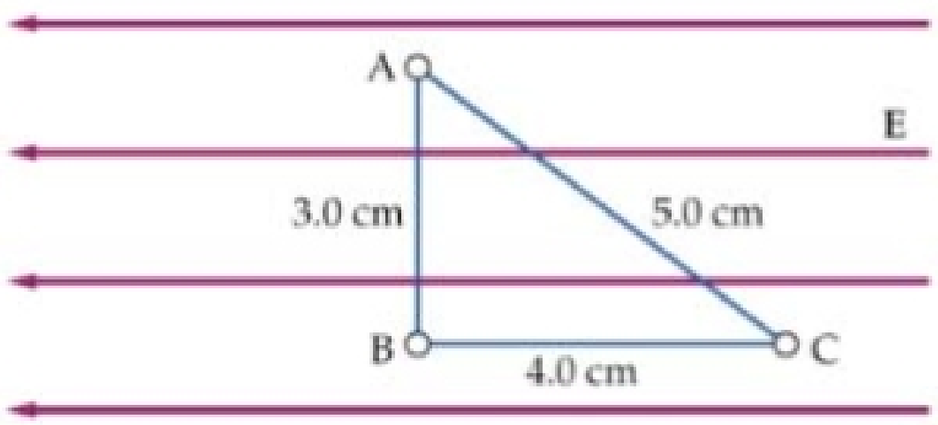
Exam 1 Review Problems

1. A point charge q= -8.0nC is located at the origin. Find the electric-field vector at the field point x=1.2 m, y=-1.6m.

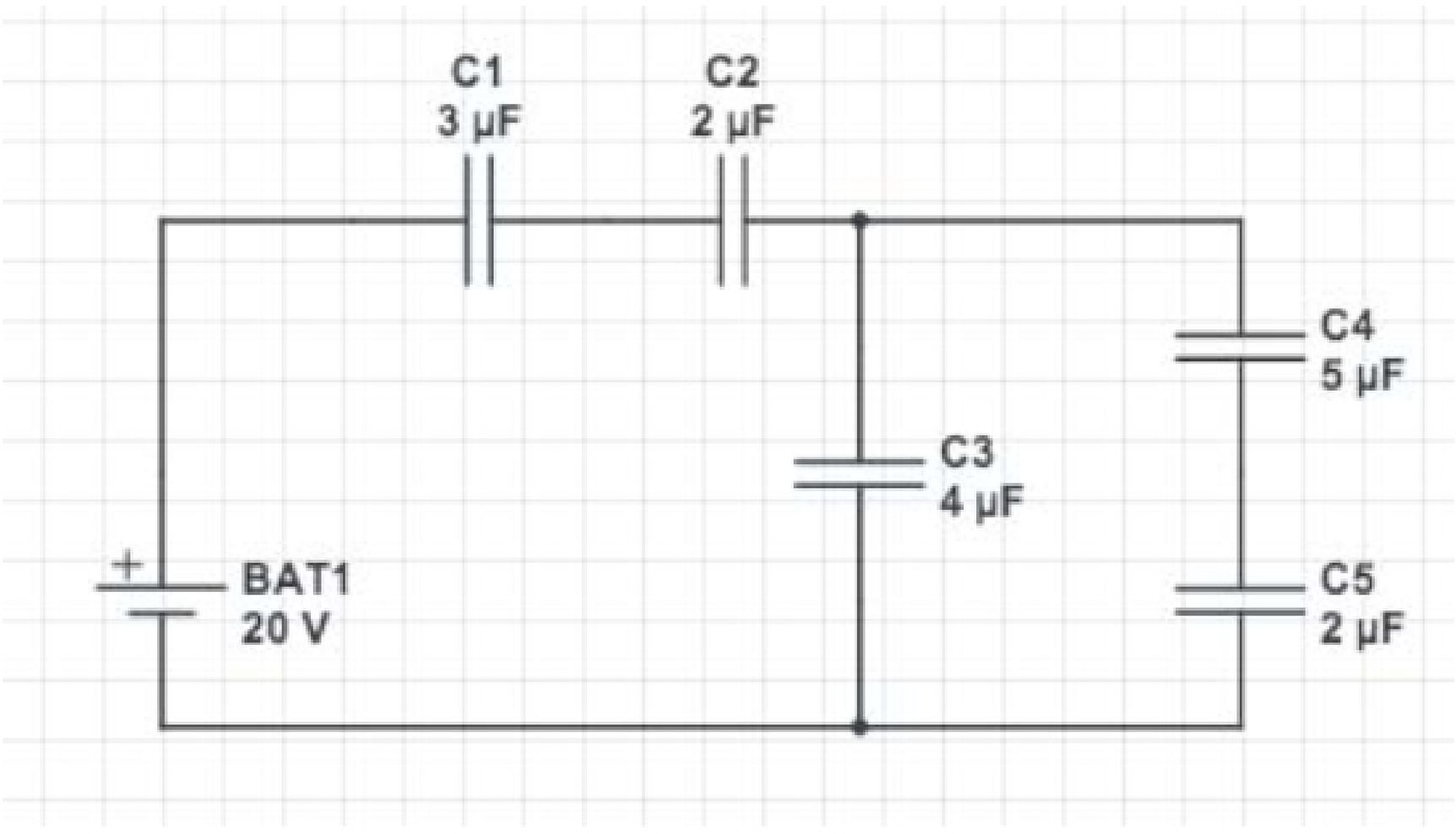
2. Three point charges are arranged on a line. Charge *q3*= +5.00 nC and is at the origin. Charge *q2*= -3.00 nC and is at x= +4.00 cm. Charge *q1* is at x= +2.00 cm. What is the magnitude and sign of *q1* if the net force on *q3* is zero?

3. An object with mass 2.0 ug and charge 5.0 nC and has a speed of 50 m/s at a point where the electric potential is 0 V. It moves to a point where the electric potential is 500 V. What is the speed at this point?

4. A uniform electric field of 1200 N/C points to the left as shown. What is the difference in potential between points 1) B and A; 2) B and C; 3) C and A

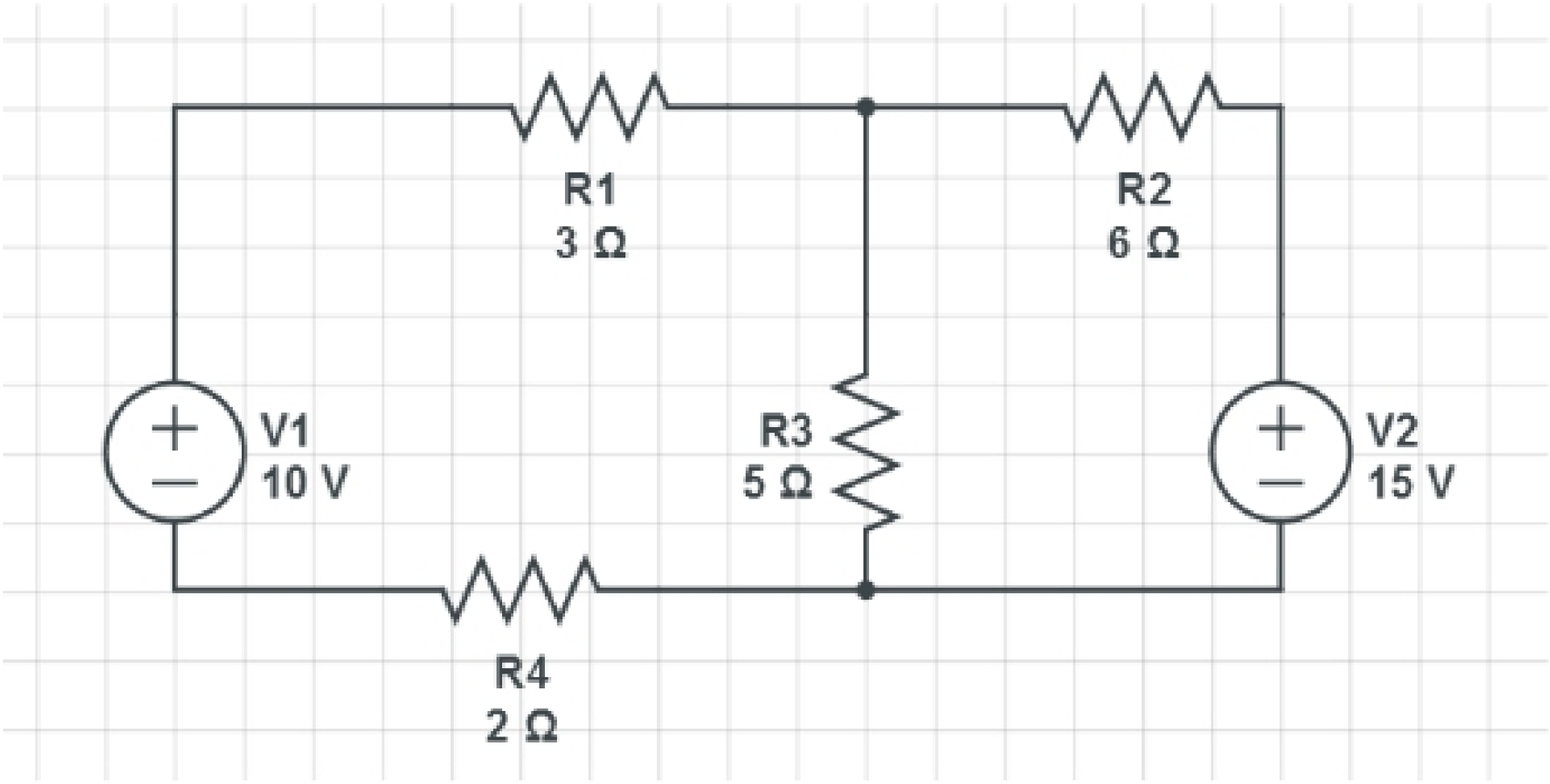


5. In the circuit below, C1=3 μF, C2= 2 μF, C3= 4 μF, C4= 5 μF, and C5=2 μF. What is the charge on C3?

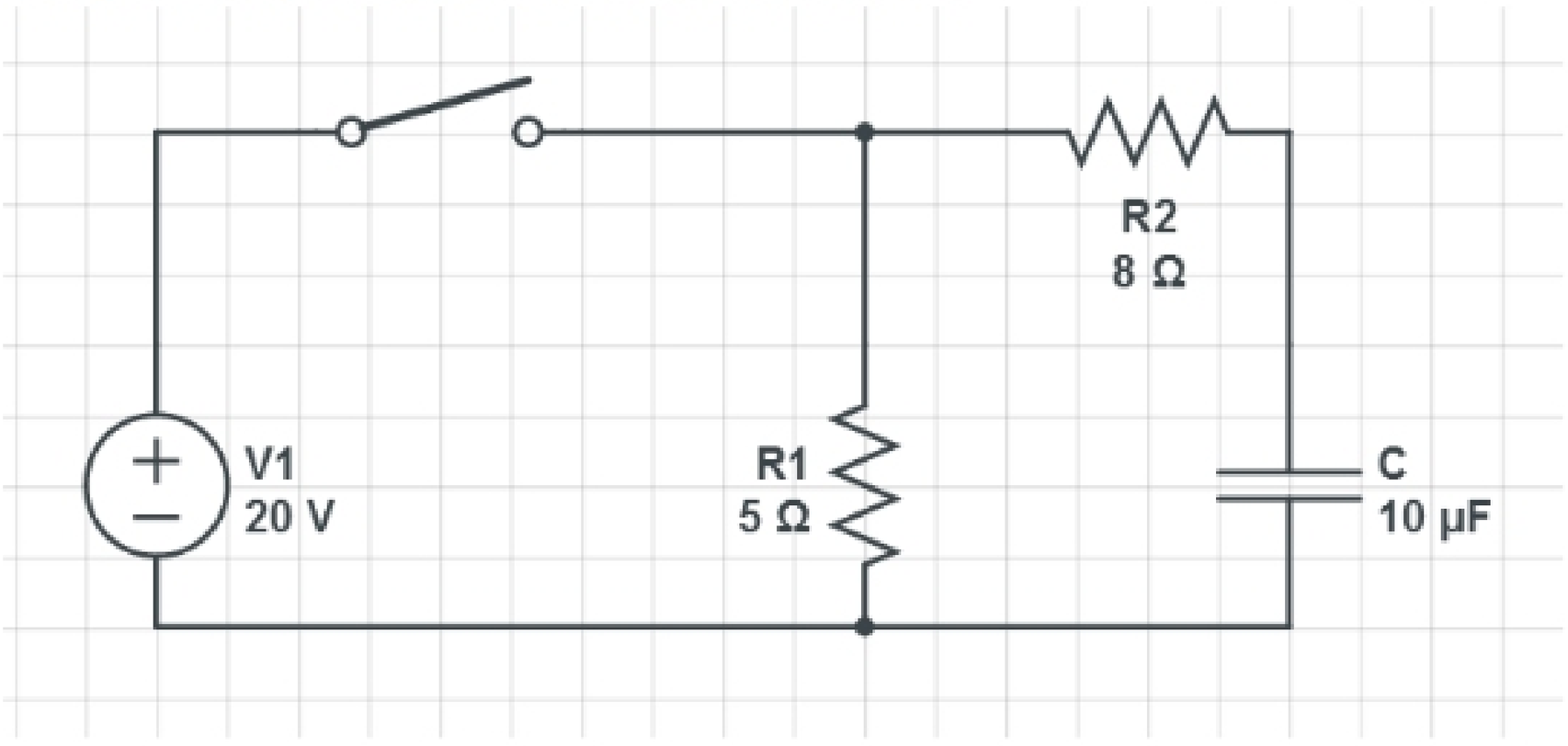


6. A 3 μF parallel plate capacitor is charged to a 100V battery, left connected. A piece of plastic with a dielectric constant κ =2 is inserted in the capacitor. What is the change in energy stored in the capacitor?

7. What are the currents through each of the four resistors in the circuits below?



For Question 8, refer to the circuit schematic below.



A.) The switch is closed and the capacitor begins charging. What is the current that is charging the capacitor at t=0?

B.) After the circuit has been closed for a long time, the switch is opened. What current goes through the two resistors?