Possibly Useful Information

Special Relativity:

$$\gamma = \frac{1}{\sqrt{1-\beta^2}} \qquad \beta = \frac{v}{c} \qquad \Delta t = \gamma \Delta t_0 \qquad L = \frac{L_0}{\gamma} \qquad p = \gamma m v$$

$$x' = \gamma\left(x - vt\right) \qquad t' = \gamma\left(t - \frac{vx}{c^2}\right) \qquad u = \frac{u' + v}{1 + u'v/c^2} \qquad E_0 = mc^2$$

$$E = \gamma E_0 = E_0 + K \qquad E^2 = \left(pc\right)^2 + \left(mc^2\right)^2 \qquad \left(pc\right)^2 = K^2 + 2Kmc^2$$

Photons, Matter Waves & Quantum Mechanics:

$$E = hf \qquad hf = K_{\max} + \Phi \qquad p = \frac{hf}{c} = \frac{h}{\lambda} \qquad \Delta\lambda = \frac{h}{mc}\left(1 - \cos\phi\right)$$

$$\frac{d^2\psi}{dx^2} + \frac{2m}{\hbar^2}\left[E - U\left(x\right)\right]\psi = 0 \qquad \frac{d^2\psi}{dx^2} + k^2\psi = 0 \qquad \hbar = \frac{h}{2\pi}$$

$$\Delta x \Delta p_x \geq \hbar \qquad \Delta E \Delta t \geq \hbar \qquad \Delta L \Delta\phi \geq \hbar \qquad T \approx e^{-2bL} \qquad b = \sqrt{\frac{2m\left(U_b - E\right)}{\hbar^2}}$$

$$E_n = \frac{h^2}{8mL^2}n^2 \qquad E_{n_x,n_y} = \frac{h^2}{8m}\left(\frac{n_x^2}{L_x^2} + \frac{n_y^2}{L_y^2}\right) \qquad E_{n_x,n_y,n_z} = \frac{h^2}{8m}\left(\frac{n_x^2}{L_x^2} + \frac{n_y^2}{L_y^2} + \frac{n_z^2}{L_z^2}\right)$$

$$\psi_n(x) = \sqrt{\frac{2}{L}}\sin\left(\frac{n\pi}{L}x\right) \qquad P(x) = \int_{x_1}^{x_2}\left|\psi_n(x)\right|^2 dx \qquad \frac{1}{\lambda} = R_\infty\left(\frac{1}{n_{low}^2} - \frac{1}{n_{high}^2}\right)$$

$$P(r,\theta,\phi) = \left|\psi(r)\right|^2 dV \qquad P(r) = 4\pi r^2\left|\psi(r)\right|^2 \qquad \int_{-\infty}^{+\infty} P(x)dx = 1$$

$$\psi_{100}(r) = \frac{1}{\sqrt{\pi}a_0^{3/2}}e^{-r/a_0} \qquad E_n = \frac{-13.6\text{ eV}}{\text{n}^2} \qquad E_n = \left(n + \tfrac{1}{2}\right)\hbar\omega$$

Constants & Conversions:

c = 2.998 x 10^8 m/s c^2 = 931.5 Mev/u 1 u = 1.6605 x 10^{-27} kg

h = 6.626 x 10^{-34} J·s = 4.136 x 10^{-15} eV·s hc = 1240 eV·nm 1 eV = 1.602 x 10^{-19} J

$\hbar = \dfrac{h}{2\pi}$ = 1.054 x 10^{-34} J·s = 6.583 x 10^{-16} eV·s $\varepsilon_0 = 8.85\times10^{-12}\,\dfrac{\text{C}^2}{\text{Nm}^2}$

μ_B = 9.274 x 10^{-24} J/T $k_B = 1.38\times10^{-23}$ J/K R_∞ = 1.097 x 10^7 m^{-1}

m_e = 9.11 x 10^{-31} kg = 511 keV/c^2
m_p = 1.67 x 10^{-27} kg = 938 MeV/c^2
m_n = 1.68 x 10^{-27} kg = 940 MeV/c^2

a_0 = 52.9 pm

1 μm = 10^{-6} m
1 nm = 10^{-9} m
1 pm = 10^{-12} m