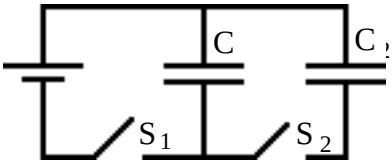
Physics 4B SECOND EXAM Chapters 26 - 28 Spring 1994

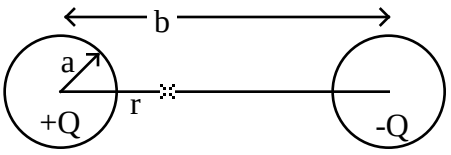
Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles which are on the last page. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. In the circuit at the right V=12.0V, C_1=4.00μF and C_2=8.00μF. Initially the capacitors are uncharged. (a)Find the charge on the capacitors when switch S_1 is closed and switch S_2 is open. (b)Now, S_1 is opened and S_2 is closed. The charge that was on C_1 can flow to C_2. Find the resulting charge on each capacitors.



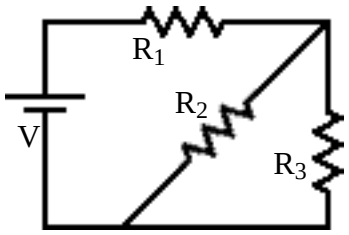
2. Two identical spheres of radius a are separated by a distance b. The sphere on the right has a charge, +Q, and the sphere on the left has a charge, -Q. Find (a)the electric field at a distance r from the sphere on the right along the line that joins the spheres, (b)the potential difference between the spheres, (c)the capacitance of the spheres.



3. A 2.00mm diameter wire is 60.0cm long. When a 1.50V battery is connected to it the resulting current is 1.20mA. (a)Find the resistivity of the wire and (b)the heat created each second by the collisions between the electrons and the atoms in the wire.

4. A galvanometer has an internal resistance of 30.0Ω and deflects full scale when 2.00μA flows through it. Use it to make a voltmeter that can read up to 50.0V. Draw the internal circuitry of this voltmeter and indicate where the potential differences are to be applied.

5. For the circuit shown find (a)the equivalent resistance, (b)the current supplied by the battery, (c)the power supplied by the battery, (d)the potential difference across each resistor, (e)the current through each resistor, and (f)the power consumed by each resistor. V=12.0V, R_1=1.00kΩ, R_2=3.00kΩ and R_3=6.00kΩ.



V(V)	I(mA)	R(kΩ)	P(mW)