REMEMBER: Bubble in ALL Bubblesheet information!
This includes your first and last name, your UTEID, and your version number.

Please refer to the back of the bubble sheet for more info.

\[ h = 6.626 \times 10^{-34} \text{ J} \cdot \text{s} \]
\[ R = 2.18 \times 10^{-18} \text{ J} \]
\[ c = 3.00 \times 10^8 \text{ m/s} \]
\[ N_A = 6.022 \times 10^{23} \text{ mol}^{-1} \]
\[ m_e = 9.11 \times 10^{-31} \text{ kg} \]
\[ 1 \text{ lb} = 453.6 \text{ g} \]
\[ 1 \text{ in} = 2.54 \text{ cm} \]
\[ 1 \text{ u} = 1.66 \times 10^{-27} \text{ kg} \]

\[ c = \lambda \cdot \nu \]
\[ E = h\nu \]
\[ E_k = \frac{1}{2} m_e v^2 = h\nu - \Phi \]
\[ E_n = -\frac{R}{n^2} \]
\[ \Delta E = R \left( \frac{1}{n_f^2} - \frac{1}{n_i^2} \right) \]
\[ \lambda = \frac{\hbar}{mv} \]
\[ \psi_n(x) = \left( \frac{\hbar}{L} \right)^{\frac{1}{2}} \sin \left( \frac{n\pi x}{L} \right) \quad n = 1, 2, \cdots \]
\[ E_n = \frac{n^2\hbar^2}{8mL^2} \quad n = 1, 2, 3, \cdots \]
\[ \Delta x \Delta p \geq \frac{\hbar}{4\pi} \]
\[ -\frac{\hbar^2}{2m} \frac{d^2\psi}{dx^2} + V(x)\psi = E\psi \]

NOTE: Please keep your Exam copy intact (all pages still stapled). You must turn in your exam copy, plus your bubble sheet, and any scratch paper.