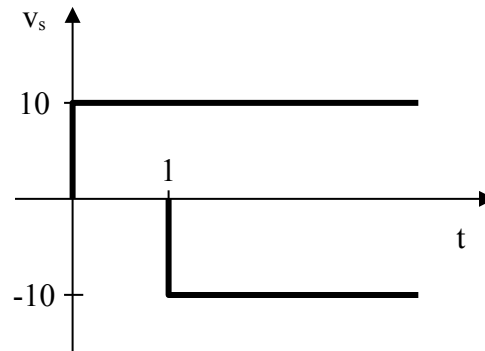


### Chapter 7, Solution 65.

Since  $v_s = 10[u(t) - u(t - 1)]$ , this is the same as saying that a 10 V source is turned on at  $t = 0$  and a -10 V source is turned on later at  $t = 1$ . This is shown in the figure below.



$$\text{For } 0 < t < 1, \quad i(0) = 0, \quad i(\infty) = \frac{10}{5} = 2$$

$$R_{th} = 5 \parallel 20 = 4, \quad \tau = \frac{L}{R_{th}} = \frac{2}{4} = \frac{1}{2}$$

$$i(t) = i(\infty) + [i(0) - i(\infty)]e^{-t/\tau}$$

$$i(t) = 2(1 - e^{-2t}) \text{ A}$$

$$i(1) = 2(1 - e^{-2}) = 1.729$$

$$\text{For } t > 1, \quad i(\infty) = 0 \quad \text{since } v_s = 0$$

$$i(t) = i(1)e^{-(t-1)/\tau}$$

$$i(t) = 1.729e^{-2(t-1)} \text{ A}$$

Thus,

$$i(t) = \begin{cases} 2(1 - e^{-2t}) \text{ A} & 0 < t < 1 \\ 1.729e^{-2(t-1)} \text{ A} & t > 1 \end{cases}$$