

22. (a) We use Eq. 39-6:

$$V_{\text{stop}} = \frac{hf - \Phi}{e} = \frac{hc/\lambda - \Phi}{e} = \frac{(1240 \text{ eV} \cdot \text{nm}/400 \text{ nm}) - 1.8 \text{ eV}}{e} = 1.3 \text{ V} .$$

(b) We use the formula obtained in the solution of problem 21:

$$\begin{aligned} v &= \sqrt{\frac{2(E_{\text{photon}} - \Phi)}{m_e}} = \sqrt{\frac{2eV_{\text{stop}}}{m_e}} = c\sqrt{\frac{2eV_{\text{stop}}}{m_e c^2}} \\ &= (2.998 \times 10^8 \text{ m/s})\sqrt{\frac{2e(1.3 \text{ V})}{511 \times 10^3 \text{ eV}}} \\ &= 6.8 \times 10^5 \text{ m/s} . \end{aligned}$$