

FUNDAMENTAL CONSTANTS*

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| speed of light in vacuum | $c = 2.99792458 \times 10^8 \text{ m}\cdot\text{s}^{-1}$ | |
| Avogadro's number | $N_A = 6.0221415(10) \times 10^{23} \text{ mol}^{-1}$ | |
| Boltzmann constant | $k \text{ or } k_B = 1.3806505(24) \times 10^{-23} \text{ J}\cdot\text{K}^{-1}$ | |
| gas constant | $R = 8.314472(15) \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1} = 0.08205746 \text{ L}\cdot\text{atm}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$ | |
| atomic mass unit (amu) | $u = 1.66053886(28) \times 10^{-27} \text{ kg}$ | |
| mass of electron | $m_e = 9.1093826(16) \times 10^{-31} \text{ kg} = 0.00054857990945(24) \text{ amu}$ | |
| mass of neutron | $m_n = 1.67492728(29) \times 10^{-27} \text{ kg} = 1.00866491560(55) \text{ amu}$ | |
| mass of proton | $m_p = 1.672621171(29) \times 10^{-27} \text{ kg} = 1.00727646688(13) \text{ amu}$ | |
| charge of electron | $e = 1.60217653(14) \times 10^{-19} \text{ C}$ | |
| Planck's constant | $h = 6.6260693(11) \times 10^{-34} \text{ J}\cdot\text{s}$ | |
| | $\hbar = 1.05457168(18) \times 10^{-34} \text{ J}\cdot\text{s}$ | $= h / 2\pi$ |
| Faraday | $F = 96485.3383(83) \text{ C}\cdot\text{mole}^{-1}$ | $= N_A e$ |
| Bohr radius | $a_0 = 0.5291772108(18) \times 10^{-10} \text{ m}$ | $= 4\pi\epsilon_0\hbar^2 / m_e e^2$ |
| Bohr magneton | $\mu_B = 9.27400949(80) \times 10^{-24} \text{ J/T}$ | $= e\hbar / 2m_e$ |
| Hartree | $E_h = 4.35974417(75) \times 10^{-18} \text{ J}$ | $= \hbar^2 / m_e a_0^2$ |
| Rydberg Constant | $R_\infty = 109737.31568525(73) \text{ cm}^{-1}$ | $= E_h / 2hc$ |
| Nernst constant | $k_N = 0.05916 \text{ V at } 25^\circ\text{C}$ | $= \ln 10 RT/F = 2.303RT/F$ |

* The numbers in parentheses are the uncertainties in the last digits of the values reported.
Data from CODATA 2002 Recommended Values (<http://physics.nist.gov/cuu/index.html>).

CONVERSION FACTORS

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| 1 Tesla (T) = 1 V-s/m ² = 10 ⁴ Gauss (G) | 1 Joule = 4.184 cal = 1 V-C |
| 1 atm = 760 mmHg = 101325 Pascal = 1.01325 bar | 0°C = 273.15 K |
| kT at 25°C = 207.2249 cm ⁻¹ = 2.47896 kJ/mol | 1 Å = 10 ⁻⁸ cm = 100 pm = 0.1 nm |
| 1 Hartree = E _h = atomic unit of energy | = 4.35974417(75) × 10 ⁻¹⁸ J |
| = 27.2113845 eV = 2625.50 kJ/mol | = 627.5095 kcal/mol |
| E _h / k _B = 315774.64 K | E _h / hc = 219474.6317 cm ⁻¹ |