

$$\lambda = 625 \text{ nm} = 625 \times 10^{-9} \text{ m}$$

$$v = 4.6 \times 10^5 \text{ m/s}$$

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

a) Find KE_{max} :

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

$$= \frac{1}{2} \cdot (9.11 \times 10^{-31} \text{ kg}) \cdot (4.6 \times 10^5 \text{ m/s})^2$$

$$KE_{\text{max}} = 9.64 \times 10^{-20} \text{ J}$$

Find ϕ

$$KE_{\text{max}} = \frac{h \cdot c}{\lambda} - \phi$$

$$(9.64 \times 10^{-20} \text{ J}) = \frac{(1.99 \times 10^{-25} \text{ J} \cdot \text{m})}{(625 \times 10^{-9} \text{ m})} - \phi$$

$$\phi = 2.22 \times 10^{-19} \text{ J}$$

b) $KE_{\text{max}} = 0$ for cutoff f :

$$KE_{\text{max}} = h \cdot f - \phi$$

$$0 = (6.63 \times 10^{-34} \text{ J} \cdot \text{s}) \cdot f - (2.22 \times 10^{-19} \text{ J})$$

$$f = 335 \times 10^{14} \text{ Hz}$$