

Equations, Constants, and Conversion Factors

$$\text{Molarity} = \frac{n}{V}$$

$$E_K = \frac{1}{2}mv^2 \quad E_K = \frac{3RT}{N_a}$$

$$E_P = mgh \quad E_{el} = V(\text{voltage}) = \frac{\kappa Q_1 Q_2}{d}$$

$$\Delta E = q + w$$

$$w = F \times d = F \times \Delta x$$

$$w = -P\Delta V$$

$$\Delta H = \Delta E + P\Delta V$$

$$q_{cal} = C\Delta T = mC_s\Delta T$$

$$\Delta H_{rxn}^o = \Sigma_{prod.} \Delta H_f^o - \Sigma_{react.} \Delta H_f^o$$

$$PV = nRT$$

$$d = \frac{P\mathcal{M}}{RT}$$

$$P_T = P_1 + P_2 + P_3 + P_4 + \dots$$

$$P_1 = \frac{n_1}{n_T} P_T = \chi_1 P_T$$

$$u_{rms} = \sqrt{\frac{3RT}{\mathcal{M}}} \quad u_{mp} = \sqrt{\frac{2RT}{\mathcal{M}}}$$

$$\lambda\nu = c \quad E_{photon} = h\nu \quad E = \frac{hc}{\lambda}$$

$$\lambda = \frac{h}{p} = \frac{h}{mv}$$

$$\Delta E_n = (-2.178 \times 10^{-18} \text{ J}) \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$$

$$E_n = (-2.178 \times 10^{-18} \text{ J}) \left(\frac{1}{n^2} \right)$$

$$\Delta p \times \Delta x \geq \frac{h}{4\pi} \quad \text{or} \quad m\Delta\nu \times \Delta x \geq \frac{h}{4\pi}$$

$$R = 0.08206 \frac{\text{L atm}}{\text{mol K}} = 8.314 \frac{\text{J}}{\text{mol K}} = 8.314 \frac{\text{m}^3 \text{Pa}}{\text{mol K}}$$

$$R = 1.987 \frac{\text{cal}}{\text{mol K}} = 62.36 \frac{\text{L torr}}{\text{mol K}}$$

$$101.325 \text{ J} = 1 \text{ L} \cdot \text{atm}$$

$$1 \text{ J} = 1 \text{ kg m}^2 \cdot \text{s}^{-2}$$

$$4.184 \text{ J} = 1 \text{ cal}$$

$$1 \text{ atm} = 760 \text{ mmHg} = 760 \text{ torr}$$

$$= 1.01325 \times 10^5 \text{ Pa}$$

$$= 101.325 \text{ kPa} = 1.01325 \text{ bar}$$

$$1 \text{ L} = 1.0567 \text{ qt} = 0.2642 \text{ gal}$$

$$1 \text{ kg} = 2.2046 \text{ lb}$$

$$1 \text{ amu} = 1.6605 \times 10^{-27} \text{ kg}$$

$$1 \text{ km} = 0.62137 \text{ mi}$$

$$1 \text{ \AA} = 1 \times 10^{-10} \text{ m} = 0.1 \text{ m}$$

$$K = {}^\circ C + 273.15 \quad {}^\circ C = \frac{5}{9}({}^\circ F - 32)$$

$$\text{Proton Mass: } m_p = 1.673 \times 10^{-27} \text{ kg}$$

$$\text{Neutron Mass: } m_N = 1.675 \times 10^{-27} \text{ kg}$$

$$\text{Electron Mass: } m_e = 9.10939 \times 10^{-31} \text{ kg}$$

$$\text{electron charge: } e = 1.602 \times 10^{-19} \text{ C}$$

$$N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$$

$$\kappa = 8.99 \times 10^9 \text{ J m C}^2$$

$$g = 9.81 \text{ m/s}^2$$

$$c = 2.998 \times 10^8 \frac{\text{m}}{\text{s}}$$

$$h = 6.626 \times 10^{-34} \text{ Js}$$

$$1D = 3.336 \times 10^{-30} \text{ C m}$$

$$S_g = k P_g$$

$$P_{soln} = X_{solvent} P_{solvent}^o$$

$$\Delta T_b = K_b m_{molality} (\text{particles})$$

$$\Delta T_f = -K_f m_{molality} (\text{particles})$$

$$\Pi = i \frac{n}{V} RT = i MRT$$

PERIODIC TABLE OF THE ELEMENTS

PERIODIC TABLE OF THE ELEMENTS		VIA 17 VIA 16 VIA 15 VIA 14 VIA 13																		VIA 17 VIA 16 VIA 15 VIA 14 VIA 13		VIA 17 VIA 16 VIA 15 VIA 14 VIA 13		VIA 17 VIA 16 VIA 15 VIA 14 VIA 13		VIA 17 VIA 16 VIA 15 VIA 14 VIA 13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Initials

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(1) Atomic weights of the elements 2013, Pure Appl. Chem., **88**, 265–291 (2016)