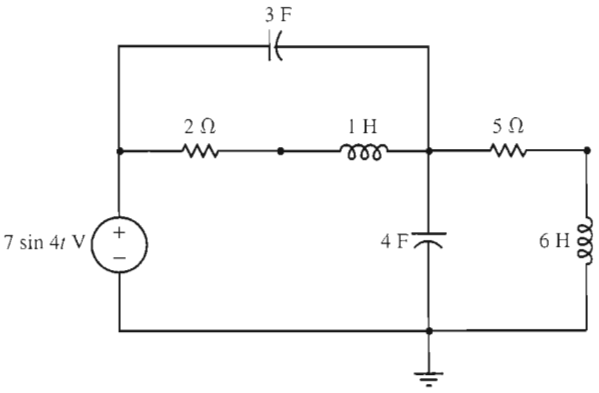

Fig. P3.26

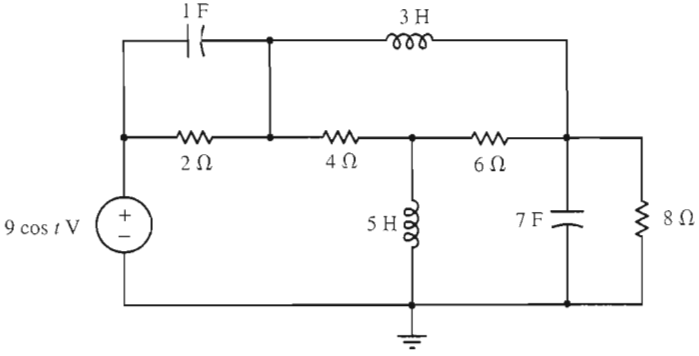

Fig. P3.27

3.29 For the circuit shown in Fig. P3.28, replace the capacitor with a 5-H inductor. For the resulting circuit, the switch opens at time $t = 0$ s. Write a differential equation in $i(t)$ for $t \geq 0$ s. Find $i(t)$ and $v(t)$ for all time and sketch these functions.

3.30 For the circuit shown in Fig. P3.30, suppose that $i_s(t) = 10$ A for $t < 0$ s and $i_s(t) = 0$ A for $t \geq 0$ s. Write a differential equation in $i(t)$ for $t \geq 0$ s. Find $i(t)$ and $v(t)$ for all time and sketch these functions.

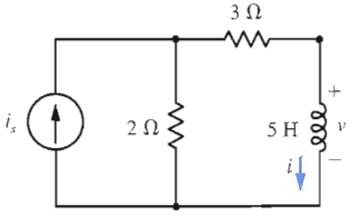

Fig. P3.30

3.31 For the circuit shown in Fig. P3.30, replace the inductor with a 0.1-F capacitor. Suppose that $i_s(t) = 10$ A for $t < 0$ s and $i_s(t) = 0$ A for $t \geq 0$ s. Write a differential equation in $v(t)$ for $t \geq 0$ s. Find $v(t)$ and $i(t)$ for all time and sketch these functions.

3.32 For the circuit shown in Fig. P3.32, suppose that $v_s(t) = 18$ V for $t < 0$ s and $v_s(t) = 0$ V for $t \geq 0$ s. Write a differential equation in $i(t)$ for $t \geq 0$ s. Find $i(t)$ and $v(t)$ for all time and sketch these functions.

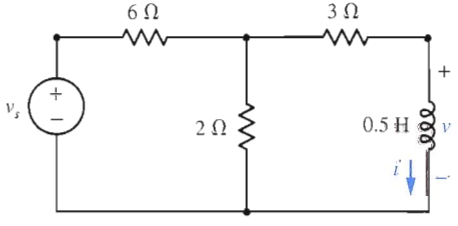

Fig. P3.32

3.33 For the circuit shown in Fig. P3.32, replace the inductor with a $\frac{1}{9}$-F capacitor. Suppose that $v_s(t) = 18$ V for $t < 0$ s and $v_s(t) = 0$ V for $t \geq 0$ s. Write a differential equation in $v(t)$ for $t \geq 0$ s. Find $v(t)$ and $i(t)$ for all time and sketch these functions.

3.34 For the circuit shown in Fig. P3.34, suppose that $v_s(t) = 12$ V for $t < 0$ s and $v_s(t) = 0$ V for $t \geq 0$ s. Write a differential equation in $v(t)$ for $t \geq 0$ s. Find $v(t)$ and $i(t)$ for all time and sketch these functions.

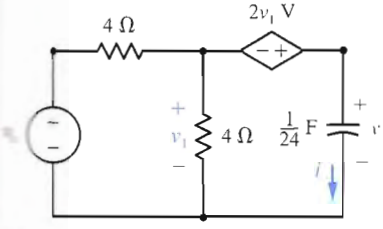

Fig. P3.34

3.35 For the circuit shown in Fig. P3.34, replace the capacitor with a 3-H inductor. Suppose that $v_s(t) = 12$ V for $t < 0$ s and $v_s(t) = 0$ V for $t \geq 0$ s. Write a differential equation in $i(t)$ for $t \geq 0$ s. Find $i(t)$ and $v(t)$ for all time and sketch these functions.

3.36 For the circuit shown in Fig. P3.36, the switch opens at time $t = 0$ s. Write a differential equation in $i(t)$ for $t \geq 0$ s. Find $i(t)$ and $v(t)$ for all time and sketch these functions.

3.37 For the circuit shown in Fig. P3.36, replace the inductor with a $\frac{1}{8}$-F capacitor. For the resulting circuit, the switch opens at time $t = 0$ s. Write a differential equation in $v(t)$ for $t \geq 0$ s. Find $v(t)$ and $i(t)$ for all time and sketch these functions.

3.38 For the circuit shown in Fig. P3.38, the switch opens at time $t = 0$ s. Find $v_1(t)$, $v_2(t)$, $i_1(t)$, $i_2(t)$, and $v(t)$ for all time.

3.39 For the circuit shown in Fig. P3.38, change the value of the 2-Ω resistor to 1 Ω. The switch in the circuit opens at time $t = 0$ s. Find $v_1(t)$, $v_2(t)$, $i_1(t)$, $i_2(t)$, and $v(t)$ for all time.

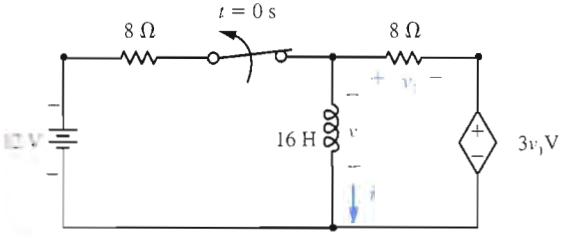

Fig. P3.36

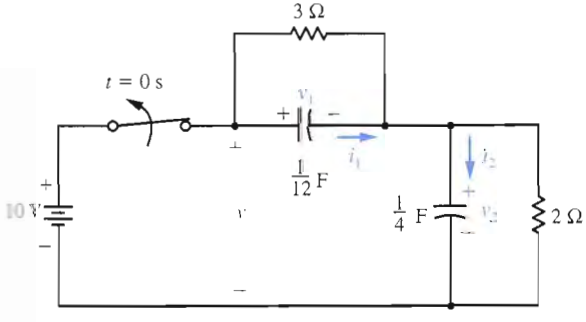

Fig. P3.38

3.40 For the parallel *RC* circuit given in Fig. P3.8, suppose that $i_s(t) = 6u(t)$ A. Find the step responses $v(t)$ and $i(t)$, and sketch these functions.

3.41 For the parallel *RL* circuit given in Fig. P3.17, find the unit step responses $i_L(t)$ and $v(t)$, and sketch these functions.

3.42 For the circuit shown in Fig. P3.42, find the step responses $v(t)$ and $i(t)$, and sketch these functions.

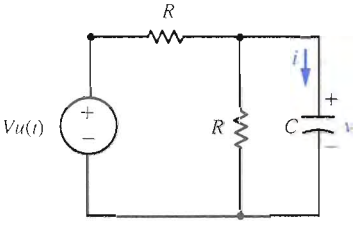

Fig. P3.42

3.43 For the circuit given in Fig. P3.30, suppose that $i_s(t) = 10u(t)$ A. Use Thévenin's theorem to find the step responses $i(t)$ and $v(t)$, and sketch these functions.

3.44 For the circuit given in Fig. P3.30, replace the inductor with a 0.1-F capacitor. Suppose that $i_s(t) = 10u(t)$ A. Use Thévenin's theorem to find the step responses $v(t)$ and $i(t)$, and sketch these functions.

3.45 For the circuit given in Fig. P3.34, suppose that $v_s(t) = 12u(t)$ V. Find the step responses $v(t)$ and $i(t)$, and sketch these functions.

3.46 For the circuit given in Fig. P3.34, replace the capacitor with a 3-H inductor. Suppose that $i_s(t) = 12u(t)$ V. Find the step responses $i(t)$ and $v(t)$, and sketch these functions.

3.47 The step responses $v_C(t)$ and $i(t)$ for the series *RC* circuit shown in Fig. P3.47*a* are given by Eq. 3.19 and Eq. 3.20, respectively. Use duality to determine the step responses $i_L(t)$ and $v(t)$ for the parallel *GL* circuit shown in Fig. P3.47*b*.

3.48 Find the step response $v_o(t)$ for the op-amp circuit shown in Fig. P3.48.

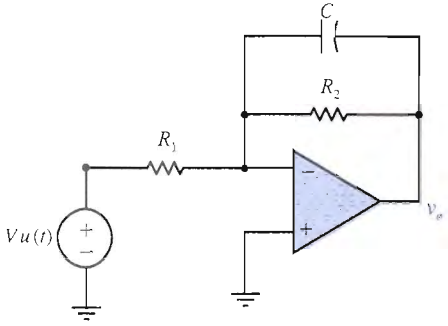

Fig. P3.48

3.49 Find the step responses $v(t)$ and $v_o(t)$ for the op-amp circuit shown in Fig. P3.49.

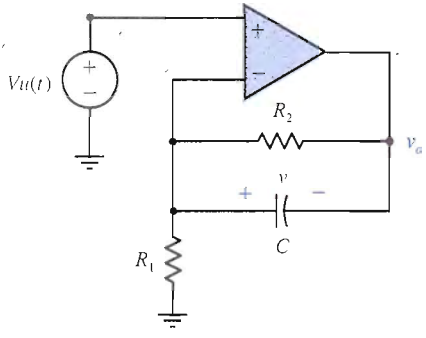

Fig. P3.49

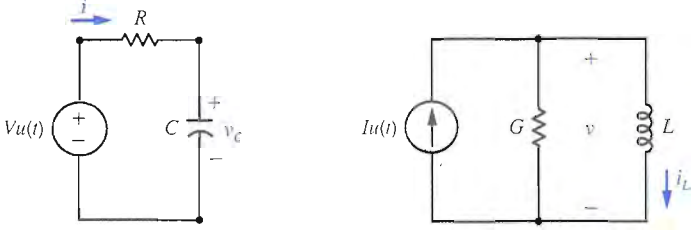

Fig. P3.47