chemical Constants

Avogadro constant	$N_A := 6.0221367 \cdot 10^{23} \cdot mole^{-1}$
Atomic mass constant	$AMU := 1.6605402 \cdot 10^{-27} \cdot kg$
Faraday constant	$96485.309 \cdot \frac{coul}{mole}$
Molar gas constant	$8.314510 \cdot \frac{joule}{mole \cdot K}$

Boltzmann's constant	$k_b := 1.380658 \cdot 10^{-23} \cdot \frac{\text{joule}}{\text{K}}$
Molar volume of ideal gas at STP	$22.41410 \cdot \frac{\text{liter}}{\text{mole}}$
Stefan-Boltzmann constant	$\sigma := 5.67051 \cdot 10^{-8} \cdot \frac{\text{watt}}{\text{m}^2 \cdot \text{K}^4}$
First radiation constant	$3.7417749 \cdot 10^{-16} \cdot \text{watt} \cdot \text{m}^2$
Second radiation constant	$0.01438769 \cdot \text{m} \cdot \text{K}$

Data from CRC Handbook of Chemistry and Physics, 73nd edition, edited by David R. Lide, CRC Press (1992).