46. (a) and (b) Using Eq. 40-6 and the result of problem 3 in Chapter 39, we find

$$\Delta E = E_{\text{photon}} = \frac{hc}{\lambda} = \frac{1240\,\text{eV}\cdot\text{nm}}{121.6\,\text{nm}} = 10.2\ \text{eV}\ .$$

Referring to Fig. 40-16, we see that this must be one of the Lyman series transitions. Therefore, $n_{\text{low}} = 1$, but what precisely is n_{high}?

$$\begin{aligned} E_{\text{high}} &= E_{\text{low}} + \Delta E \\ -\frac{13.6\,\text{eV}}{n^2} &= -\frac{13.6\,\text{eV}}{1^2} + 10.2\,\text{eV} \end{aligned}$$

which yields $n = 2$ (this is confirmed by the calculation found from Sample Problem 40-6). Thus, the transition is from the $n = 2$ to the $n = 1$ state.