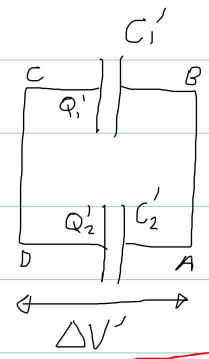
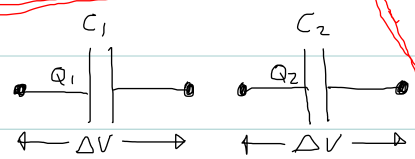
Ⓑ FINAL CONFIGURATION





Ⓐ CHARGING CONFIGURATION

TWO CAPACITORS OF CAPACITANCE C_1 AND C_2 ARE CHARGED BY [THE SAME] A [A BATTERY] POTENTIAL DIFFERENCE OF VOLTAGE ΔV AND HENCE ACQUIRE CHARGE OF [DIAGRAM Ⓐ] Q_1 AND Q_2. THE BATTERY THAT CHARGED THE CAPACITORS IS THEN REMOVED. THE CAPACITORS ARE THEN CONNECTED TO EACH OTHER AS IN DIAGRAM Ⓑ. WHAT IS THE VOLTAGE BETWEEN POINTS B AND C IN DIAGRAM Ⓑ? HENCE, WHAT IS THE NEW CHARGE ON EACH CAPACITOR Q_1' AND Q_2'?

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① VOLTAGE BETWEEN POINTS A AND B... (a) IF, IN DIAGRAM Ⓐ, THE CAPACITORS WERE CHARGED WITH THE SAME [BATTERY] POTENTIAL DIFFERENCE, AND $C_1 \neq C_2$, ARE THE CAPACITORS IN SERIES OR PARALLEL IN SITUATION Ⓑ? (b) IF THESE CAPACITORS ARE IN SERIES (OR PARALLEL) HOW DOES THE TOTAL CHARGE Q_{TOT}' RELATE TO Q_1' AND Q_2'? (c) IF THESE CAPACITORS ARE IN SERIES (OR PARALLEL) HOW DOES $\Delta V'$ RELATE TO $\Delta V_1'$ AND $\Delta V_2'$? (d) HOW DO C_1' AND C_2' RELATE TO C_1 AND C_2? DID WE CHANGE THE PHYSICAL CHARACTERISTICS OF THE CAPACITORS? (e) USING THE RELATIONSHIPS BETWEEN $\Delta V' = \frac{Q_{TOT}'}{C_{EQ}'}$ YOU HAVE DEVELOPED, DERIVE AN EXPRESSION FOR $V_B - V_C = \Delta V'$ IN TERMS OF C_1, C_2, Q, AND Q_2

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② CHARGE ON EACH CAPACITOR, Q_1' AND Q_2'

(a) HOW DOES Q_1' DEPEND ON C_1' AND $\Delta V'$? (b) GIVEN THAT $V_B - V_C = \Delta V'$, WHAT IS AN EXPRESSION FOR $V_A - V_D$? (c) HOW DOES Q_2' DEPEND ON C_2' AND $\Delta V'$?