

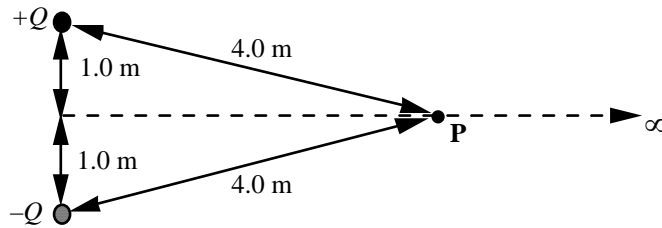
Name: \_\_\_\_\_

**Phys.116 Exam I**  
**12 July 2004**

Please do not turn the page until you are told to do so. When you do so, make sure that you have all three problems on your copy of the test.

In order to get credit on a problem, you must show your work. If you only write down an answer without the work leading up to it, you will get no credit for it, even if it is the right answer.

1. Two charges of opposite sign and equal magnitude  $Q = 2.0 \text{ C}$  are held  $2.0 \text{ m}$  apart as shown in the figure.



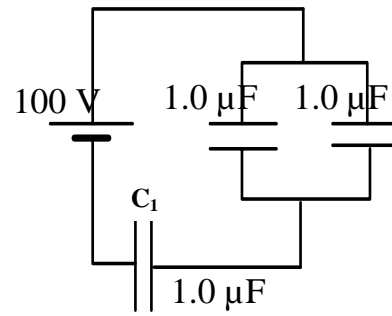
- a.(5 points) Determine the magnitude of the electric field at the point  $P$ .

- b.(5 points) Determine the electric potential at the point  $P$ .

- c.(5 points) How much work is required to move a  $1.0 \text{ C}$  charge from infinity to the point  $P$ ?

- d.(5 points) What force would the  $1.0 \text{ C}$  charge experience (magnitude and direction) at point  $P$ ?

2. a. (7 points) What is the equivalent capacitance of the combination of capacitors shown in the circuit?



~~NOT FOR EXAM 1~~

- b.(6 points) How much charge is stored on capacitor  $C_1$ ?

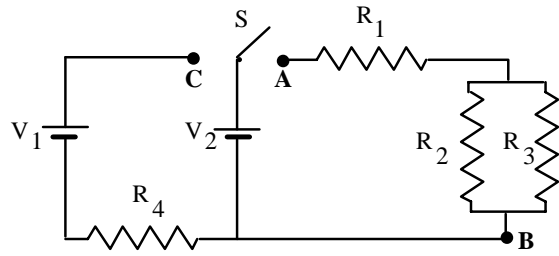
- c.(7 points) How much charge is stored on the other two capacitors?

3. The figure shows a circuit. The switch  $S$  can be closed on either point  $A$  or  $C$ , but not both at the same time. Use the following quantities:

$$V_1 = V_2 = 12 \text{ V}$$

$$R_1 = R_4 = 1.0 \ \Omega$$

$$R_2 = R_3 = 2.0 \ \Omega$$



- a.(5 points) What is the equivalent resistance between the points  $A$  and  $B$ ?

- b.(5 points) Determine the current through  $R_1$  when the switch  $S$  is closed on  $A$ .

- c.(5 points) At what rate is energy dissipated by  $R_1$  when the switch  $S$  is closed on  $A$ ?

- d.(5 points) Determine the current through  $R_4$  when the switch  $S$  is closed on  $C$ .