

P #36

Ch 27 - pg 862

$$m_e = 9.11 \times 10^{-31} \text{ kg}$$

$$\lambda = 1.0 \times 10^{-10} \text{ m}$$

Find v : $\lambda = \frac{h}{p} = \frac{h}{m \cdot v}$

$$(1.0 \times 10^{-10} \text{ m}) = \frac{(6.63 \times 10^{-34} \text{ J}\cdot\text{s})}{(9.11 \times 10^{-31} \text{ kg}) \cdot v}$$

$$v = 7.28 \times 10^6 \text{ m/s}$$

Find KE: $KE = \frac{1}{2} \cdot m \cdot v^2$

$$= \frac{1}{2} (9.11 \times 10^{-31} \text{ kg}) (7.28 \times 10^6 \text{ m/s})^2$$

$$KE = 2.41 \times 10^{-17} \text{ J}$$

Convert KE to eV:

$$KE = 2.41 \times 10^{-17} \text{ J} \cdot \frac{1 \text{ eV}}{1.6 \times 10^{-19} \text{ J}} = 150.8 \text{ eV}$$

$$KE = 150.8 \text{ eV for an } e^-$$

So

$$V = 150.8 \text{ V}$$