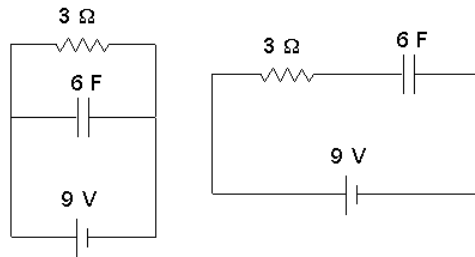


Just a little problem to warm you up for the exam. The circuits pictured below have been connected for long enough to be in static, unchanging states. Find the individual potential drops across the resistor and across the capacitor for both circuits. Explain your logic thoroughly.



First part sparse but okay, second part missing logic

Since the rules for series and parallel resistors are the same for capacitors in regard to potential drop, The potential drop for the series circuit would be 9 V for the resistor and 9 V for the cap. For the series circuit, the voltage drop across the resistor would be 4.5 V and 4.5 V for the capacitor for a total drop of 9 V .

Good thoughtful engagement with the problem

For the first circuit, the resistor, the capacitor, and the battery are in parallel so their voltage drops are equal at 9 V . However, once the capacitor is fully charged, wouldn't the flow of charges stop? I'm confused as to what happens when a resistor and a capacitor are connected.

For the second circuit, the resistor and the capacitor are in series so the current is continuous. The current through the resistor would be equal to V/R or $(9\text{ V})/(3\text{ ohms}) = 3\text{ A}$. However, overtime the capacitor stores the charges flowing through the wire until it reaches a voltage drop of 9 V and current is no longer flowing through the resistor.

Problem resolved completely

Circuit in Parallel:

Since both the resistor and capacitor are in parallel we know that the potential drop across both of them will be the same so the resistor has $V = 9$ and the capacitor has $V = 9$

Circuit in Series:

The circuits have been connected long enough so the capacitor has been fully charged. When the capacitor is fully charged there will no longer be any current into the positive or negative sides of the capacitor from the battery. This will result in no current moving through the resistor giving no potential drop. Since there is still a potential of 9 V so the capacitor would have to make up that drop. As a result, resistor has $V = 0$ and the capacitor has $V = 9$ (dp – missing units on final answers)