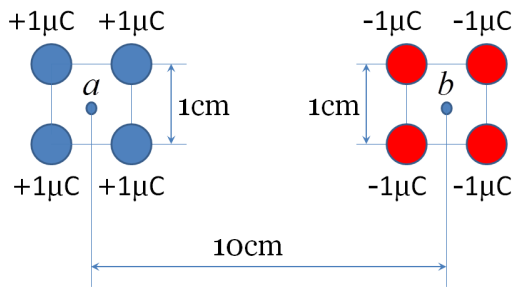


Physics 1214, Midterm I (9/17)

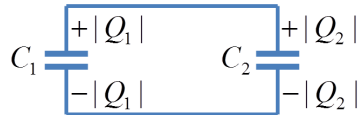
M1 The potential difference $V_a - V_b$ between points a and b is

- A. positive.
- B. negative.
- C. zero.



M2 Two capacitors are connected as shown below. The amount of charge Q_1 accumulated by capacitor 1 is two times larger than the amount of charge Q_2 accumulated by capacitor 2. What is the ratio of their capacitances C_1/C_2 ?

- A. $1/4$
- B. $1/2$
- C. 1
- D. 2
- E. 4
- F. neither of above



M3 Resistor 1 is made of a 1 m copper wire of diameter 1 mm. Resistor 2 is made of a 0.5 m copper wire of diameter 0.5 mm. What is the ratio of their resistances R_1/R_2 ?

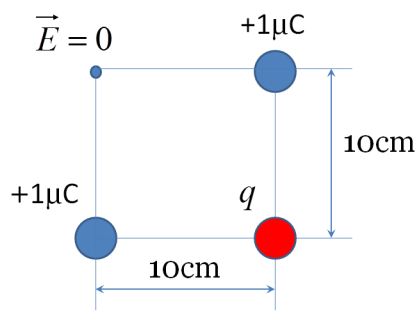
- A. $1/4$
- B. $1/2$
- C. 1
- D. 2
- E. 4
- F. neither of above

M4 A parallel-plate capacitor is charged, disconnected from the source, and immersed in distilled water (dielectric constant $K = 80$). The potential difference between the plates of the capacitor

- A. becomes $1/80$ of the charge source voltage.
- B. remains equal to the charge source voltage.
- C. becomes 80 times larger than the charge source voltage.

P1 What is the electric field energy density at a distance of 10 cm from a point charge of $+1 \mu\text{C}$?

P2 Two $+1 \mu\text{C}$ charges are placed at the corners of a square, as shown. If you want the electric field at the top left corner to be zero, what charge q must be placed at the bottom right corner?



P3 A heater coil connected to a standard $120\text{ V}_{\text{rms}}$ ac line has an average power of 900 W .
What is the heater coil resistance?

P4 Two charges of $+1 \mu\text{C}$ and $+3 \mu\text{C}$ are separated by a distance of 1 cm , as shown. What is the potential difference between points a and b ?

