7. We can use the mc^2 value for an electron from Table 38-3 (511×10^3 eV) and the hc value developed in problem 3 of Chapter 39 by writing Eq. 40-4 as

$$E_n = \frac{n^2 h^2}{8mL^2} = \frac{n^2 (hc)^2}{8(mc^2)L^2} \ .$$

The energy to be absorbed is therefore

$$\begin{aligned} \Delta E &= E_4 - E_1 = \frac{(4^2 - 1^2)h^2}{8m_e L^2} = \frac{15(hc)^2}{8(m_e c^2)L^2} \\ &= \frac{15(1240\,\text{eV}\!\cdot\!\text{nm})^2}{8(511 \times 10^3\,\text{eV})(0.250\,\text{nm})^2} = 90.3 \text{ eV} \ . \end{aligned}$$