

Determine  $v$  and  $i$  for  $t > 0$  in the circuit of Fig. 8.28. (See comments about current sources in Practice Prob. 7.5.)

Answer:  $20(1 - e^{-5t})$  V,  $5(1 - e^{-5t})$  A.

② natural response:

$$\begin{cases} i = -\frac{1}{20} v' \\ 2i' + 4i = -10i + v \end{cases} \Rightarrow v'' + 7v' + 10v = 0 \Rightarrow \begin{cases} s_1 = -2 \\ s_2 = -5 \end{cases}$$

③ complete response:  $v(t) = Ae^{-2t} + Be^{-5t} + 20$

$$\text{④ solve for } A \text{ \& } B: \begin{cases} A + B + 20 = 0 \\ -2A - 5B = 100 \end{cases} \Rightarrow \begin{cases} A = 0 \\ B = -20 \end{cases} \Rightarrow v = 20(1 - e^{-5t}) \text{ V, } t > 0$$

### Practice Problem 8.9

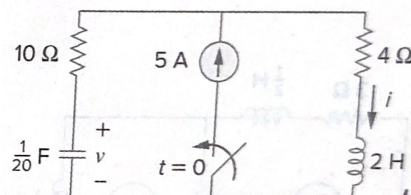


Figure 8.28

For Practice Prob. 8.9.

$$\begin{aligned} \text{⑤ } i &= 5 - \frac{1}{20} v' \\ &= 5(1 - e^{-5t}) \text{ A} \quad t > 0 \end{aligned}$$