

Physical Constants

$$k = 1.381 \times 10^{-23} \text{ J/K}$$
$$= 8.617 \times 10^{-5} \text{ eV/K}$$

$$N_A = 6.022 \times 10^{23}$$

$$R = 8.315 \text{ J/mol}\cdot\text{K}$$

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$
$$= 4.136 \times 10^{-15} \text{ eV}\cdot\text{s}$$

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

$$G = 6.673 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$$

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

$$m_e = 9.109 \times 10^{-31} \text{ kg}$$

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

Unit Conversions

$$1 \text{ atm} = 1.013 \text{ bar} = 1.013 \times 10^5 \text{ N/m}^2$$
$$= 14.7 \text{ lb/in}^2 = 760 \text{ mm Hg}$$

$$(T \text{ in } ^\circ\text{C}) = (T \text{ in K}) - 273.15$$

$$(T \text{ in } ^\circ\text{F}) = \frac{9}{5}(T \text{ in } ^\circ\text{C}) + 32$$

$$1 \text{ } ^\circ\text{R} = \frac{5}{9} \text{ K}$$

$$1 \text{ cal} = 4.186 \text{ J}$$

$$1 \text{ Btu} = 1054 \text{ J}$$

$$1 \text{ eV} = 1.602 \times 10^{-19} \text{ J}$$

$$1 \text{ u} = 1.661 \times 10^{-27} \text{ kg}$$