# Homework 8

## Due 9/29/11

1. In class discussed what happens when an electron of speed $v$ enters a region with a uniform magnetic field perpendicular to the electron's direction of motion. We concluded that it will go in a circle. If we know $v$ as well as the magnetic field, $B$, and if we measure the radius, $r$, of the circle, it is possible to solve for $e/m$. We derived this expression in class. Usually, we don't know $v$ directly – we only know that the electron was accelerated from speed (almost) zero to $v$ using a potential (voltage) $V$. Express the $e/m$ in terms of this voltage $V$ rather than in terms of $v$ (as we had before). *Note: The method we outlined in class for measuring $e/m$ is different from Thomson's original method presented in section 3.1. of the text. Although I recommend reading that section, your class notes will be more helpful for answering this question.*

2. Problem 3.5 of text. You will need to read section 3.2 for this.