

Universal Constants

Avogadro's (Loschmidt's)

Number

$$L = 6.022 \times 10^{23} \text{ particles /mole}$$

Boltzmann's Constant

$$k_B = 1.381 \times 10^{-23} \text{ J/K}$$

Gas Constant

$$R = L k_B = 8.315 \text{ J/(K mol)}$$

Planck's Constant

$$h = 6.626 \times 10^{-34} \text{ J s}$$

Molar Volume (NSTP)

(25°C, $p = 1 \text{ bar}$)

$$V_m = 24.79 \text{ dm}^3 \text{ mol}^{-1}$$

Electron Mass

$$m_e = 9.109 \times 10^{-31} \text{ kg}$$

Proton Mass

$$m_p = 1.673 \times 10^{-27} \text{ kg}$$

Permittivity of Vacuum

$$\epsilon_0 = 8.854 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$$

$$1/4\pi\epsilon_0 = 0.8988 \times 10^{10} \text{ C}^{-2} \text{ N}^{-1} \text{ m}^2$$

Gravitational Acceleration

$$g = 9.807 \text{ m s}^{-2}$$