Physics II
1st Practice

1. An electron has a kinetic energy of 1.5 eV. a) What is its velocity? b) What is its momentum? c) What is the wavelength of the associated de Broglie wave?

2. A metal surface is illuminated with light of wavelength $1.5 \cdot 10^{7} m$. What is the velocity of the emitted electrons if the photoelectric effect starts at light with a wavelength of $2.67 \cdot 10^{-7} m$? $(m_e = 9.1 \cdot 10^{-31} kg)$.

3. A photon ejects an electron with a maximum kinetic energy of $0.54 eV$ from a metal for which the work function is $3.74 eV$. a) What is the energy of the photon in electronvolts? b) What is the wavelength of the applied ultraviolet radiation?

4. In a Compton scattering experiment, X-rays with a wavelength of 0.124 nm are used. $(m_e = 9.1 \cdot 10^{-31} kg)$ a) At what scattering angle does the wavelength of the radiation increase by 1%? b) At what angle does the wavelength become 0.05% larger?

5. X-rays are scattered by electrons. $\lambda_0 = 10^{-11} m$. The magnitude of the wavelength change is $2.4 \cdot 10^{-12} m$.

   a) What is the scattering angle of the photons? b) By how much did the photon energy change during the process? $(m_e = 9.1 \cdot 10^{-31} kg)$