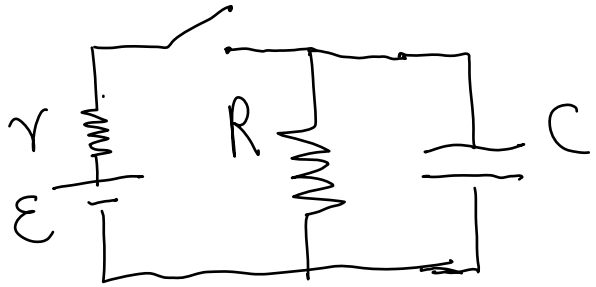
Problem 1

In the figure below, let $\varepsilon = 12$ V, $r = 2\ \Omega$, $R = 6\ \Omega$, and $C = 4.5\ \mu$F. The capacitor is uncharged initially. The switch is connected at $t = 0$. (a) At $t = 0^+$ find the initial current through each resistor and the charge on the capacitor. (b) Find the current through each resistor and the charge on the capacitor a long time after the battery is connected to the circuit.

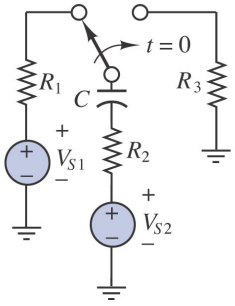


Problem 2
Ch. 26, #44

Problem 3
Ch. 26, #46

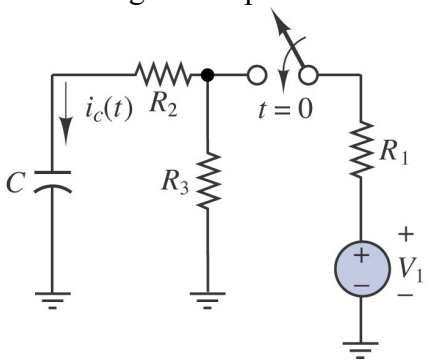
Problem 4
Ch. 26, #49

Problem 5
At $t < 0$, the circuit shown in the Figure below is at steady sate. The switch is changed as shown at $t = 0$.
$V_{S1} = 35$ V, $V_{S2} = 130$ V, $C = 11\ \mu$F, $R_1 = 17\ k\Omega$, $R_2 = 7\ k\Omega$, and $R_3 = 23\ k\Omega$.
Determine at $t = 0^+$ the initial current through R_3 just after the switch is changed.



Problem 6

Steady-state conditions exist in the circuit shown below at $t < 0$. The switch is closed at $t = 0$. $V_1 = 12$ V, $R_1 = 0.68$ kΩ, $R_2 = 2.2$ kΩ, $R_3 = 1.8$ kΩ, $C = 0.47$ μF. Determine the current through the capacitor at $t = 0^+$, just after the switch is closed.



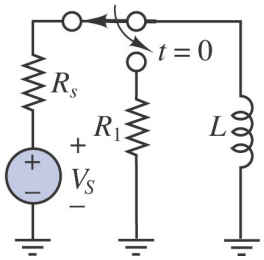
Problem 7

Ch. 26, #89

Problem 8

Determine the voltage across the inductor just before and just after the switch is changed in the figure below. Assume steady-state conditions exist for $t < 0$.

$V_S = 12$ V, $R_S = 0.7$ Ω, $R_1 = 22$ kΩ, and $L = 100$ mH.



Problem 9

The circuit in the figure below is a simple model of an automotive ignition system. The switch models the "points" that switch electric power to the cylinder when the fuel-air mixture is compressed. And R is the resistance between the electrodes (i.e., the "gap") of the spark plug. $V_G = 12$ V, $R_G = 0.37$ Ω, and $R = 1.7$ kΩ.

Determine the value of L and R_1 so that the voltage across the spark plug gap just after the switch is changed is 23 kV and so that this voltage will change exponentially with a time constant $\tau = 13$ ms.