1.12 Consider the circuit shown in Fig. P1.12. (a) Given $i_1 = -4$ A, find v_1. (b) Given $i_2 = 1$ A, find v_2. (c) Given $i_3 = 1$ A, find v_3. (d) Given $i_4 = 2$ A, find v_4.

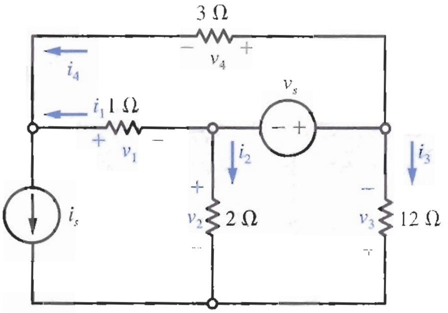

Fig.P1.12

1.13 Consider the circuit in Fig. P1.12. (a) Given $v_1 = -2$ V, find i_1. (b) Given $v_2 = -1$ V, find i_2. (c) Given $v_3 = -6$ V, find i_3. (d) Given $v_4 = 3$ V, find i_4.

1.14 Consider the circuit in Fig. P1.14. (a) Given $i_1 = 3$ A and $v_1 = 6$ V, find R_1. (b) Given $i_2 = 3$ A and $v_2 = -15$ V, find R_2. (c) Given $i_3 = -2$ A and $v_3 = 6$ V, find R_3. (d) Given $i_4 = -1$ A and $v_3 = 6$ V, find R_4.

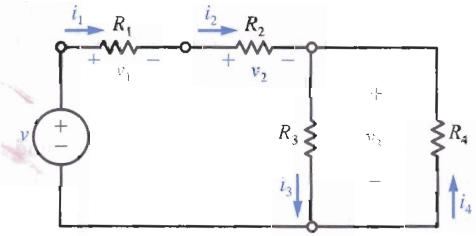

Fig. P1.14

1.15 Consider the circuit in Fig. P1.14. (a) Given $i_1 = 6$ A and $v_1 = 18$ V, find R_1. (b) Given $i_2 = 6$ A and $v_2 = -36$ V, find R_2. (c) Given $i_3 = 4$ A and $v_3 = 16$ V, find R_3. (d) Given $i_4 = -2$ A and $v_3 = 16$ V, find R_4.

1.16 For the circuit shown in Fig. P1.16, find v when (a) $i_s = 1$ A, (b) $i_s = 2$ A, (c) $i_s = 3$ A.

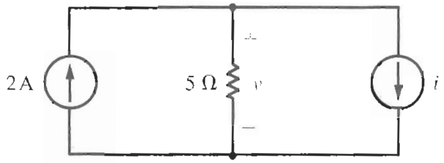

Fig. P1.16

1.17 For the circuit shown in Fig. P1.17, find i when (a) $v_s = 1$ V, (b) $v_s = 2$ V, (c) $v_s = 3$ V.

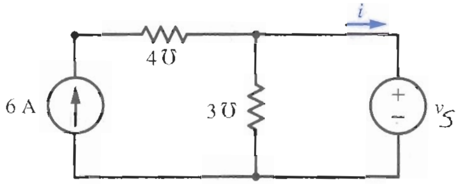

Fig. P1.17

1.18 For the circuit shown in Fig. P1.18, find v_4 when (a) $v_s = 2$ V, (b) $v_s = 4$ V, (c) $v_s = 6$ V.

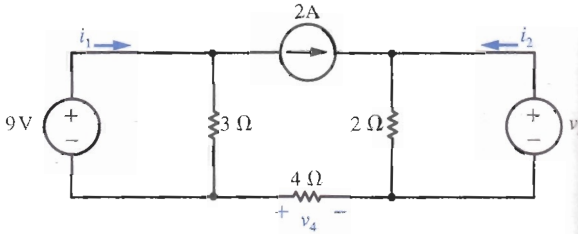

Fig. P1.18

1.19 For the circuit shown in Fig. P1.19, suppose that $i_1 = 6$ A. Use the current-divider formula to determine i_2, i_3, i_4, and i_5.

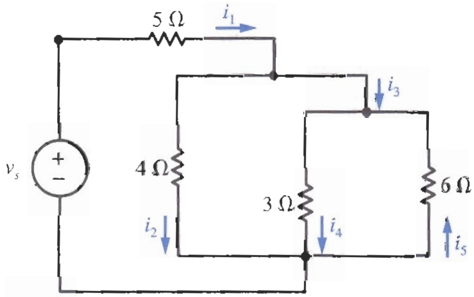

Fig. P1.19

1.20 For the circuit shown in Fig. P1.19, suppose that $i_4 = 4$ A. Use the current-divider formula to determine i_1, i_2, i_3, and i_5.

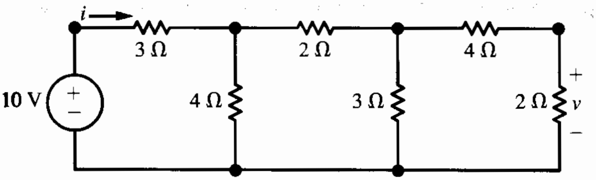

Fig. P1.30

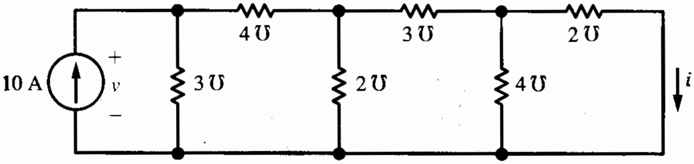

Fig. P1.31

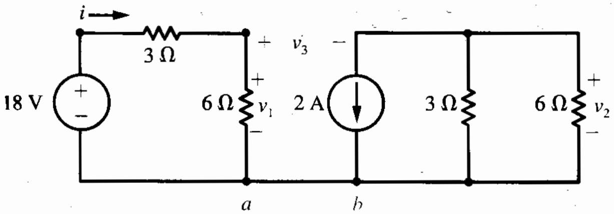

Fig. P1.32

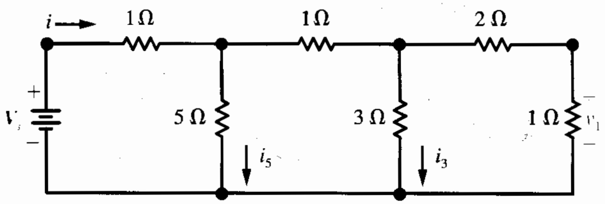

Fig. P1.33

1.34 Consider the nonseries-parallel circuit shown in Fig. P1.34. (a) When $R = \frac{1}{2}$ Ω, then $v_1 = 6$ V. Determine the resistance $R_{eq} = V_s/i$ loading the battery.

1.35 Consider the nonseries-parallel circuit shown in Fig. P1.34. When $R = 4$ Ω, then $v_1 = 4$ V. Determine the resistance $R_{eq} = V_s/i$ loading the battery.

36 Consider the nonseries-parallel circuit shown Fig. P1.34. Determine R and the resistance $R_{eq} =$ $/i$ loading the battery when $v_1 = 3$ V.

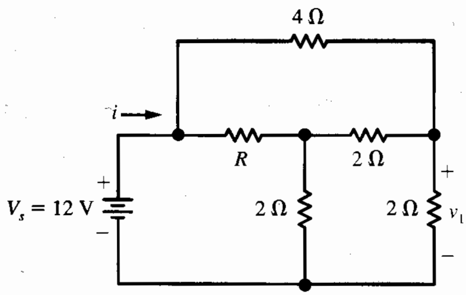

Fig. P1.34

1.37 The nonseries-parallel circuit shown in Fig. P1.37 is known as a **twin-T network**. (a) When $R_1 = 1\ \Omega$ and $R_2 = 3\ \Omega$, then $v_2 = 6$ V. Determine the resistance $R_{eq} = V_s/i$ loading the battery.

1.38 For the twin-T network shown in Fig. P1.37, suppose that $R_2 = \frac{3}{4}\ \Omega$ and $v_2 = 3$ V. Determine R_1 and the resistance $R_{eq} = V_s/i$ loading the battery.

1.39 Shown in Fig. P1.39 is a nonseries-parallel connection known as a **bridge circuit**. When $R_1 = 10\ \Omega$ and $R_2 = 1\ \Omega$, then $v_1 = 10$ V. Find v_2, i, v_3, and the resistance $R_{eq} = V_s/i_s$ loading the voltage source.

1.40 For the bridge circuit shown in Fig. P1.39, when $R_1 = 2\ \Omega$ and $R_2 = 4\ \Omega$, then $v_1 = 4$ V. Find v_2, i, v_3, and the resistance $R_{eq} = V_s/i_s$ loading the voltage source.

1.41 For the bridge circuit shown in Fig. P1.39, when the current $i = 0$ A, we say that the bridge is **balanced**. Under what condition (find an expression relating R_1 and R_2) will this bridge be balanced?

1.42 For the circuit shown in Fig. P1.42, find i_1 when (a) $K = 2$, (b) $K = 3$, and (c) $K = 4$.

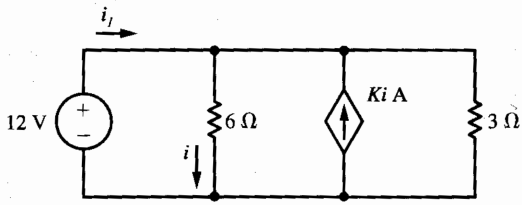

Fig. P1.42

1.43 The circuit shown in Fig. P1.43 contains a **voltage-dependent voltage source** as well as a current-dependent current source. Find i_1 when (a) $K = -3$, (b) $K = -1.5$, and (c) $K = 1.5$.

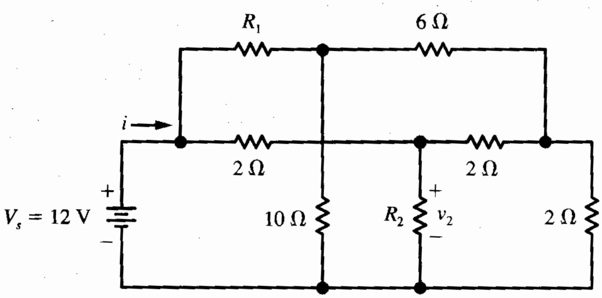

Fig. P1.37

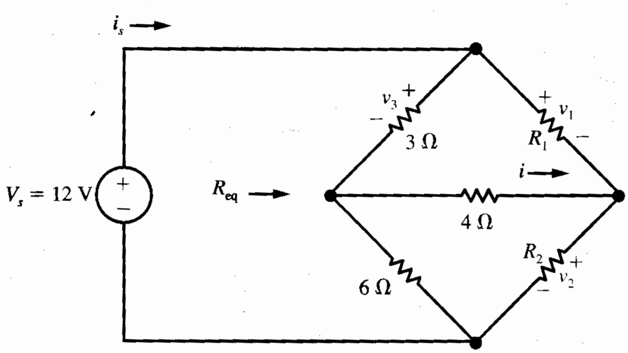

Fig. P1.39

1.44 Consider the circuit shown in Fig. P1.44. Find v when (a) $K = 2$, and (b) $K = 4$.

1.45 Consider the circuit shown in Fig. P1.45. Find i when (a) $K = 2$, and (b) $K = 4$.

1.46 Consider the circuit shown in Fig. P1.46. (a) Find the resistance $R_{eq} = v_1/i_1$. (b) Find the voltage v_2 in terms of the applied voltage v_1.

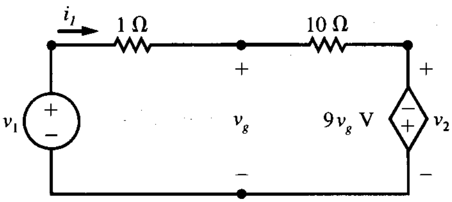

Fig. P1.46

1.47 Consider the circuit shown in Fig. P1.47. (a) Find the resistance $R_{eq} = v_1/i_1$. (b) Use voltage division to find v in terms of v_g. (c) Find the voltage v_2 in terms of the applied voltage v_1.

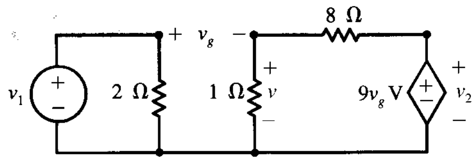

Fig. P1.47

1.48 For the circuit shown in Fig. P1.48, suppose that $R = 10\ \Omega$. Determine (a) v_s, and (b) $R_{eq} = v_s/i_s$.

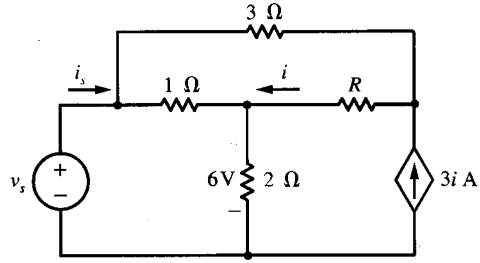

Fig. P1.48

1.49 For the circuit shown in Fig. P1.48, suppose that $R = 8\ \Omega$. Determine (a) v_s, and (b) $R_{eq} = v_s/i_s$.

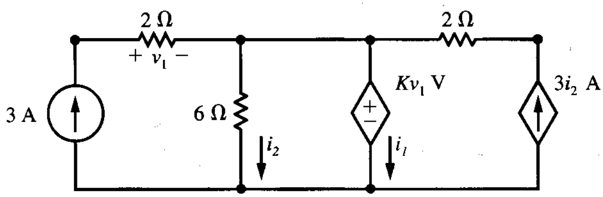

Fig. P1.43

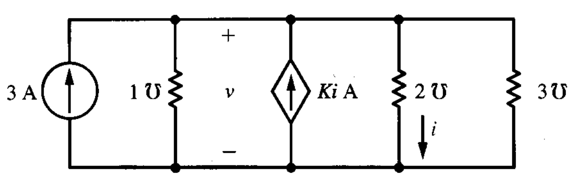

Fig. P1.44

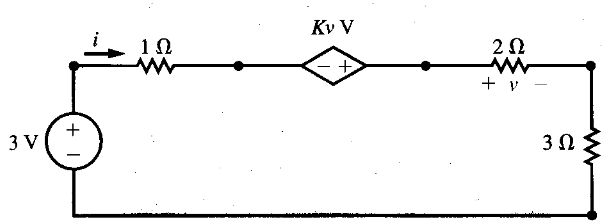

Fig. P1.45