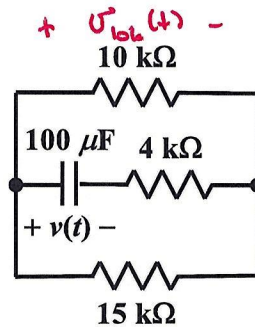


Homework Problem #067



Given $v(0) = 100\text{ V}$, determine $v(t)$ and the power absorbed by the $4\text{ k}\Omega$ resistor for $t \geq 0$.

$$\begin{aligned} R_{eq} &= 4\text{ k}\Omega + (10\text{ k}\Omega \parallel 15\text{ k}\Omega) \\ &= 4\text{ k}\Omega + 6\text{ k}\Omega \\ &= 10\text{ k}\Omega \end{aligned}$$

$$\begin{aligned} \tau &= R_{eq} C = (10\text{ k}\Omega)(100\ \mu\text{F}) \\ &= 1\text{ s} \end{aligned}$$

$$v(t) = v(0) e^{-t/\tau} = 100 e^{-t} \text{ V}$$

$$v_{4k\Omega}(t) = \frac{4}{10} v(t) = 40 e^{-t} \text{ V}$$

$$\begin{aligned} p_{10k\Omega}(t) &= \frac{(40 e^{-t} \text{ V})^2}{4\text{ k}\Omega} \\ &= 400 e^{-2t} \text{ mW} \end{aligned}$$