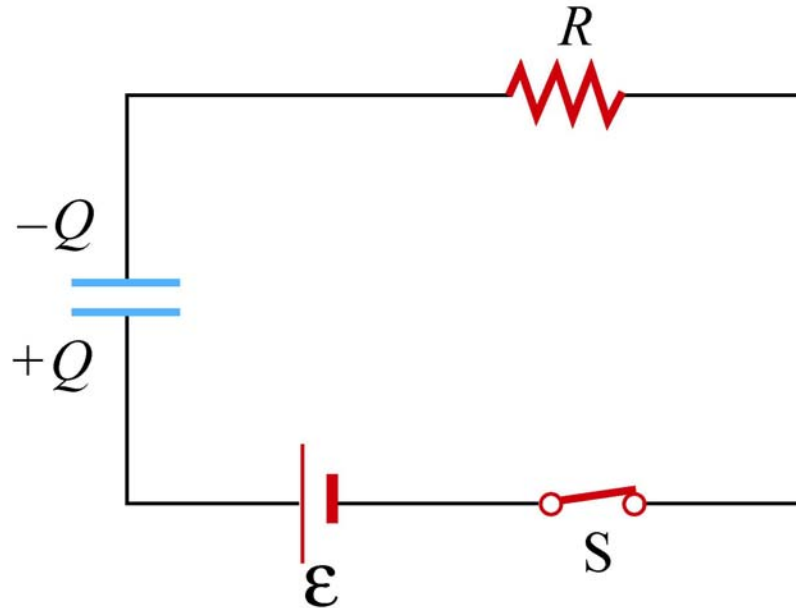


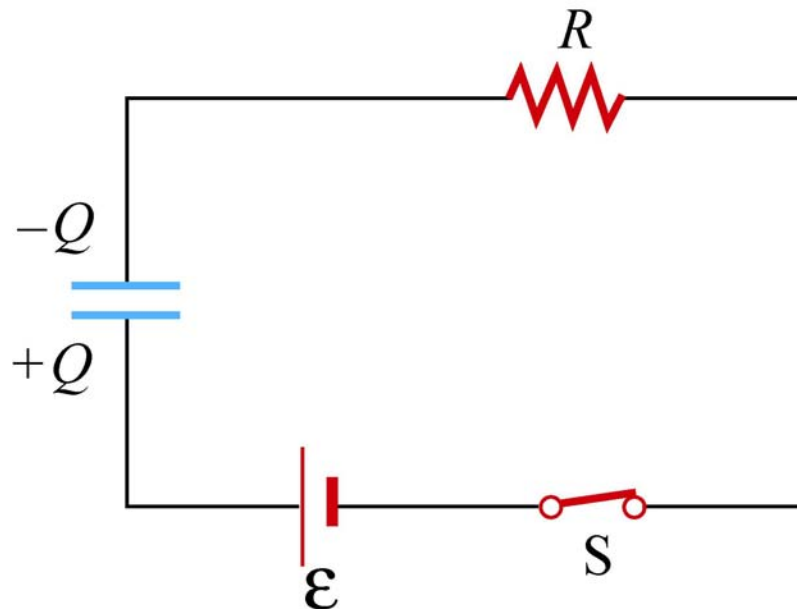
# RC Circuit



An uncharged capacitor is connected to a dc voltage source via a switch. A resistor is placed in series with the capacitor. The switch is initially open. At  $t = 0$ , the switch 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

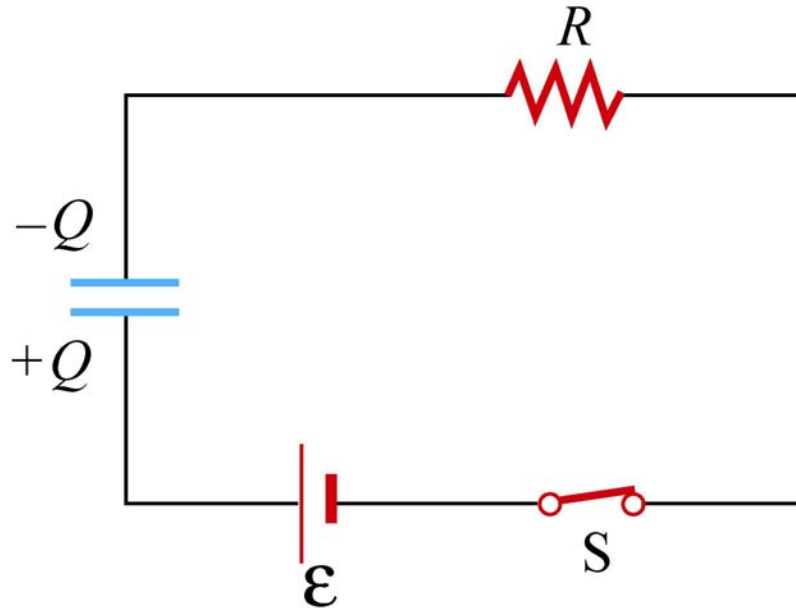
# RC Circuit



(1) After a long time the current is 0

Eventually the capacitor gets “full” – the voltage increase provided by the battery is equal to the voltage drop across the capacitor. The voltage drop across the resistor at this point is 0 – no current is flowing.

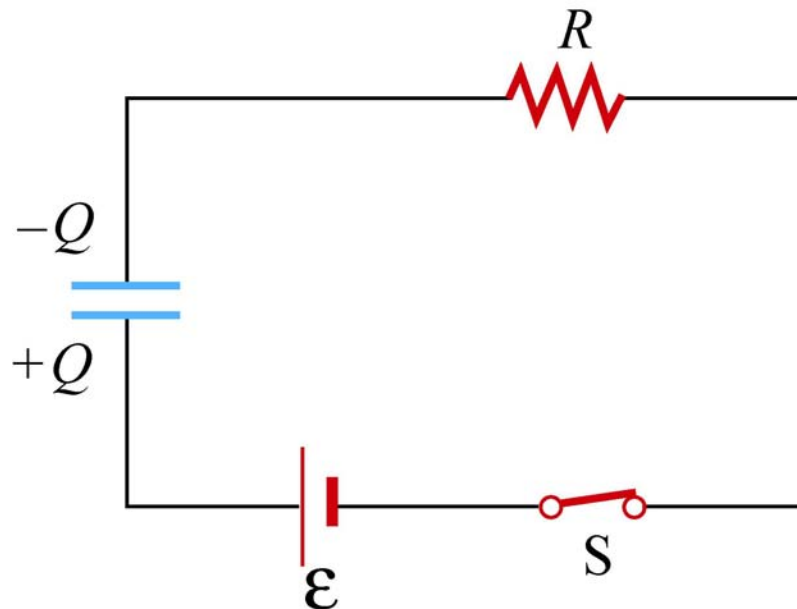
# RC Circuit



An uncharged capacitor is connected to a dc voltage source via a switch. A resistor is placed in series with the capacitor. The switch is initially open. At  $t = 0$ , the switch is closed. Just after the switch is closed, the current in the circuit is

1. zero and increasing
2. at a maximum and decreasing
3. constant but non-zero

# RC Circuit

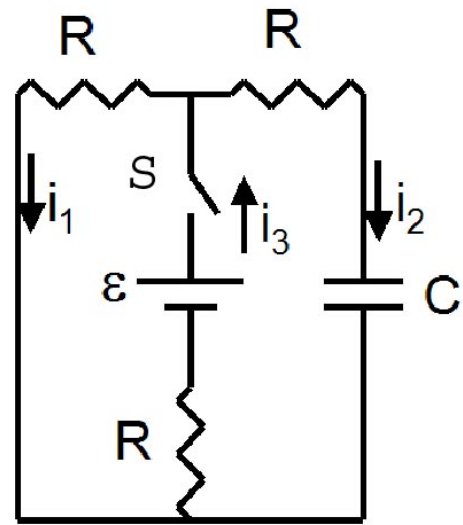


(2) at a maximum and decreasing

Initially there is no charge on the capacitor and hence no voltage drop across it. All of the potential drop is across the resistor – maximum current. As charge builds up on the capacitor the current will “slow down” – there will be a smaller drop across the resistor and hence less current.

## MULTILOOP CIRCUIT WITH CAPACITOR

An uncharged capacitor is connected to a dc voltage source in the circuit shown. The switch is initially open. At  $t = 0$ , the switch is closed. A *long time after* the switch  $S$  is closed, the current  $i_3$  is



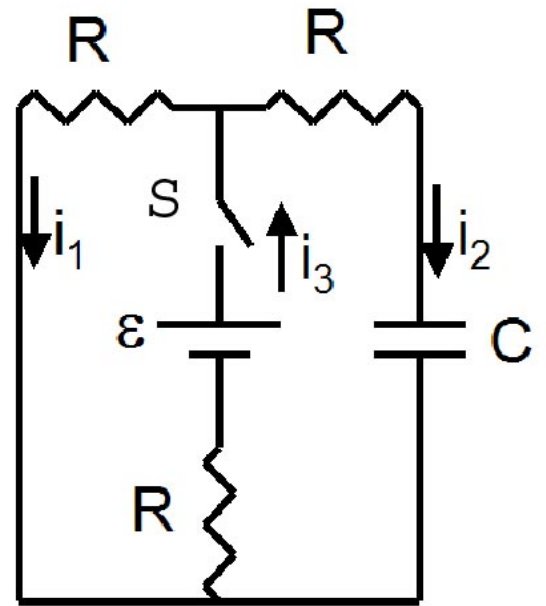
- 1)  $\epsilon / 3R$
- 2)  $\epsilon / 2R$
- 3)  $3\epsilon / 2R$
- 4)  $2\epsilon / 3R$
- 5) Don't Know

## MULTILOOP CIRCUIT WITH CAPACITOR

A long time after the switch  $S$  is closed, the current

$i_3$  is

$$2) \quad \varepsilon / 2R$$



After a long time the capacitor is fully charged and no current flows through it. Then we simply have a one loop circuit on the left with a total resistance of  $2R$ .