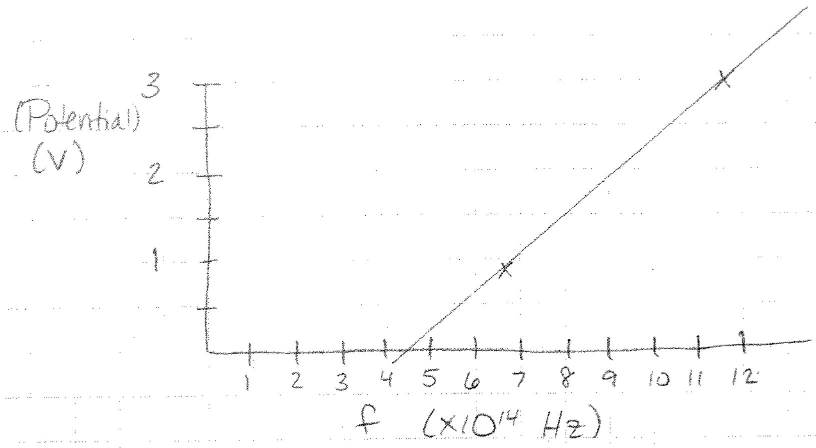
P #17

$\lambda_1 = 254\ nm = 254\times10^{-9} m$
$V_1 = 3.00 V$

$\lambda_2 = 436\ nm = 436\times10^{-9} m$
$V_2 = .900 V$



$f_1 = \frac{v}{\lambda_1} = \frac{(3\times10^8 m/s)}{(254\times10^{-9} m)} = 1.18\times10^{15} Hz$
$= 11.8\times10^{14} Hz$

$f_2 = \frac{v}{\lambda_2} = \frac{(3\times10^8 m/s)}{(436\times10^{-9} m)} = 6.88\times10^{14} Hz$

Best fit line (found w/ a calculator):

$V = (4.27\times10^{-15})\cdot f + (-2.0)$

a) Cut-off frequency occurs @ $V=0$: $0 = (4.27\times10^{-15})\cdot f + (-2.0)$

$\boxed{f = 4.77\times10^{14} Hz}$

(can also be estimated from the graph)

b) ϕ = Energy of cut-off f $= h\cdot f$

$\phi = (4.14\times10^{-15} eV\cdot s)(4.77\times10^{14} Hz)$

$\boxed{\phi = 2.0 eV}$