Problems

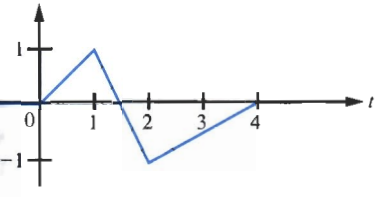
1 An ideal voltage source is described by the ction $v(t) = 10e^{-t}$ V. Find the value of this volt- source when (a) $t = 0$ s, (b) $t = 1$ s, (c) $t = 2$ d) $t = 3$ s, (e) $t = 4$ s.

2 An ideal voltage source is described by the ction $v(t) = 5 \sin (\pi/2)t$ V. Find the value of this tage source when (a) $t = 0$ s, (b) $t = 1$ s, $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.

3 An ideal voltage source is described by the ction $v(t) = 3 \cos (\pi/2)t$ V. Find the value of this tage source when (a) $t = 0$ s, (b) $t = 1$ s, $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.

4 Find the current in a region when the total rge in the region is described by the function $q(t) = 4e^{-2t}$ C, (b) $q(t) = 3 \sin \pi t$ C, (c) $q(t) =$ os $2\pi t$ C, and (d) $q(t) = 5e^{-4t} \cos 3t$ C.

5 An ideal voltage source is described by the ction shown in Fig. P1.5. Find the value of this tage source when (a) $t = 0$ s, (b) $t = 1$ s, $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.



. P1.5

6 The total charge $q(t)$ in some region is de- ibed by the function shown in Fig. P1.5. Sketch current $i(t)$ in this region.

1.7 Consider the circuit shown in Fig. P1.7. (a) Given $i_1 = 4$ A, find v_1. (b) Given $i_2 = -2$ A, find v_2. (c) Given $i_3 = 2$ A, find v_3. (d) Given $i_4 = -2$ A, find v_4.

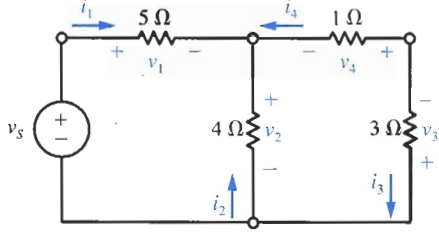


Fig. P1.7

1.8 Consider the circuit in Fig. P1.7. (a) Given $v_1 = 30$ V, find i_1. (b) Given $v_2 = 12$ V, find i_2. (c) Given $v_3 = -9$ V, find i_3. (d) Given $v_4 = -3$ V, find i_4.

1.9 Consider the circuit shown in Fig. P1.7. (a) Given $v_1 = -10$ V, find i_1. (b) Given $i_2 = 1$ A, find v_2. (c) Given $v_3 = 3$ V, find i_3. (d) Given $i_4 = 1$ A, find v_4.

1.10 Consider the circuit in Fig. P1.10. (a) Given $v_1 = -6$ V, find i_1. (b) Given $v_2 = 24$ V, find i_2. (c) Given $v_3 = 11$ V, find i_3. (d) Given $v_4 = 21$ V, find i_4. (e) Given $v_5 = -14$ V, find i_5.

1.11 Consider the circuit shown in Fig. P1.10. (a) Given $i_1 = 1.5$ A, find v_1. (b) Given $i_2 = -4$ A, find v_2. (c) Given $i_3 = 5.5$ A, find v_3. (d) Given $i_4 = 3.5$ A, find v_4. (e) Given $i_5 = 3.5$ A, find v_5.

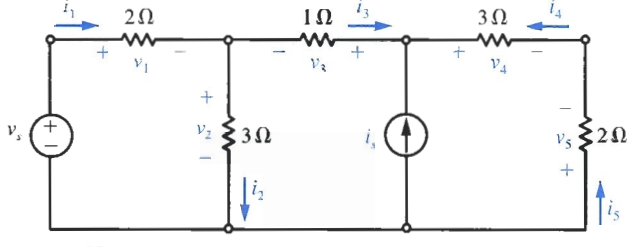


Fig. P1.10

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.

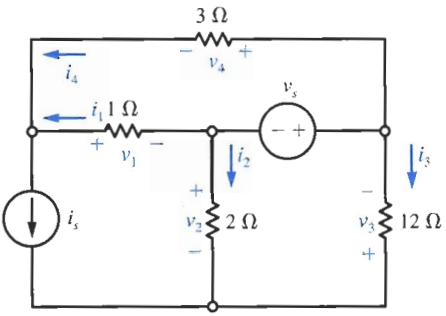


Fig.P1.12

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.

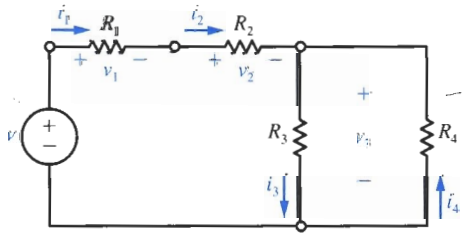


Fig. P1.14

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.

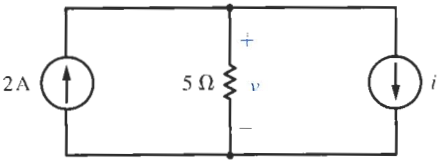


Fig. P1.16

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.

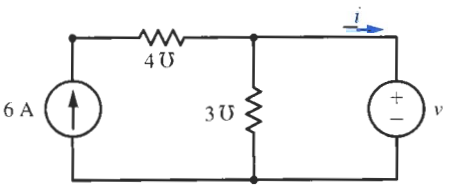


Fig. P1.17

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.

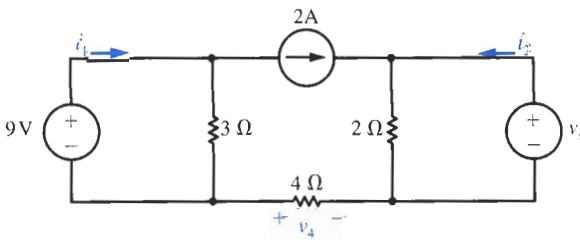


Fig. P1.18

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.

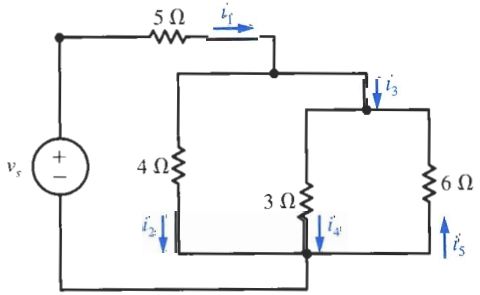


Fig. P1.19

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.