

13.46 In the circuit in Fig. P13.46, the switch moves from position 1 to position 2 at $t = 0$. Use Laplace transforms to find $v(t)$ for $t > 0$. **PSV**

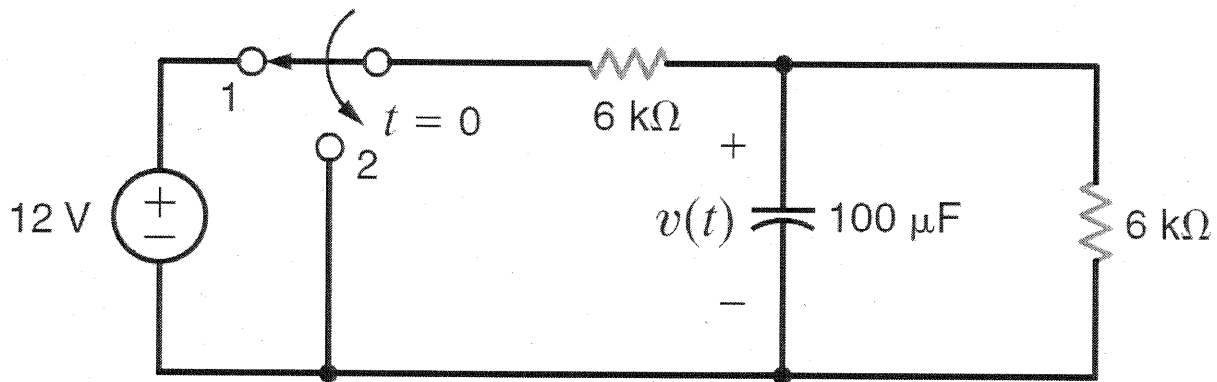


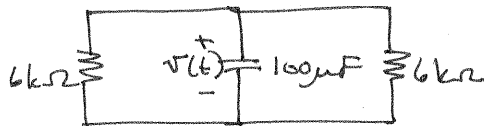
Figure P13.46

SOLUTION:

for $t < 0$,

$$v(0^-) = \frac{12(6k)}{6k+6k} = 6V$$

for $t > 0$



$$\frac{v(t)}{6000} + \frac{v(t)}{6000} + 10^{-4} \frac{dv}{dt} - 10^{-4} v(0^-) = 0$$

$$v(t) + v(t) + 0.6 \frac{dv}{dt} = 0.6(6) = 3.6$$

$$V(s) [0.6s + 2] = 3.6 \Rightarrow V(s) = \frac{6}{s + 10/3}$$

$$v(t) = 6e^{-3.33t} u(t)$$