

# EEE434/591: Quantum Mechanics

## Homework set #1

1. Assuming that the electron moves in a circular orbit in a Coulomb field, derive the Balmer formula for the spectrum of hydrogen atoms from the quantum condition

$$\oint p_i dq_i = n_i h ,$$

and the Bohr formula  $\Delta E = h\nu$ .

2. Ultraviolet light of wavelength 3500 Å falls on a potassium surface. The maximum energy of the photoelectrons is 1.6 eV. What is the workfunction of potassium?
3. The smallest separation resolvable by a microscope is of the order of magnitude of the wavelength used. What energy electrons would one need in an electron microscope to resolve separations of (a) 150 Å, (b) 5 Å ?