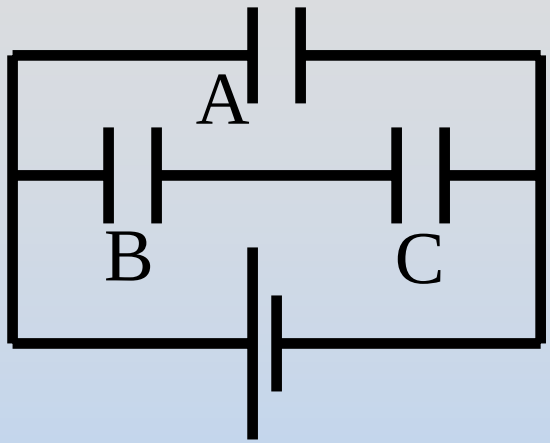
Concept Question: Capacitors

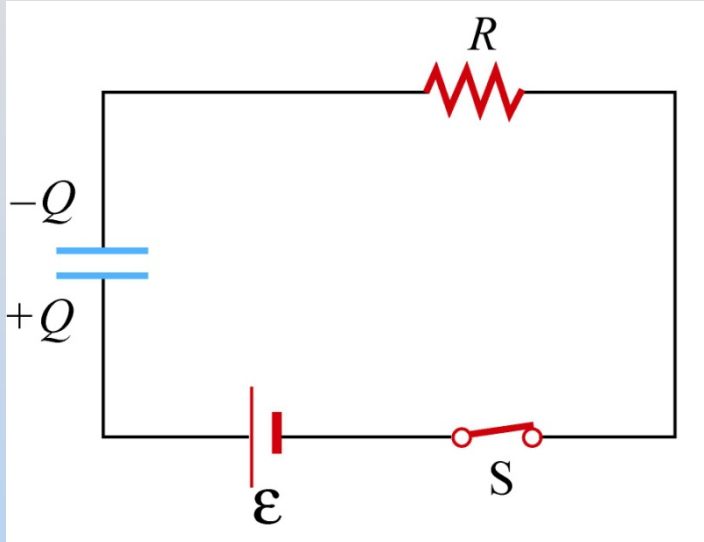
Three identical capacitors are connected to a battery. The battery is then disconnected. How do the charge on A, B & C compare before and after the battery is removed?



BEFORE;	AFTER
1. $Q_A = Q_B = Q_C$;	No Change
2. $Q_A = Q_B = Q_C$;	$Q_A > Q_B = Q_C$
3. $Q_A = Q_B = Q_C$;	$Q_A < Q_B = Q_C$
4. $Q_A > Q_B = Q_C$;	No Change
5. $Q_A > Q_B = Q_C$;	$Q_A = Q_B = Q_C$
6. $Q_A < Q_B = Q_C$;	No Change
7. $Q_A < Q_B = Q_C$;	$Q_A = Q_B = Q_C$

Concept Question: RC Circuit

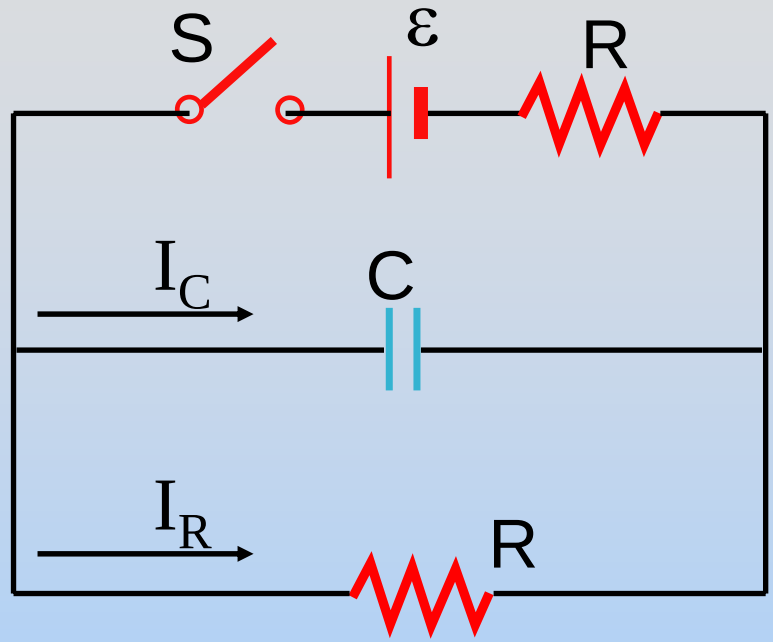
An uncharged capacitor is connected to a battery, resistor and switch. The switch is initially open but at t = 0 it is closed. A very long time after the switch is closed, the current in the circuit is



1. Nearly zero
2. At a maximum and decreasing
3. Nearly constant but non-zero
4. I don’t know

Concept Question: RC Circuit

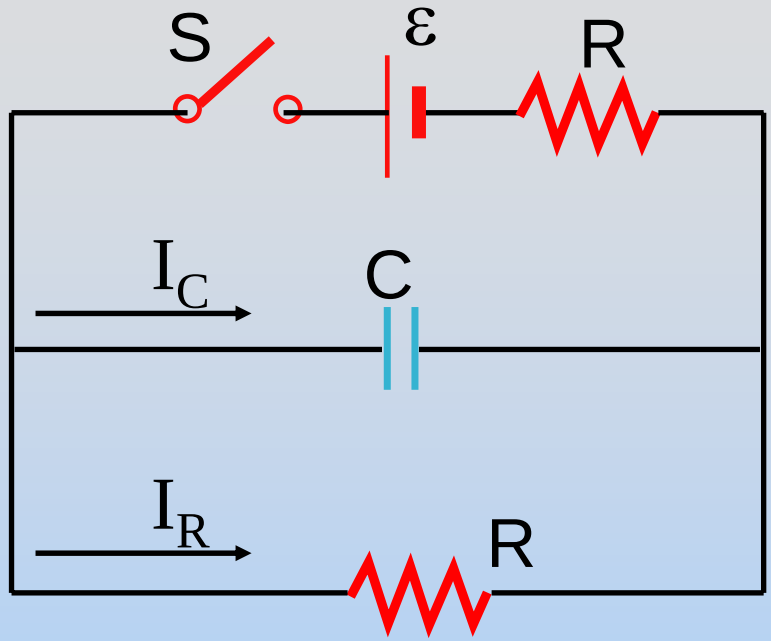
Consider the circuit at right, with an initially uncharged capacitor and two identical resistors. At the instant the switch is closed:



1. $I_R = I_C = 0$
2. $I_R = \varepsilon/2R$; $I_C = 0$
3. $I_R = 0$; $I_C = \varepsilon/R$
4. $I_R = \varepsilon/2R$; $I_C = \varepsilon/R$
5. I don't know

Concept Question: RC Circuit

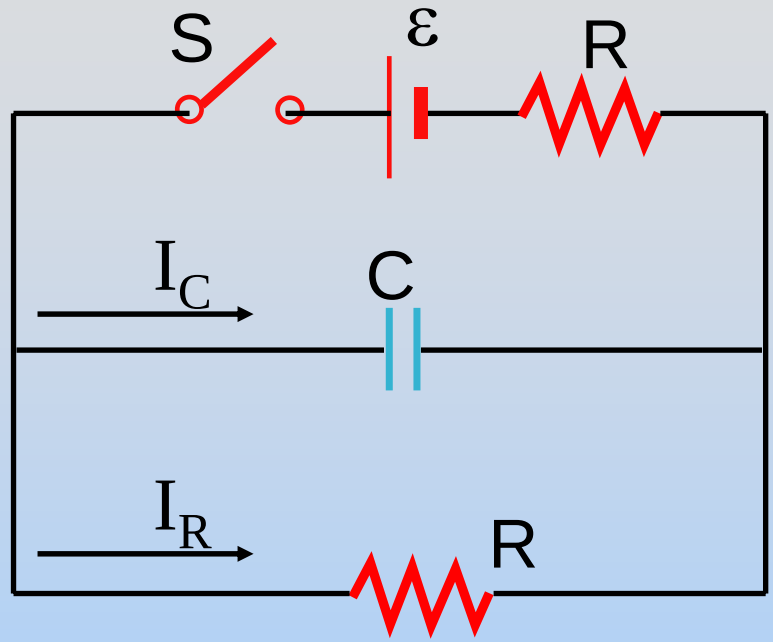
Now, after the switch has been closed for a very long time, it is opened. What happens to the current through the lower resistor?



1. It stays the same
2. Same magnitude, flips direction
3. It is cut in half, same direction
4. It is cut in half, flips direction
5. It doubles, same direction
6. It doubles, flips direction
7. None of the above

Concept Question: Current Thru Capacitor

In the circuit at right the switch is closed at $t = 0$. At $t = \infty$ (long after) the *current through the capacitor* will be:



1. $I_C = 0$
2. $I_C = \varepsilon / R$
3. $I_C = \varepsilon / 2R$
4. I don't know

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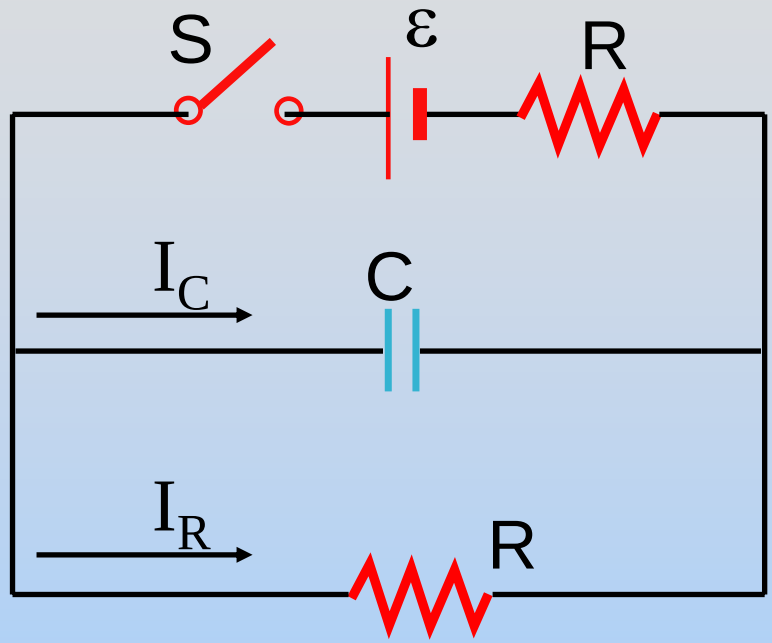
Concept Question: Current Thru Resistor

In the circuit at right the switch is closed at $t = 0$. At $t = \infty$ (long after) the *current through the lower resistor* will be:



1. $I_R = 0$
2. $I_R = \varepsilon / R$
3. $I_R = \varepsilon / 2R$
4. I don't know

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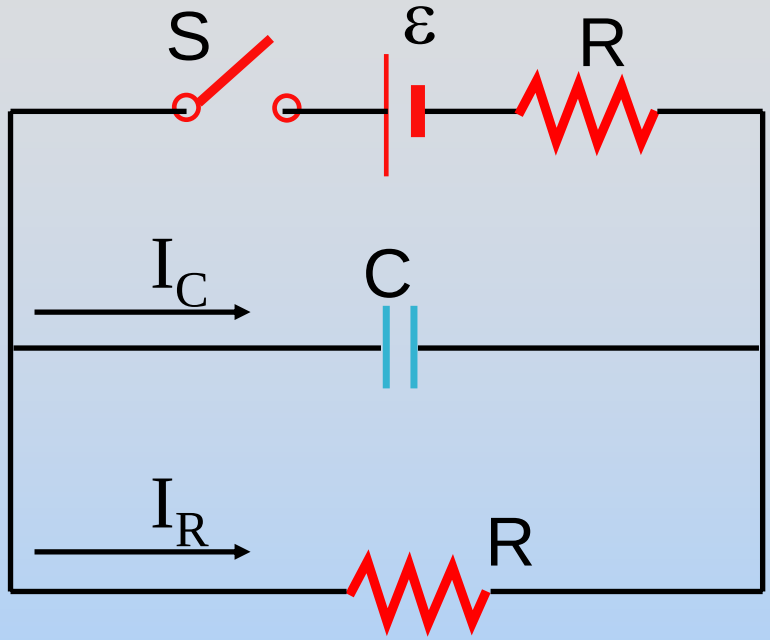
Concept Question: Opening Switch in RC Circuit

Now, after the switch has been closed for a very long time, it is opened. What happens to the current through the lower resistor?



1. It stays the same
2. Same magnitude, flips direction
3. It is cut in half, same direction
4. It is cut in half, flips direction
5. It doubles, same direction
6. It doubles, flips direction
7. None of the above.

Concept Question: Voltage/Current in RC

Starting from a point in time where the voltage across the battery (V_B) & across the capacitor (V_C) as well as the current (I) are all zero, what happens when the battery is 'turned on'?

1. I jumps up then decays as V_C rises
2. V_C jumps up then decays as I rises
3. I & V_C both jump up then decay
4. I & V_C both gradually rise
5. I don't know

8.02SC Physics II: Electricity and Magnetism

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