Constants and Equations

Planck's constant, $h = 6.62608 \times 10^{-34}$ J.s

Avogadro's constant, $N_A = 6.02214 \times 10^{23}$ mol^{-1}

Rydberg constant, $R = 3.28984 \times 10^{15}$ Hz

Boltzmann's constant, $k = 1.38 \times 10^{-23}$ J·K^{-1}

Faraday's constant, F = 96,485 C·mol^{-1}

Gas constant, $R = 8.314$ J·K^{-1}·mol^{-1} $= 8.206 \times 10^{-2}$ L·atm·K^{-1}·mol^{-1} =

8.314×10^{-2} L·bar·K^{-1}·mol^{-1} = 62.364 L·Torr·K^{-1}·mol^{-1}

Mass of electron, $m_e = 9.109\,383 \times 10^{-31}$ kg Mass of proton, $m_p = 1.672\,622 \times 10^{-27}$ kg

Mass of neutron, $m_n = 1.674\,927 \times 10^{-27}$ kg Speed of light, $c = 2.99792 \times 10^{8}$ m.s^{-1}

C_2 = Second radiation constant = 0.0144 K·m 1 eV = 1.602×10^{-19} J 1 J = 1 kg.m^2.s^{-2}

0°C = 273.15 K 1L = 1 dm^3 1 atm = 101.325 kPa $\pi = 3.14$

Water Density = 1g.ml^{-1} $\ln(X) = 2.303 \log_{10}(X)$ 1 kcal = 4.18 kJ 1 kg = 1000 g

$PV = nRT$ $pH = -\log[H^+]$ 1 nm = 10^{-9} m 1 Å = 10^{-10} m 1 pm = 10^{-12} m

$c = \lambda \nu$ $E = h\nu$ $E = pc$ $p = mv$ $E_n = -\frac{h R}{n^2}$

$\lambda = \frac{h}{p}$ $E_K = \frac{1}{2} mv^2$ $\Delta p \, \Delta x \geq \frac{h}{4\pi}$

$E_{TOTAL}\, \psi(x) = E_K\, \psi(x) + V(x)\, \psi(x) = -\frac{h^2}{8\pi^2 m} \frac{d^2\psi(x)}{dx^2} + V(x)\, \psi(x)$ $E_n = \frac{h^2 n^2}{8\, m\, L^2}$

$pH = pK_a + \log \frac{[base]}{[acid]}$ $K_a \times K_b = K_w = 10^{-14}$ at 25 °C

Solution to $AX^2 + BX + C = 0$ is $X = \frac{-B +/- \sqrt{B^2 - 4AC}}{2A}$