14.4 Use Laplace transforms to find $v(t)$ for $t > 0$ in the network shown in Fig. P14.4. Assume zero initial conditions.

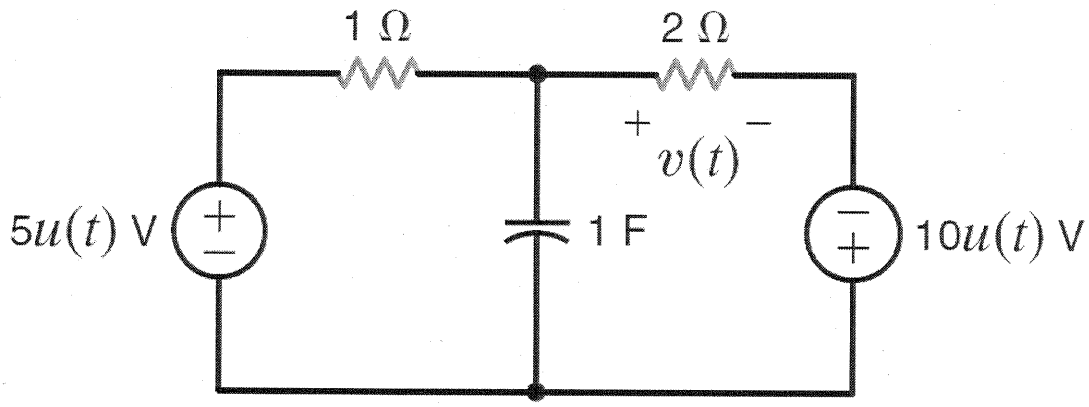
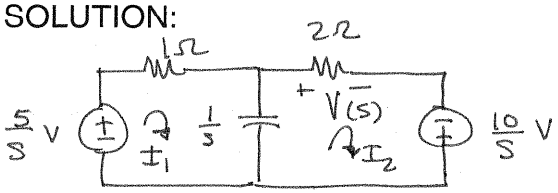


Figure P14.4

SOLUTION:



$$\frac{5}{s} = I_1(s)\left[1 + \frac{1}{s}\right] - I_2(s)\left(\frac{1}{s}\right)$$

$$\frac{10}{s} = -I_1(s)\left(\frac{1}{s}\right) + I_2(s)\left[2 + \frac{1}{s}\right]$$

or,

$$5 = I_1(s+1) - I_2$$

$$10 = -I_1 + I_2(2s+1)$$

$$I_1 = 5/s$$

$$I_2 = 5/s$$

$$V(s) = 2I_2(s) = \frac{10}{s}$$

$$\boxed{v(t) = 10\,u(t)}$$