

## Review Questions

### Q1 [Alexander Problem 4.8]

Which pair of circuits in Figure 4.68 are equivalent?

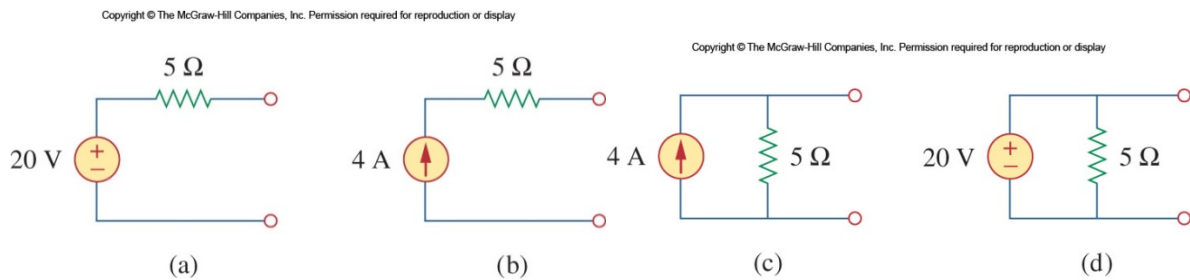


Figure 4.68

### Q2 [Alexander Problem 4.4]

Obtain the Thevenin and Norton equivalent circuit at seen across terminals  $a-b$  of Figure 4.67

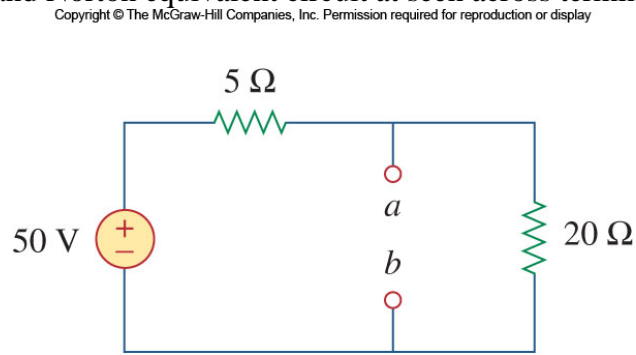


Figure 4.67

### Q3

A load is connected to a network. Across the terminals where the load is to be connected, the Thevenin voltage is 40 V and the Thevenin resistance is 10  $\Omega$ . Find the value of the load required to set the load voltage across the terminals to 24 V.

## Thevenin's and Norton's Theorems

### Q4 [Alexander Problem 4.45]

Obtain the Norton equivalent across terminals  $a-b$  of the circuit shown in Figure 4.112.

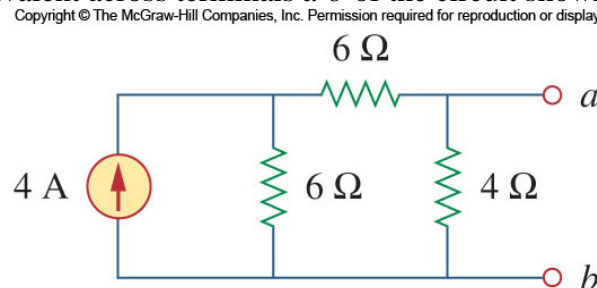


Figure 4.112

**Q5 [Alexander Problem 4.39]**

Obtain the Thevenin equivalent across terminals  $a$ - $b$  of the circuit shown in Figure 4.106.

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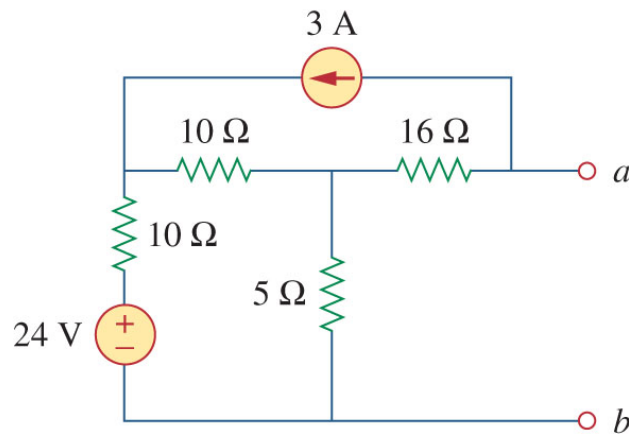


Figure 4.106

**Q6 [Modified from Alexander Problem 4.34]**

Obtain the Thevenin equivalent across terminals  $a$ - $b$  of the circuit shown in Figure 4.102.

Let  $V = 10$  V,  $I = 1$  A,  $R_1 = 20$  Ω,  $R_2 = 30$  Ω,  $R_3 = 6$  Ω.

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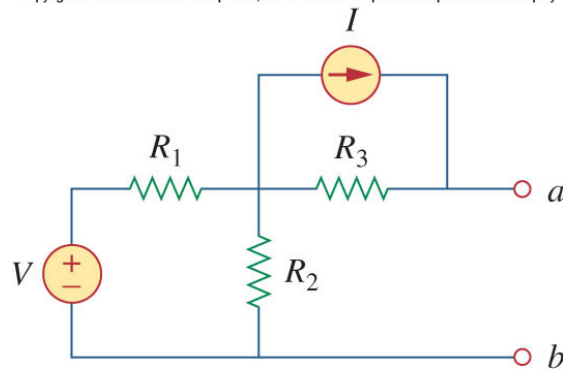


Figure 4. 102

**Q7 [Alexander Problem 43.7]**

Obtain the Norton equivalent across terminals  $a$ - $b$  of the circuit shown in Figure 4.104.

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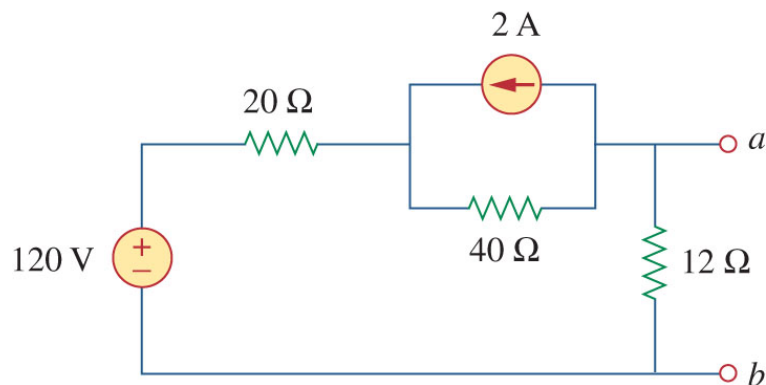


Figure 4.104

**Q8 [Modified from Rizzoni Problem 3.54]**

Obtain the Norton equivalent across terminals  $a$ - $b$  of the circuit shown in Figure P3.54.

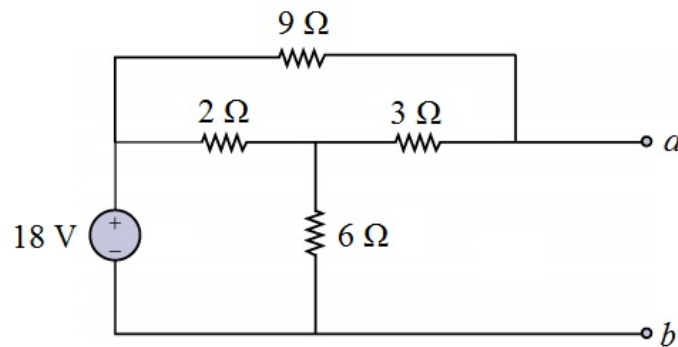


Figure P3.54

**Source Transformation****Q9 [Alexander Problem 4.20]**

Use source transformation to obtain the Norton equivalent seen across terminals  $a$ - $b$  for the circuit shown in Figure 4.88

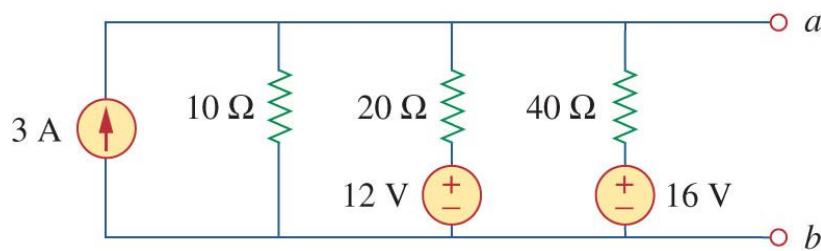


Figure 4.88

**Q10 [Alexander Problem 4.27]**

Using mesh current analysis on the circuit in Fig 4.94, how many mesh current equations are needed?

Using nodal voltage analysis, how many nodal voltage equations are needed?

Use source transformation to find  $v_x$  in the circuit shown in Fig 4.94.

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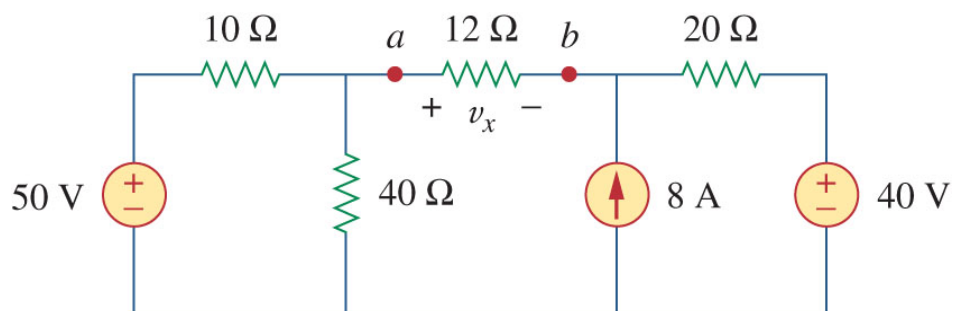


Figure 4.94

## Circuit Analysis with Dependent Sources

### Q11 [Problem 3.8 of Alexander & Sadiku]

Find  $v_o$  in the following circuit.

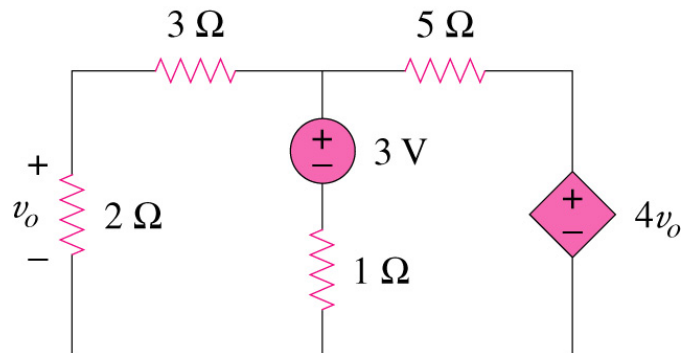


Figure 3.57

### Q12 [Problem of 3.60 Alexander & Sadiku]

Find the current  $i_o$

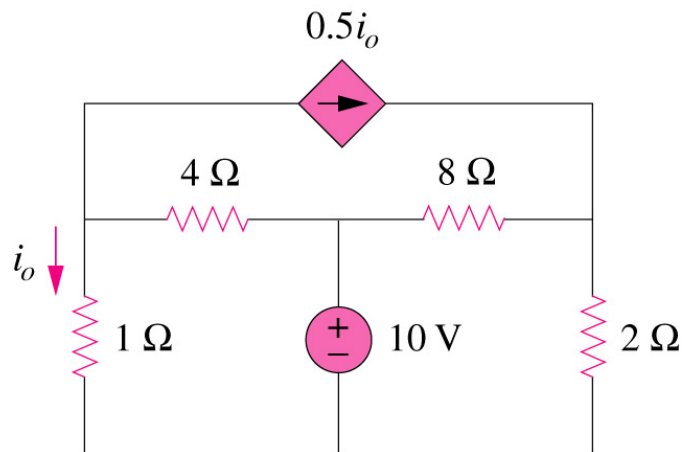


Figure 3.101

### Q13 [Problem of 3.86 Alexander & Sadiku]

Find the voltage  $v_o$  in the following circuit.

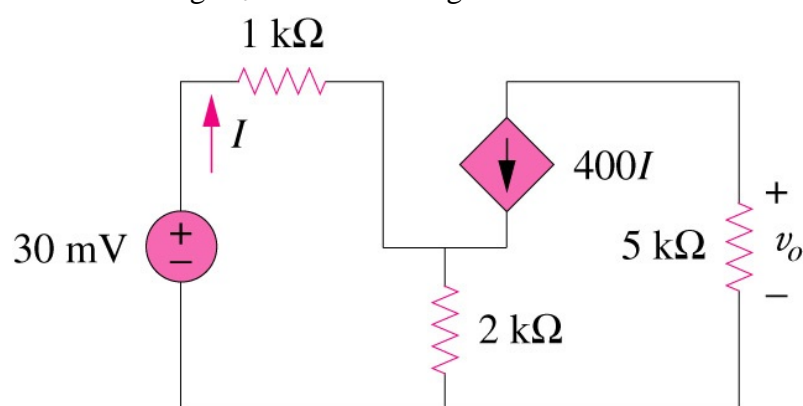


Figure 3.118

**Numerical solutions****Q1 [Alexander Problem 4.8]**

Circuits (a) and (c) are equivalent

**Q2 [Alexander Problem 4.4]**

$R_{Th} = R_N = 4\Omega$ ,  $V_{Th} = 40\text{ V}$ ,  $I_N = 10\text{ A}$

**Q3**

Required load resistance =  $15\ \Omega$

**Q4 [Alexander Problem 4.45]**

$R_N = 3\ \Omega$ ,  $I_N = 2\text{ A}$

**Q5 [Alexander Problem 4.39]**

$R_{Th} = 20\ \Omega$ ,  $V_{Th} = -49.2\text{ V}$

**Q6 [Modified from Alexander Problem 4.34]**

$V_{Th} = 12\text{ V}$ ,  $R_{Th} = 18\ \Omega$

**Q7 [Alexander Problem 4.37]**

$R_N = 10\ \Omega$ ,  $I_N = 2/3\text{ A}$

**Q8. [Modified from Rizzoni Problem 3.54]**

$R_N = 3\ \Omega$ ,  $I_N = 5\text{ A}$

**Q9 [Alexander Problem 4.20]**

$R_N = 5.714\ \Omega$ ,  $I_N = 4\text{ A}$

**Q10 [Alexander Problem 4.27]**

$v_x = -48\text{ V}$

**Q11. [Problem of 3.8 Alexander & Sadiku]**

$v_o = 1.111\text{ V}$  (Voltage across series combination of  $3\text{ V}$  source and  $1\ \Omega$  resistor is  $2.778\text{ V}$ )

**Q12. [Problem of 3.60 Alexander & Sadiku]**

$i_o = 10/7\text{ A}$  (Voltage across  $1\ \Omega$  resistor is  $10/7\text{ V}$ )

**Q13. [Problem of 3.86 Alexander & Sadiku]**

$v_o = -74.8\text{ mV}$  (Voltage across the  $2\text{ k}\Omega$  resistor is  $29.963\text{ mV}$ ,  $I = 37.4\text{ nA}$ )