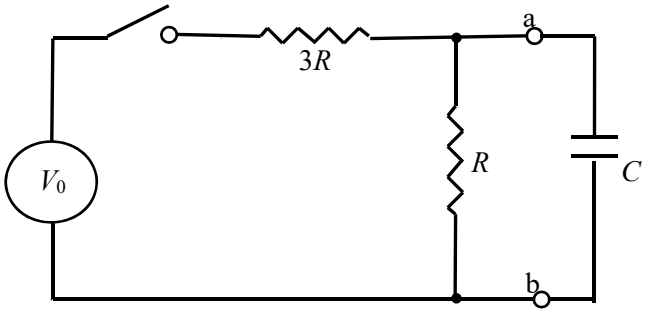
Physics 3150
Problem Set 1

Due Monday, February 1, 2016

1. Eggleston, Chapter 1, problem 11 (denoted from now on as 1-11, etc.).
2. Eggleston 1-12.
3. Eggleston 1-16.
4. Eggleston 2-3
5. Here's a chance to put together a few of the key ideas from Chapters 1 and 2. For the variation on Problem 2-3 drawn below, find an equation for the time-dependent voltage $V_{ab}(t)$ across the capacitor, assuming that the switch is initially open and then suddenly closed at $t = 0$, and that the capacitor is initially discharged. You will find this considerably easier if you first find the Thèvenin equivalent of everything to the left of Points a and b, then use this result.



Extra credit, just for fun (worth ½ of a normal problem): Twelve 100 ohm resistors are connected to form a cube with a resistor along each edge. What resistance will be measured between a pair of diagonally opposite corners of this cube? *Hint*: If you can show by symmetry that certain points are equivalent, and must therefore have equal potentials, you might be able to take advantage of this.