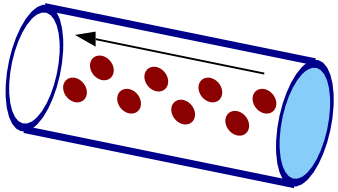
Warm Up Question 1

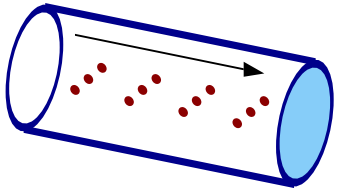
A capacitor is charged by a battery and is then disconnected from the battery, leaving the charge on its plates. The plates are then pulled further apart. Does this increase, decrease or leave the same the energy stored in the capacitor? Explain your answer.

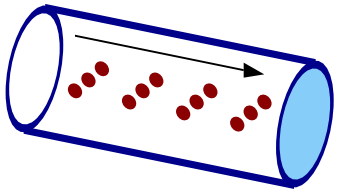
1. Decreases. Capacitance decreases and $U = \frac{1}{2}C(\Delta V)^2$.
2. Increases. Electric potential increases since $Q = C\Delta V$.
3. Stays constant. Charge stays constant.

Question 1

Charged particles pass along wires as illustrated. In each case, the number of charged particles that pass through the end of the wire is N, the charge of each particle is q and the time during which this is observed is Δt.

Case A  $N = 40 \quad q = -6\,\mathrm{C} \quad \Delta t = 4\,\mathrm{s}$

Case B  $N = 100 \quad q = 1\,\mathrm{C} \quad \Delta t = 4\,\mathrm{s}$

Case C  $N = 100 \quad q = 2\,\mathrm{C} \quad \Delta t = 4\,\mathrm{s}$

Rank the situations in order of magnitude of current through the shaded end of the wire.

1. $I_\mathrm{A} = I_\mathrm{B} = I_\mathrm{C}$
2. $I_\mathrm{A} > I_\mathrm{B} > I_\mathrm{C}$
3. $I_\mathrm{A} > I_\mathrm{C} > I_\mathrm{B}$
4. $I_\mathrm{B} > I_\mathrm{C} > I_\mathrm{A}$
5. $I_\mathrm{C} > I_\mathrm{B} > I_\mathrm{A}$

Warm Up Question 2

A wire is connected from the positive to the negative terminal of a battery. Will electrons flow from the positive to negative or from the negative to the positive? Which way will the current flow? Explain your answer.

1. Electrons: - to +. Current: - to +.
2. Electrons: - to +. Current: + to -.