

Do not write answers here!

Chemistry BC3254y

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	$h = 6.6260693(11) \times 10^{-34} \text{ J}\cdot\text{s} \quad \hbar = h / 2\pi$
Faraday	$\mathcal{F} = 96485.3383(83) \text{ C}\cdot\text{mole}^{-1} = N_A e$
Nernst constant	$k_N = 0.05916 \text{ V at } 25^\circ\text{C} = \ln 10 RT / \mathcal{F} = 2.303RT / \mathcal{F}$
acceleration of gravity	$g = 9.80 \text{ m/s}^2$

Units and Conversion Factors

Volume	1 liter (L) = 1000 cm ³
Pressure	1 atmosphere (atm) = 1.01325 x 10 ⁵ Pa = 760 mmHg = 1.01325 Bar
Temperature	0 degrees Celsius (°C) = 273.15 K
Energy	1 calorie (cal) = 4.184 Joules (J) 101.325 Joule = 1 L-atm RT at exactly 25°C = 2.47897 kJ/mole $k_B T$ at exactly 25°C = 4.11641 x 10 ⁻²¹ Joules = 207.2249 cm ⁻¹
Mass	1 amu = 1.6605402 x 10 ⁻²⁷ kg = 931.49432 MeV
Viscosity	Poise (P) = g-cm/s
Sedimentation	Svedberg (S) = 10 ⁻¹³ second
Current: Ampere (A) = Coulomb/sec	Electrical potential: Volt (V) = Joule/Coulomb
Resistance: Ohm (Ω) = Volt/Ampere	Conductance: Sieman (S) = 1/Ohm
Activity: Becquerel (Bq) = 1 decay/second	Curie (Ci) = 3.7 x 10 ¹⁰ Bq

$$\ln x = 2.302585 \log x = \ln (10) \log x$$