Act 1 – Solution

1. It is observed that shining light with wavelength 310 nm on a material will eject electrons, while 312 nm will not. What is the workfunction of the material?

Hint: What is V_{stop} at the maximum wavelength (minimum frequency)?

a) +2 V   b) -2 V   c) +2 eV   d) -4 eV   e) +4 eV

The workfunction must have units of energy, and is defined to be *positive*, so c) and e) are the only possible candidates. V_{stop} = 0, so E_{photon} = Φ.
Use E = hc / λ → λ = hc / E = 1240 eV·nm / 310 nm = 4 eV

2. If the same light is shined onto a material with ϕ = 2 eV, what stopping voltage will prevent all electrons from making it to the collector?

a) +2 V   b) +4 V   c) +2 eV   d) -4 eV   e) +4 eV