

King Fahd University of Petroleum & Minerals
Physics Department – Term 182
Phys212- Quiz#3

Name:

Key

ID#:

1. The surface of metallic zinc is illuminated and photoelectrons are observed. The work function of zinc is 4.31 eV.
- (a) What is the largest wavelength that will cause photoelectrons to be emitted from the surface of the metal?

$$K_{\max} = eV_s = hf - \phi = \frac{hc}{\lambda} - \phi$$

$$\text{When } \lambda_{\max} \quad eV_s = 0 \Rightarrow \frac{hc}{\lambda_{\max}} - \phi = 0$$

$$\lambda_{\max} = \frac{hc}{\phi} = \frac{1240 \text{ eV}\cdot\text{nm}}{4.31 \text{ eV}} = \boxed{287 \text{ nm}}$$

- (b) What is the stopping potential when light of wavelength 220 nm is used?

$$\begin{aligned} eV_s &= \frac{hc}{\lambda} - \phi = \frac{1240 \text{ eV}\cdot\text{nm}}{220 \text{ nm}} - 4.31 \text{ eV} \\ &= 5.64 - 4.31 = 1.33 \text{ eV} \end{aligned}$$

$$\boxed{V_s = 1.33 \text{ V}}$$

- (c) What is the stopping potential when light of wavelength 400 nm is used?

$$400 \text{ nm} > 287 \text{ nm} = \lambda_{\max}$$

No photoelectric effect will occur
in this case.

$$hf < \phi !$$