LATEX PRACTICE

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$$U(x) = \frac{mw^2x^2}{2}$$

$$E_n = (n + \frac{1}{2})\hbar\omega$$

$$\psi_0(x) = \left(\frac{\beta^2}{\pi}\right)^{\frac{1}{4}} e^{-\frac{1}{2}\beta^2x^2}$$

$$-\frac{\hbar^2}{2m}\frac{d^2}{dx^2}\psi(x) + U(x)\psi(x) = E\psi(x)$$

$$\beta = \sqrt{\frac{m\omega}{\hbar}}$$

(4) d. From $n = 4$ to $n = 1$
Find energy (eV)

$$E_p = E_4 - E_1$$

$$E_n = \frac{\pi^2\hbar^2}{2mL^2}n^2$$

$$E_n = \frac{(\pi\hbar)^2}{2mL^2}n^2$$

$$E_n = \frac{\left(\pi\frac{h}{2\pi}\right)^2}{2mL^2}n^2$$

$$E_n = \frac{\left(\frac{h}{2}\right)^2}{2mL^2}n^2$$

$$E_n = \frac{h^2}{8mL^2}n^2$$

$$E_p = \frac{h^2}{8mL^2}4^2 - \frac{h^2}{8mL^2}1^2$$

$$E_p = \frac{h^2}{8mL^2}\left(4^2 - 1^2\right)$$

$$E_p = \frac{h^2}{8mL^2}\,(15)$$

$$E_p = \frac{\left(6.626 \times 10^{-34}\text{J s}\right)^2}{8\left(1.67 \times 10^{-27}\text{kg}\right)\left(1.733 \times 10^{-11}\right)^2} \quad (15)$$

$$E_p = 1.094 \times 10^{-19}\text{J}$$

$$E_p = 1.094 \times 10^{-19}\text{J}\left(\frac{1\text{eV}}{1.602 \times 10^{-19}\text{J}}\right) = 0.6829 \text{ eV}$$

Find frequency (Hz)

$$f = \frac{E}{h}$$

$$f = \frac{1.094 \times 10^{-19}\text{J}}{6.626 \times 10^{-34}\text{J s}} = 1.651 \times 10^{14} \text{ Hz}$$

Find wavelength

$$\lambda = \frac{v}{f}$$

$$\lambda = \frac{3.00 \times 10^{8}\frac{\text{m}}{\text{s}}}{1.651 \times 10^{14} \text{ Hz}} = 1.817 \times 10^{-6}\text{m}$$