4-17) a) $\lambda = 410.7\,nm$ ↘ VISIBLE LIGHT

↘ PART OF $n=2$ SERIES

$$hf = \frac{hc}{\lambda} = E_n - E_2 = E_0\left(\frac{1}{2^2} - \frac{1}{n^2}\right)$$

↘

$$\frac{1}{2^2} - \frac{1}{n^2} = \frac{hc}{E_0\lambda}$$

$$n^2 = \left(\frac{1}{2^2} - \frac{hc}{E_0\lambda}\right)^{-1}$$

$$n = \frac{1}{\sqrt{\frac{1}{2^2} - \frac{hc}{E_0\lambda}}}$$

USE $\frac{hc}{E_0\lambda} = \frac{1240\,eV\,nm}{13.6\,eV \cdot 410.7\,nm} = 0.222$

↘ $n = 6$

b) 2 → 6 BALMER

4-23) $r_1 = \frac{a_0}{Z} = \frac{0.059\,nm}{6} = \underline{8.82 \cdot 10^{-3}\,nm}$

$$E_1 = -E_0 Z^2 = -13.6eV \cdot 36 = -490\,eV$$

$$\frac{hc}{\lambda} = E_2 - E_1 \quad \text{↘} \quad \lambda_L = \frac{hc}{E_2 - E_1}$$

$$\lambda_L = \frac{1240\,eV \cdot nm}{490eV\left(1 - \frac{1}{4}\right)} = \underline{3.37\,nm}$$