

SOLUTION TO THE SCHRODINGER EQUATION

Particle of mass m in a one dimensional box: $V(x) = 0$ when $0 < x < L$, $V(x) = \infty$ otherwise

$$\psi_n(x) = (2/L)^{1/2} \sin(n\pi x/L) \quad n = 1, 2, 3\dots$$

$$E_n = n^2 h^2 / 8mL^2$$

FUNDAMENTAL CONSTANTS*

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	$a_0 = 0.5291772108(18) \times 10^{-10} \text{ m}$	$= 4\pi\epsilon_0\hbar^2 / m_e e^2$
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

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