

$$m\lambda = a \sin \theta \quad \theta_R = 1.22 \frac{\lambda}{D}$$

$$\frac{\vec{S}}{c} = \frac{1}{\mu_0 c} \vec{E} \times \vec{B} \quad pflux = \frac{\langle S \rangle}{c} = \frac{I}{c} \quad L = 4\pi r^2 F$$

$$E_N = \frac{-13.6 \text{eV}}{N^2} \quad E_N = N\hbar\omega_0 + E_0 \quad \omega_0 = \sqrt{\frac{k_s}{m}}$$

$$PV = Nk_B T \quad PV^\gamma = \text{constant} \quad \gamma = 1 + \frac{2}{f}$$

$$dW = -PdV \quad \Delta U = Q + W \quad Q = cm\Delta T \quad Q = Lm$$

$$U = \frac{f}{2} Nk_B T \quad \frac{1}{2} m v_{rms}^2 = \frac{3}{2} k_B T \quad P(v) = 4\pi \left( \frac{M}{2\pi k_B T} \right)^{\frac{3}{2}} v^2 e^{-\frac{Mv^2}{2k_B T}}$$

$$v_{rms} = \sqrt{\frac{3k_B T}{M}} \quad v_P = \sqrt{\frac{2k_B T}{M}} \quad v_{avg} = \sqrt{\frac{8k_B T}{\pi M}}$$

$$\frac{dQ}{dt} = -\kappa A \frac{dT}{dx} \quad d = \frac{1}{\sqrt{2} An_V} \quad \lambda_{peak} = \frac{2.9 \times 10^{-3} m - K}{T} \quad \frac{dQ}{dt} = e\sigma AT^4$$

### Conversions/Constants

$$\gamma = 1.67 \text{ (monatomic gas)} \quad \gamma = 1.44 \text{ (diatomic gas)}$$

$$T[\text{K}] = T[^\circ\text{C}] + 273$$

$$N_A = 6.02 \times 10^{23}$$

$$k_B = 1.38 \times 10^{-23} \frac{\text{J}}{\text{K}} \quad \sigma = 5.6703 \times 10^{-8} \frac{\text{W}}{\text{m}^2 \text{K}^4}$$

$$h = 6.6 \times 10^{-34} \text{J} \cdot \text{s} \quad \hbar = 1.05 \times 10^{-34} \text{J} \cdot \text{s}$$

$$\mu_0 = 4\pi \times 10^{-7} \frac{\text{T} \cdot \text{m}}{\text{A}} \quad c = 3 \times 10^8 \text{ m s}^{-1}$$

$$1 \text{ eV} = 1.602 \times 10^{-19} \text{J} \quad m_{\text{proton}} = 1.67 \times 10^{-27} \text{kg}$$

$$1 \mu\text{m} = 10^{-6} \text{m} \quad 1 \text{ nm} = 1 \times 10^{-9} \text{m}$$

$$1^\circ = 3600''$$