Physics 2140 Homework #7

3 problems

Complete by October 15th

▷ **1.**

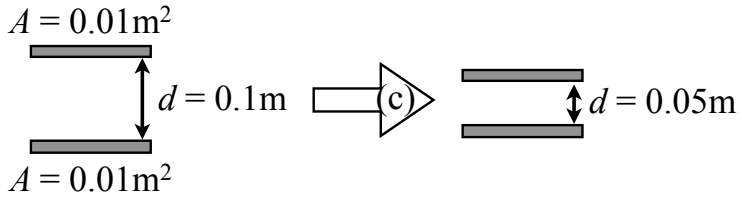
A metal cone has a capacitance of $C = 10\,\mu\text{F}$. Suppose one end of a power supply is connected to the cone and the other to a point far away from the cone ("ground"). What voltage should the power supply be set to, so that the cone ends up with a charge of $Q = 5\,\mu\text{C}$?

▷ **2.**

Two identical circular metal plates are separated by a distance of $10^{-9}\,\text{m}$. If these plates have a capacitance of $1\,\text{F}$, what is their radius?

▷ **3.**

The figure shows two plates, each with area $A = 0.01\,\text{m}^2$, which are $d = 0.1\,\text{m}$ apart. They are connected by a $9\,\text{V}$ battery.



(a) Find the capacitance of this capacitor.
(b) Find the energy stored in the capacitor.
(c) If the two plates are moved closer together, so that they are only $d = 0.05\,\text{m}$ apart, what is the energy stored in the capacitor then?