Table of Physical Constants

Speed of light in free space	c	3.00×10^{8} m s^{-1}
Gravitational Constant	G	6.67×10^{-11} N m^2 kg^{-2}
Planck's Constant	h	6.63×10^{-34} J s
	$\hbar$	1.055×10^{-34} J s
Elementary charge	e	1.60×10^{-19} C
Mass of the electron	m_e	9.11×10^{-31} kg
Mass of the proton	m_p	1.6726×10^{-27} kg
Mass of the neutron	m_n	1.6749×10^{-27} kg
Boltzmann's constant	k_B	1.38×10^{-23} J K^{-1}
Gas constant	R	8.31 J K^{-1} mol^{-1}
Permittivity of free space	ε_0	8.85×10^{-12} F m^{-1}
Permeability of free space	μ_0	$4\pi \times 10^{-7}$ H m^{-1}
Bohr magneton	μ_B	9.27×10^{-24} J T^{-1}
Stefan-Boltzmann constant	σ	5.67×10^{-8} W m^{-2} K^{-4}
Avogadro's number	N_A	6.02×10^{23} mol^{-1}

Information you may find useful

$< x^2 > \approx 6Dt$ where $D = \frac{k_B T}{6\pi\mu a}$

$P \propto \exp(-U/k_B T)$

$F(x) = -\frac{dU}{dx}$

$U_{dipole} = -\boldsymbol{p}.\boldsymbol{E}$ where $\boldsymbol{p} = qd\hat{\boldsymbol{r}}$

$\boldsymbol{p} = \alpha \boldsymbol{E}_{\boldsymbol{ext}}$ where $\alpha = 4\pi\epsilon\epsilon_r d^3$

$U(x) = -\frac{\pi n_1 C}{6x^3}$

$A_{12} = n_1 n_2 \pi^2 C$

$W_{adhesion} = \gamma_{13} + \gamma_{23} - \gamma_{12}$

$\Delta P = \gamma \left[\frac{1}{R_1} + \frac{1}{R_2}\right]$

$h = \frac{2\gamma\cos(\theta)}{\rho g R}$

$k = \frac{k_B T}{<z^2>} = \frac{3EI}{L^3}$

$< I >= \frac{c\epsilon\epsilon_0 n}{2} \left\langle E^2 \right\rangle$

$\Pi = \left(n_+ + n_- - 2n_0\right) k_B T$

$\frac{-d^2 V}{dx^2} = \frac{\rho}{\epsilon\epsilon_0}$

$P_{Tot} = 4n_0 \frac{z^2 e^2 V_0^2}{k_B T} \exp(-\kappa D) - \frac{A}{6\pi D^3}$

$s = k_B \ln W$

$\Delta U = \Delta H - T\Delta S$

$\Delta U = P_{osm} \Delta V_{excl}$

$\mu = \frac{dU}{dN}$

$P(N = N_c) = \exp(-\Delta U/k_B T)$

$H = \frac{\nu}{l_c a_0}$

$P_{Tot} = \left[\frac{(k_B T)^2}{\kappa\pi^2} - \frac{A}{6\pi}\right] \frac{1}{D^3}$

where the symbols take their usual meanings as used throughout this course.