

THE PHOTOELECTRIC EFFECT Q1.0H

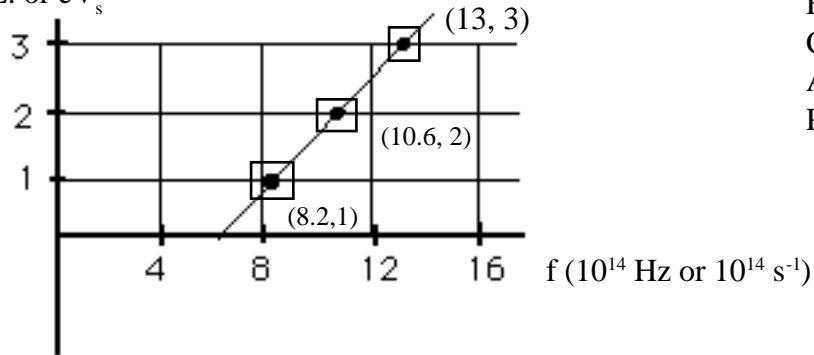
$$E = hf \quad h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s} \quad \text{or} \quad h = 4.14 \times 10^{-15} \text{ eV} \cdot \text{s} \quad 1 \text{ eV}_s = 1.6 \times 10^{-19} \text{ J}$$

$$c = f\lambda \quad eV_s = hf - \phi \quad (\text{Einstein's Photoelectric Equation})$$

1. What is the energy in joules of a 100nm photon?
2. What is the wavelength of a 2.4eV photon?
3. Use the graph shown below from a photoelectric experiment.
 - (a) Calculate the slope of the line.
 - (b) Find the work function (in eV).

Metal	ϕ (eV)
Na	2.28
Co	3.90
Al	4.08
Pb	4.14
Zn	4.31
Fe	4.50
Cu	4.70
Ag	4.73
Pt	6.35

max K.E. or eV_s



4. What is the cutoff frequency for lead (Pb) ?
5. If the work function for a metal is 1.9eV, (a) what would be the stopping potential or voltage for light having a wavelength of 400nm? (b) what is the cutoff wavelength?