38.32. Solve: Photons emitted from the $n = 4$ state start in energy level $n = 4$ and undergo a quantum jump to a lower energy level with $m < 4$. The possibilities are $4 \rightarrow 1$, $4 \rightarrow 2$, and $4 \rightarrow 3$. According to Equation 38.36, the transition $4 \rightarrow m$ emits a photon of wavelength.

$$\lambda = \frac{\lambda_0}{\left(\frac{1}{m^2} - \frac{1}{n^2}\right)} = \frac{91.18 \text{ nm}}{\left(\frac{1}{m^2} - \frac{1}{16}\right)}$$

These values are given in the table below.

Transition	Wavelength
$4 \rightarrow 1$	97.3 nm
$4 \rightarrow 2$	486 nm
$4 \rightarrow 3$	1876 nm