Table 1: Fundamental and derived constants

Name	Symbol	Value	Units
Atomic Mass Unit	u	$1.660\,54 \times 10^{-27}$	kg
Avogadro's Number	N_A	$6.022\,14 \times 10^{23}$	mol^{-1}
Mass of an Electron	m_e	$9.109\,38 \times 10^{-31}$	kg
Mass of a Neutron	m_n	$1.674\,93 \times 10^{-27}$	kg
Mass of a Proton	m_p	$1.672\,62 \times 10^{-27}$	kg
Faraday's Constant	F	$9.648\,53 \times 10^{4}$	C/mol
Gas Constant	R	8.314 46	J/(K mol)
		0.082 06	L atm/(K mol)
		62.363 58	L Torr/(K mol)
Boltzmann's Constant	k_B	$1.380\,65 \times 10^{-23}$	J/K
Planck's Constant	h	$6.626\,07 \times 10^{-34}$	J s
Speed of Light	c	$2.997\,92 \times 10^{8}$	m/s
Earth's Gravitational Constant	g	9.806 65	$\mathrm{m/s^2}$
Bohr Radius	a_0	$5.291\,77 \times 10^{-11}$	m
Rydberg Constant	R_∞	$1.097\,37 \times 10^{7}$	m^{-1}
Hartree Energy	E_h	$4.359\,74 \times 10^{-18}$	J

Table 2: Formulas

$$\ln 2 = 0.693$$

$$\ln 3 = 1.099$$

$$\ln 5 = 1.609$$

$$\ln N! \approx N \ln N - N$$

$$\Delta U = q + w$$

$$H = U + PV$$

$$q = mc_s \Delta T$$

$$q_{\text{calorimeter}} = C_{\text{calorimeter}} \Delta T$$

$$c_P = c_v + R$$

$$c_P = \frac{5}{2} R$$

$$c_V = \frac{3}{2} R$$

$$\Delta U = nc_V \Delta T$$

$$\Delta H = nc_P \Delta T$$

$$w = -\int_{V_1}^{V_2} P_{\text{ext}}(V)\,\mathrm{d}V$$

$$w = -nRT \ln\left(\frac{V_2}{V_1}\right)$$

$$w = -P_{\text{ext}} \Delta V$$

$$\Delta S_{\text{sys}} = \int_1^2 \frac{\mathrm{d}q_{\text{rev}}}{T}$$

$$\Delta S_{\text{sys}} = \frac{q_{\text{rev}}}{T}$$

$$\Delta S_{\text{sys}} = nR \ln\left(\frac{V_2}{V_1}\right)$$

$$\Delta S_{\text{surr}} = \frac{q_{\text{surr}}}{T_{\text{surr}}}$$

$$\Delta S_{\text{sys}} = nc_P \ln\left(\frac{T_2}{T_1}\right)$$

$$\Delta S_{\text{sys}} = nc_V \ln\left(\frac{T_2}{T_1}\right)$$

$$\int_0^\infty \mathrm{e}^{-\alpha x}\,\mathrm{d}x = \frac{1}{\alpha}$$

$$\int_0^\infty \mathrm{e}^{-\alpha x^2}\,\mathrm{d}x = \frac{1}{2}\sqrt{\frac{\pi}{\alpha}}$$

$$\int_0^\infty x\mathrm{e}^{-\alpha x^2}\,\mathrm{d}x = \frac{1}{2\alpha}$$

$$\int_0^\infty x^2\mathrm{e}^{-\alpha x^2}\,\mathrm{d}x = \frac{1}{4}\sqrt{\frac{\pi}{\alpha^3}}$$

$$N! \approx \left(\frac{N}{\mathrm{e}}\right)^N$$

$$f(x) = \sum_{i=0}^{\infty} \frac{1}{i!} \left.\frac{\mathrm{d}^i f(x)}{\mathrm{d}x^i}\right|_{x=a} (x-a)^i$$