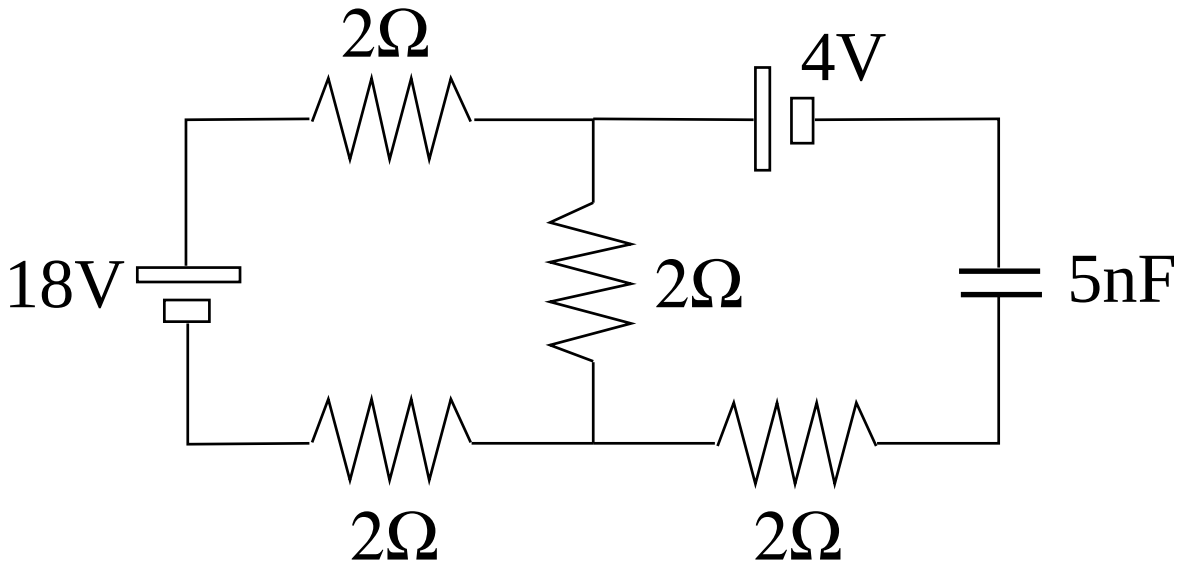
RC Circuit: Application (1)

This circuit has been running for a very long time.

(a) Find the current through the 18V battery.

(b) Find the total power dissipated in the resistors.

(c) Find the charge stored on the capacitor.



RC Circuit: Application (2)

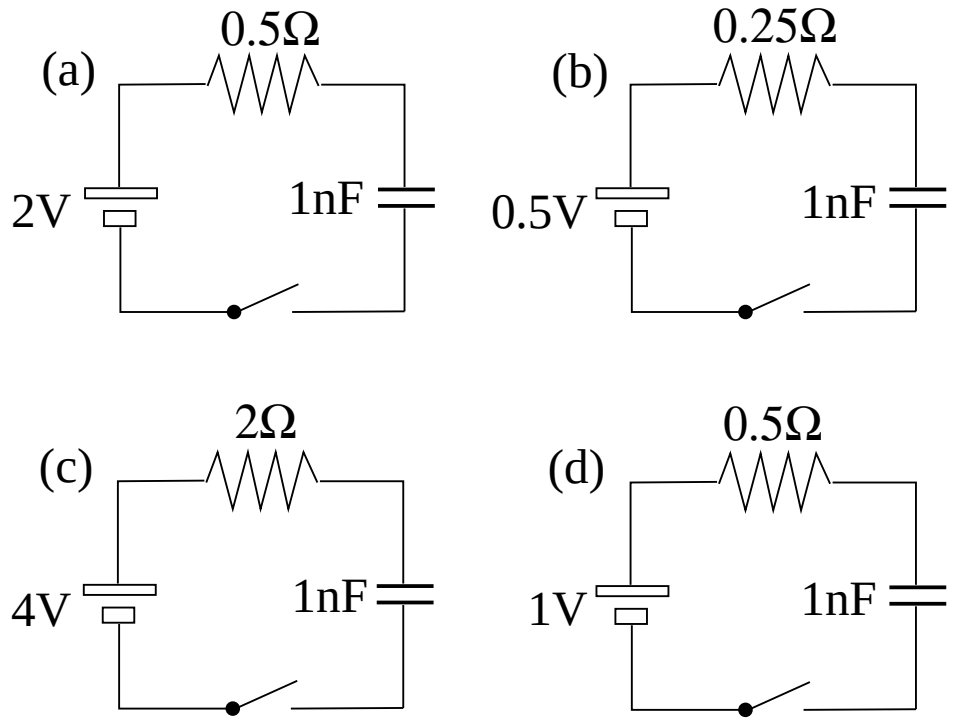
The switches are closed at $t = 0$. This begins the charging process in each RC circuit.

Name the circuit in which...

(a) the charge flows into the capacitor at the highest rate initially,

(b) the capacitor has the most charge ultimately,

(c) the capacitor is 90% full in the shortest time.



RC Circuit: Application (3)

At time $t = 0$ the capacitor in this circuit is discharged.

Find the current I_1

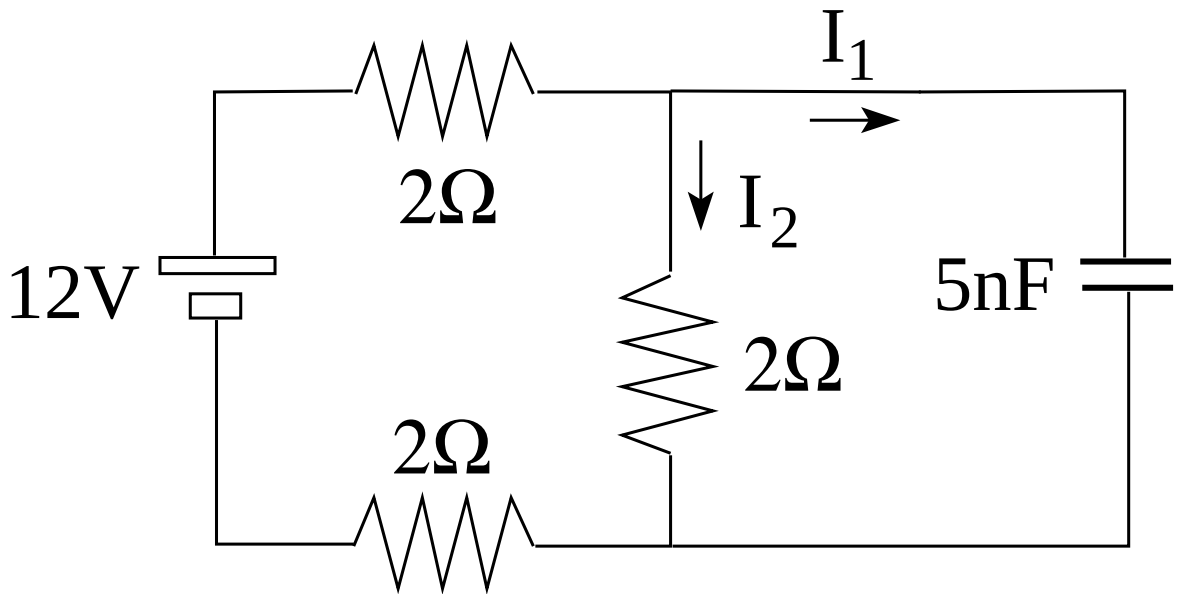
(a) at $t = 0$,

(b) at $t = \infty$.

Find the current I_2

(c) at $t = 0$,

(d) at $t = \infty$.

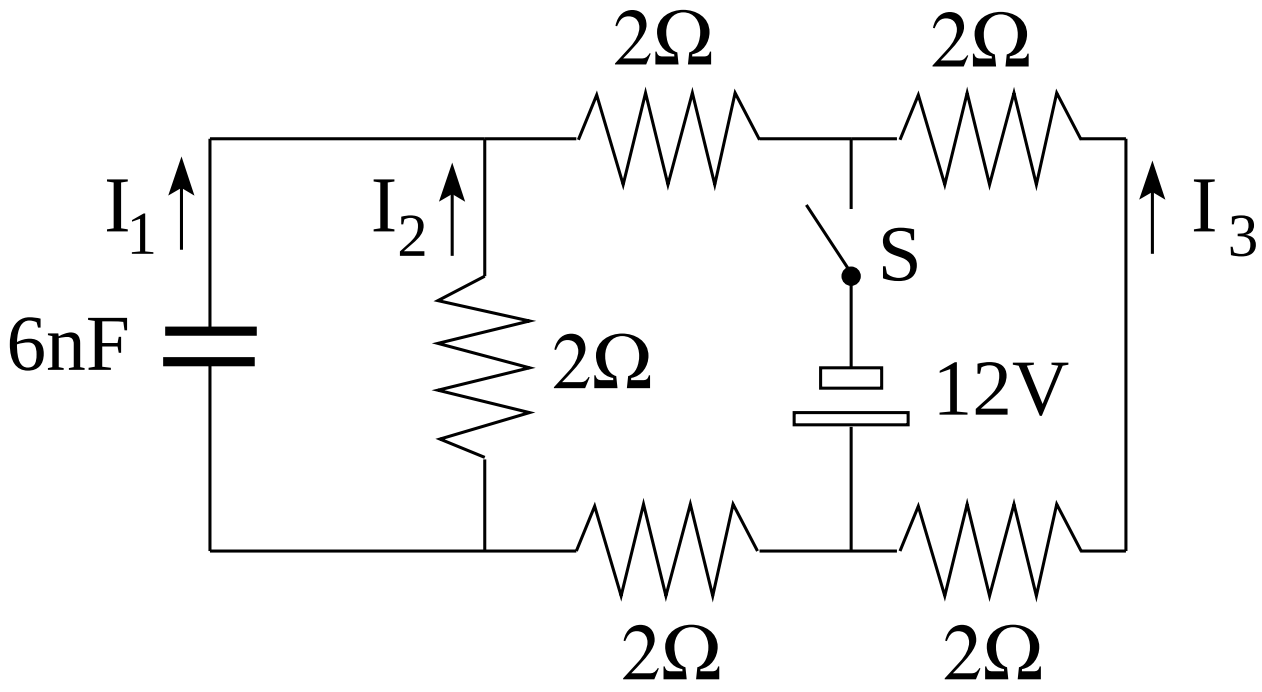


RC Circuit: Application (4)

In this 3-loop RC circuit, the switch S is closed at time $t = 0$.

(a) Find the currents I_1, I_2, I_3 just after the switch has been closed.

(b) Find the currents I_1, I_2, I_3 a very long time later.

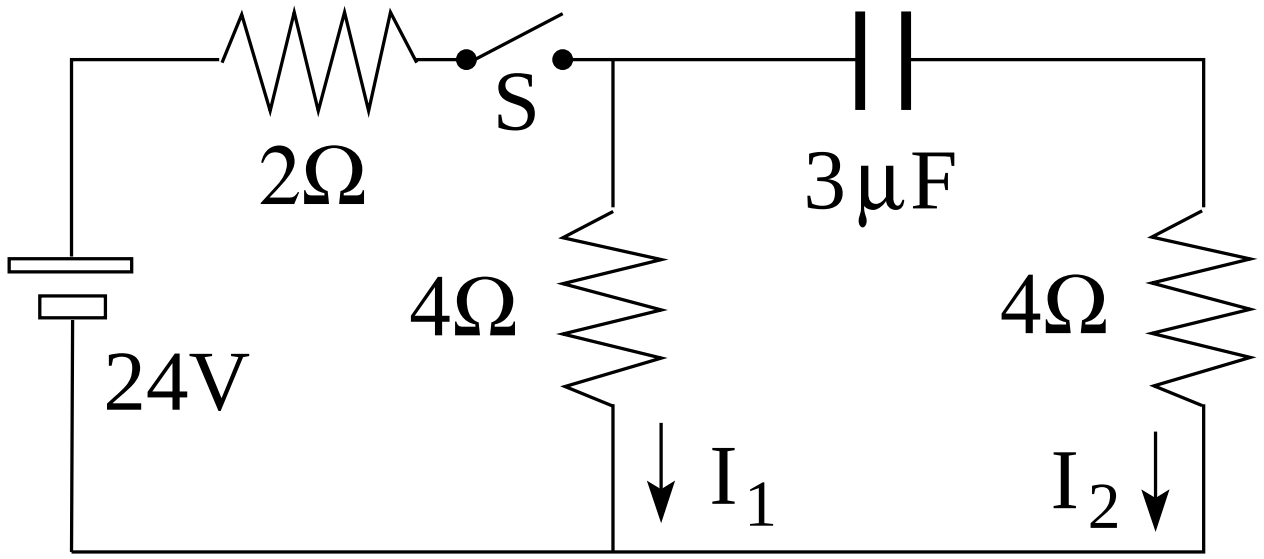


RC Circuit: Application (5)

In the RC circuit shown, the switch S has been open for a long time.

(a) Find the currents I_1 and I_2 immediately after the switch has been closed.

(b) Find the currents I_1 and I_2 a very long time later.



RC Circuit: Application (6)

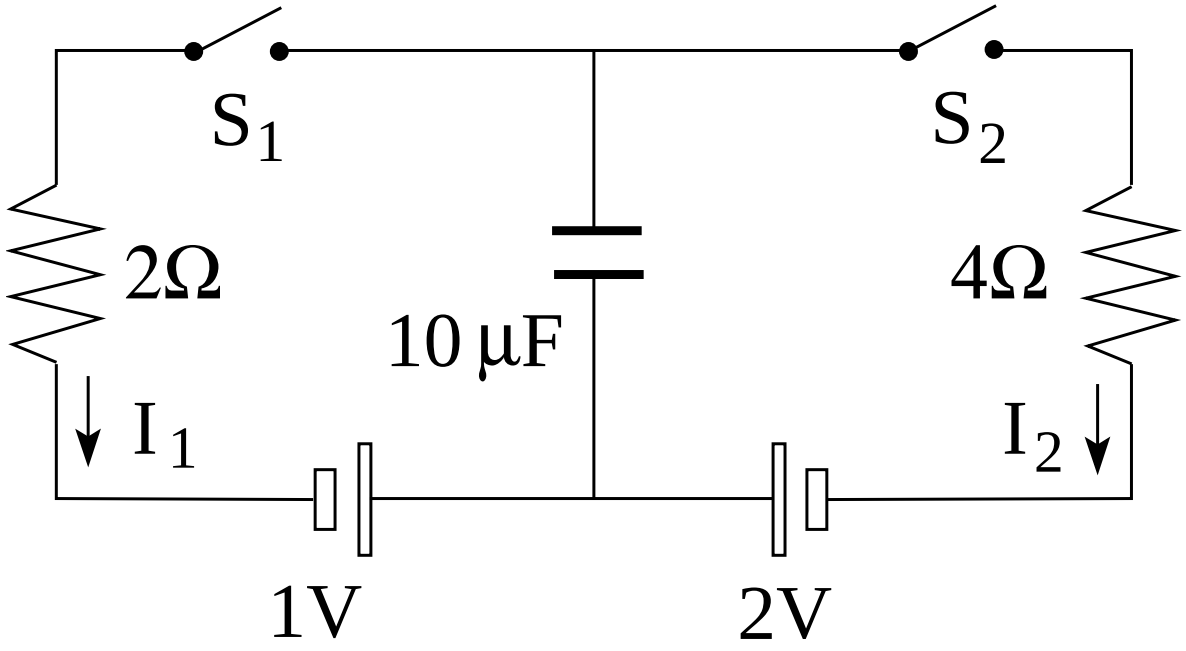
In the RC circuit shown, both switches are initially open and the capacitor is discharged.

(a) Close switch S_1 and find the currents I_1 and I_2 immediately afterwards.

(b) Find the currents $I_1 I_2$ and the charge Q on the capacitor a very long time later.

(c) Now close switch S_2 also and find the currents I_1 and I_2 immediately afterwards.

(d) Find the currents I_1, I_2 and the charge Q on the capacitor a very long time later.



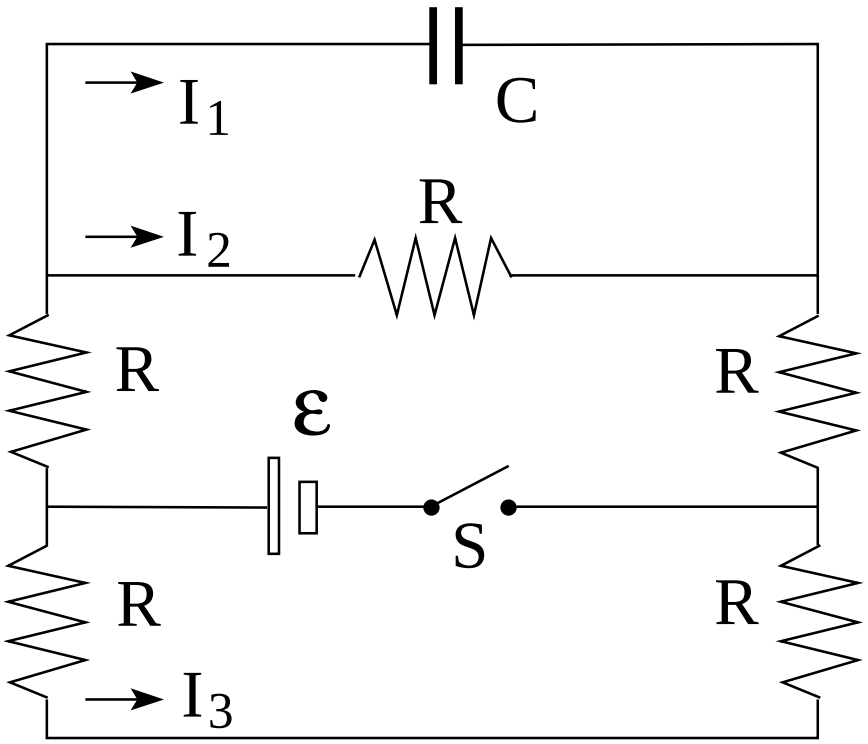
RC Circuit: Application (7)

In the RC circuit shown, the switch has been open for a long time.

Find the currents I_1, I_2, I_3 and the charge Q on the capacitor

(a) right after the switch has been closed,

(b) a very long time later.



$R = 2\Omega$

$C = 6\mu F$

$\varepsilon = 12V$

RC Circuit: Application (8)

The circuit shown is that of a flashing lamp, such as are attached to barrels at highway construction sites.

The power is supplied by a battery with $\mathcal{E} = 95V$. The fluorescent lamp L is connected in parallel to the capacitor with $C = 0.15\mu F$ of an RC circuit.

Current passes through the lamp only when the potential difference across it reaches the breakdown voltage $V_L = 72V$. In this event, the capacitor discharges through the lamp, and the lamp flashes briefly.

Suppose that two flashes per second are needed. What should the resistance R be?