

70. In the steady state situation, the capacitor voltage will equal the voltage across the $15\text{ k}\Omega$ resistor:

$$V_0 = (15\text{ k}\Omega) \left(\frac{20\text{ V}}{10\text{ k}\Omega + 15\text{ k}\Omega} \right) = 12\text{ V} .$$

Now, multiplying Eq. 28-36 by the capacitance leads to $V = V_0 e^{-t/RC}$ describing the voltage across the capacitor (and across the $R = 15\text{ k}\Omega$ resistor) after the switch is opened (at $t = 0$). Thus, with $t = 0.00400\text{ s}$, we obtain

$$V = (12)e^{-0.004/(15000)(0.4 \times 10^{-6})} = 6.16\text{ V} .$$

Therefore, using Ohm's law, the current through the $15\text{ k}\Omega$ resistor is $6.16/15000 = 4.11 \times 10^{-4}\text{ A}$.