

## PHYSICAL CONSTANTS

Name	Symbol	Approximate value
Atomic mass unit	u	$1\text{u} = \frac{1}{12}m(^{12}\text{C}_{\text{atom}})$ $= 1.66 \times 10^{-27}\text{kg}$ $= 931.5\text{MeV}/c^2$
Avogadro's constant	$N_A$	$= 6.022204 \times 10^{23}\text{particles/mol}$
Bohr radius	$a_B$	$a_B = \hbar^2 / (ke^2 m_e)$ $= 5.2917 \times 10^{-11}\text{m}$
Boltzmann's constant	$k_B$	$= 8.62 \times 10^{-5}\text{eV/K}$ $= 1.38066 \times 10^{-23}\text{J/K}$
Coulomb force constant	$k$	$= 1/(4\pi \epsilon_0) = \mu_0 c^2 / (4\pi)$ $= 8.99 \times 10^9 \text{N} \cdot \text{m}^2 / \text{C}^2$
Electron Compton wavelength	$\lambda_c$	$= h / (m_e c)$ $= 2.43 \times 10^{-12}\text{m}$
Electron volt	eV	$= 1.60218 \times 10^{-19}\text{J}$
Elementary charge	$e$	$= 1.60218 \times 10^{-19}\text{C}$
Gas constant	R	$= 8.31\text{J}/(\text{mol} \cdot \text{K})$ $= 0.0821\text{ liter} \cdot \text{atm}/(\text{mol} \cdot \text{K})$
Gravitational constant	G	$= 6.67 \times 10^{-11}\text{N} \cdot \text{m}^2 / \text{kg}^2$
Mass of electron	$m_e$	$= 5.49 \times 10^{-4}\text{u}$ $= 9.11 \times 10^{-31}\text{kg}$ $= .511\text{MeV}/c^2$
Mass of proton	$m_p$	$= 1.007\text{u}$ $= 1.67264 \times 10^{-27}\text{kg}$ $= 938.3\text{MeV}/c^2$
Mass of neutron	$m_n$	$= 1.009\text{u}$ $= 1.675 \times 10^{-27}\text{kg}$ $= 939.6\text{MeV}/c^2$

Permeability of free space	$\mu_0$	$= 4\pi \times 10^{-7} \text{N/A}^2$ $= 1.25663 \times 10^{-6} \text{N/A}^2$
Permittivity of free space	$\epsilon_0$	$= 1/(\mu_0 c^2)$ $= 8.85418 \times 10^{-12} \text{C}^2/(\text{N}\cdot\text{m}^2)$
Planck's constants	$h$	$= 6.62617 \times 10^{-34} \text{J}\cdot\text{s}$ $= 4.14 \times 10^{-15} \text{eV}\cdot\text{s}$
	$\hbar$	$= h/(2\pi)$ $= 1.05458 \times 10^{-34} \text{J}\cdot\text{s}$ $= 6.58 \times 10^{-16} \text{eV}\cdot\text{s}$
Room Temperature value of $kT$	$kT$	$= 0.0259 \text{eV}$
Rydberg constant	R	$= 1.10 \times 10^{-2} \text{nm}^{-1}$
Speed of light	$c$	$= 2.99792 \times 10^8 \text{m/s}$

**Source:** Taylor, John R. and Chris D. Zafiratos. Modern Physics for Scientists and Engineers.