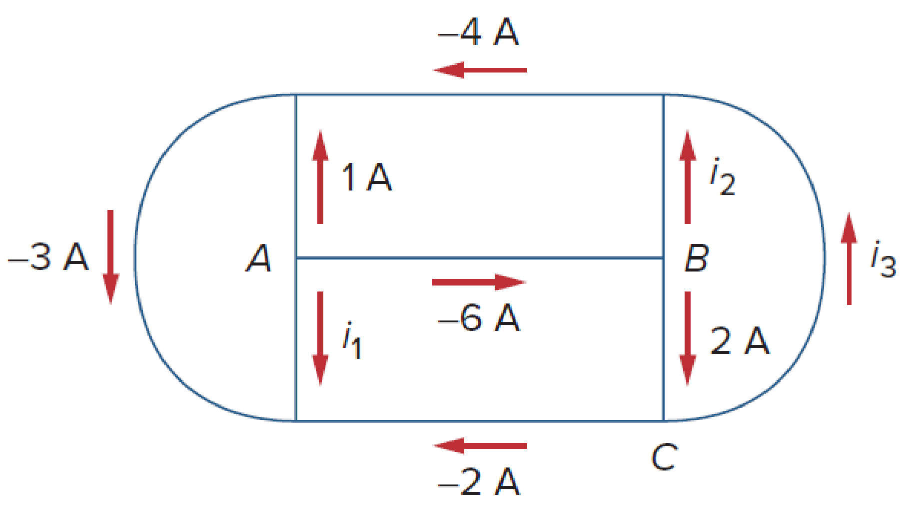
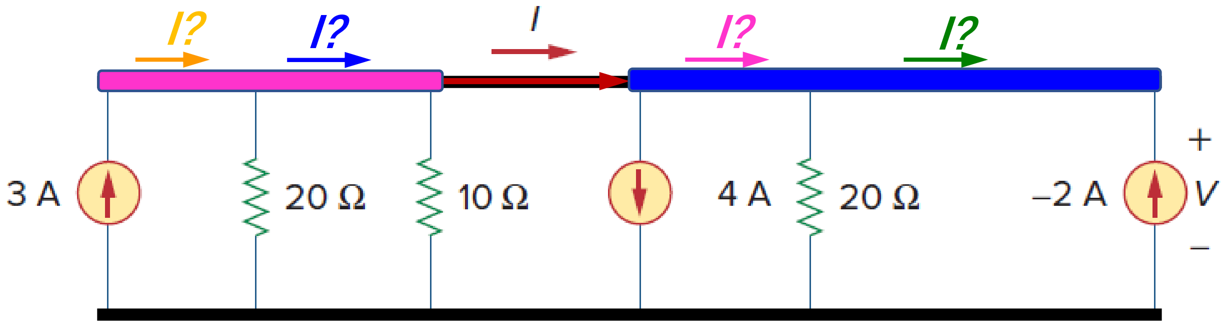
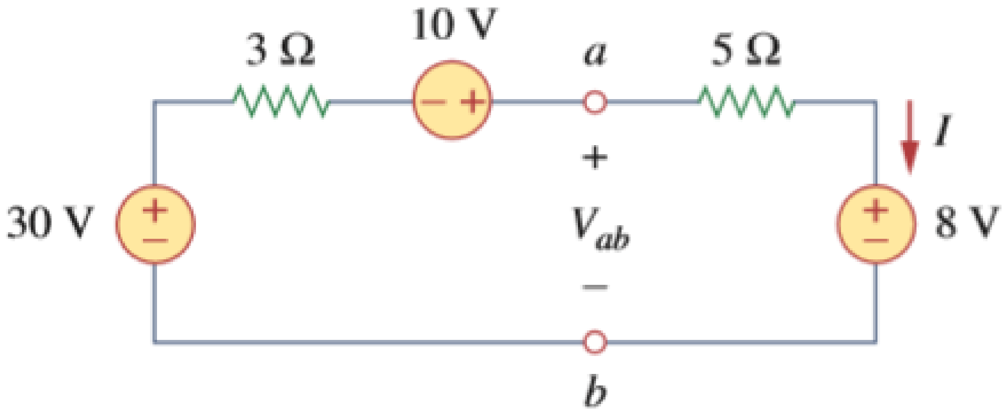
2.9 Find i_1, i_2, and i_3 in Fig. 2.73.



2.18 Find I and V in the circuit of Fig. 2.82.



2.18 Find I and V_{ab} in the circuit of Fig. 2.82.



2.18

Accordin to KVL :

$$-30 + 3I - 10 + 5I + 8 = 0$$

$\therefore$ $-32 = -8I$ $\quad \therefore I = 4A$

$\therefore$ $V_{ab} = (4 \times 5 + 8)V = 28V$

2.25 For the network in Fig. 2.89, find the current, voltage, and power associated with the 20-kΩ resistor.

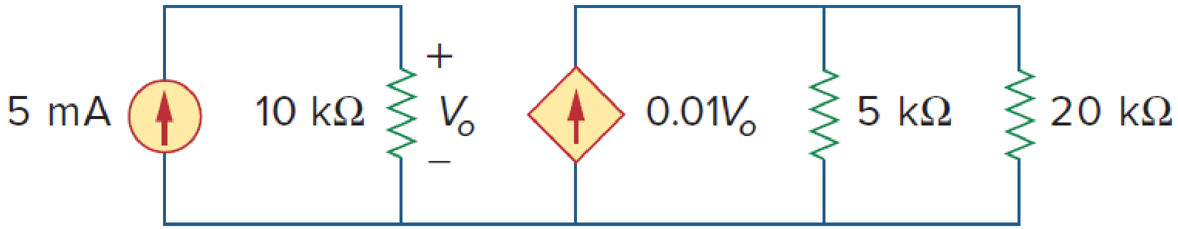


Figure 2.89

2.25

$V_o = 10k\Omega \times 5mA = 50\ V$

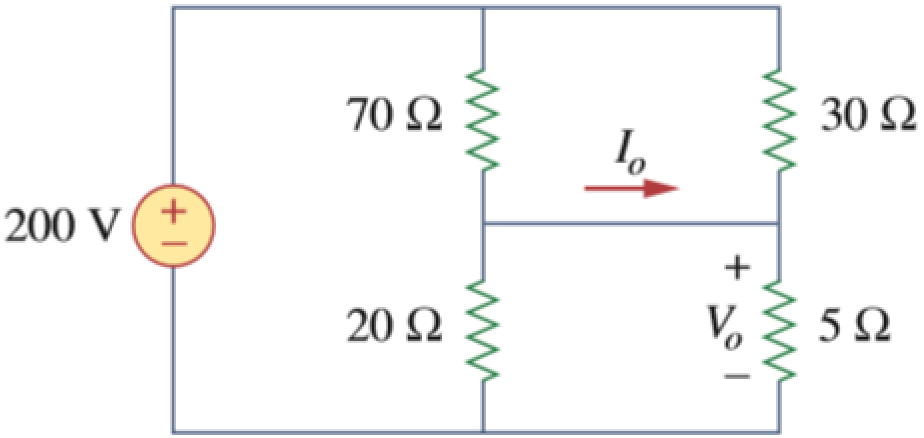
$I = 0.01 \times 50 = 0.5\ A$

$I_R = \frac{5}{20+5} I = 0.1\ A$

$V_R = R I_R = 20k\Omega \times 0.1\ A = 2kV$

$P_R = V_R I_R = 0.1 \times 2000\ W = 200\ W$

2.35 Calculate V_o and I_o in the circuit of Fig. 2.99.



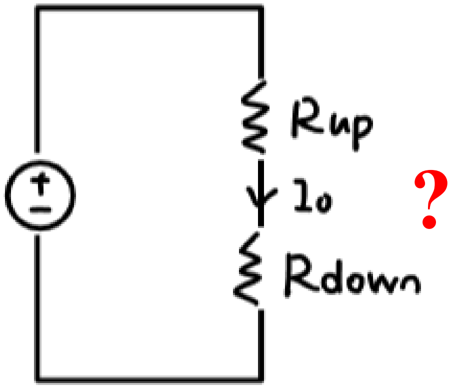
2.35

$$R_{up} = \frac{1}{\frac{1}{70}+\frac{1}{30}} = 21\,\Omega$$

$$R_{down} = \frac{1}{\frac{1}{20}+\frac{1}{5}} = 4\,\Omega$$

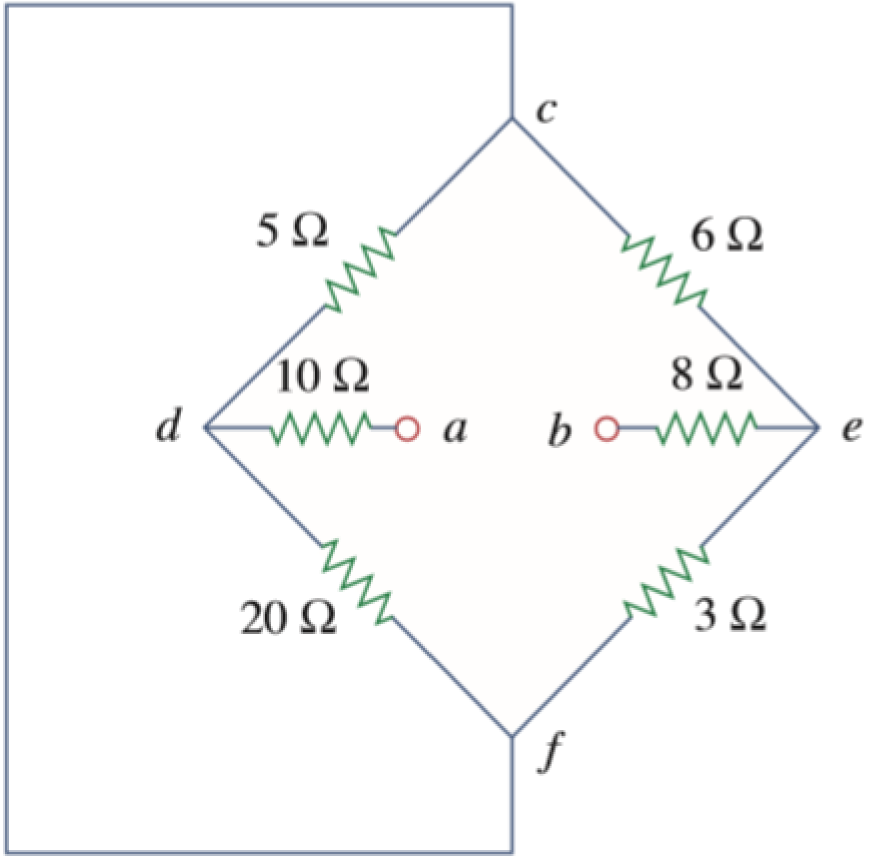
$$\therefore V_o = \frac{4}{21+4} \times 200\text{ V} = 32\text{V}$$

$$\therefore I_o = \frac{200\text{V}}{(21+4)\Omega} = 8\text{ A}$$

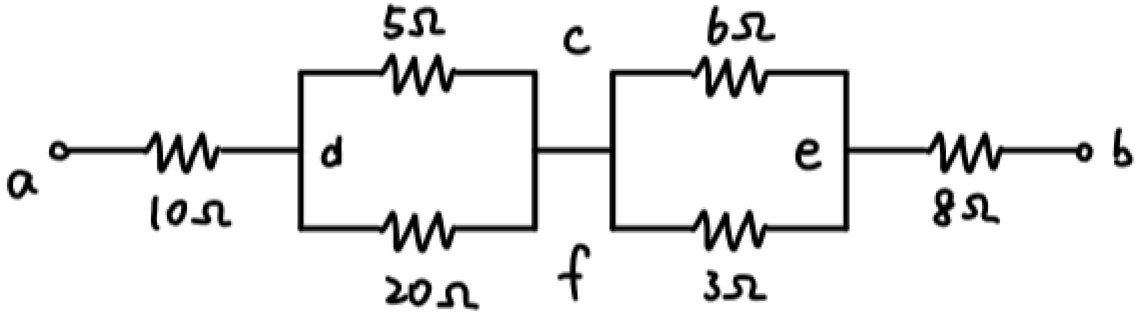


$$I_0 = \frac{V_0}{5} - \frac{200-V_0}{30} = 0.8\text{A}$$

2.47 Find the equivalent resistance R_{ab} in the circuit of Fig. 2.111.



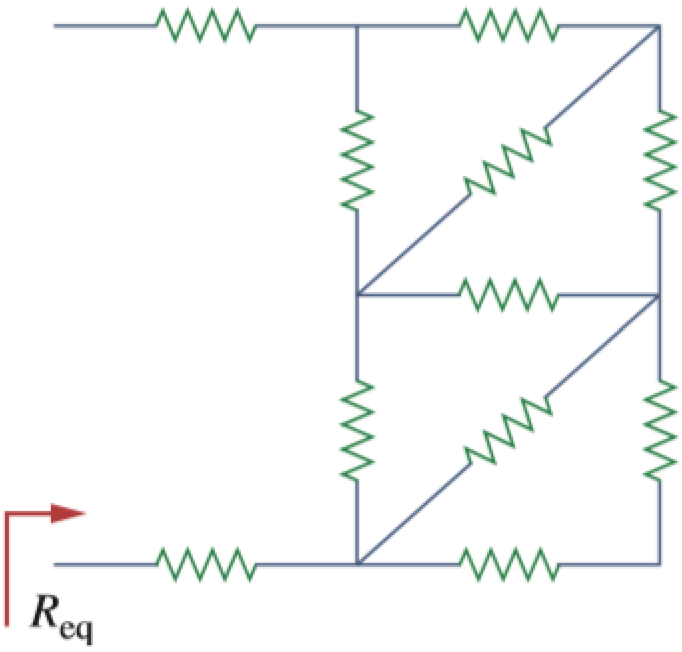
2.47



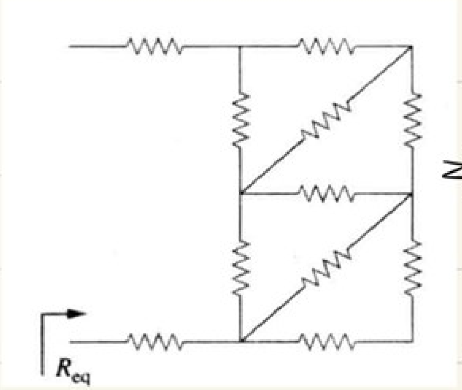
$$\therefore R_{ab} = 10 + 8 + \frac{1}{\frac{1}{5}+\frac{1}{20}} + \frac{1}{\frac{1}{6}+\frac{1}{3}} = 24\ \Omega$$

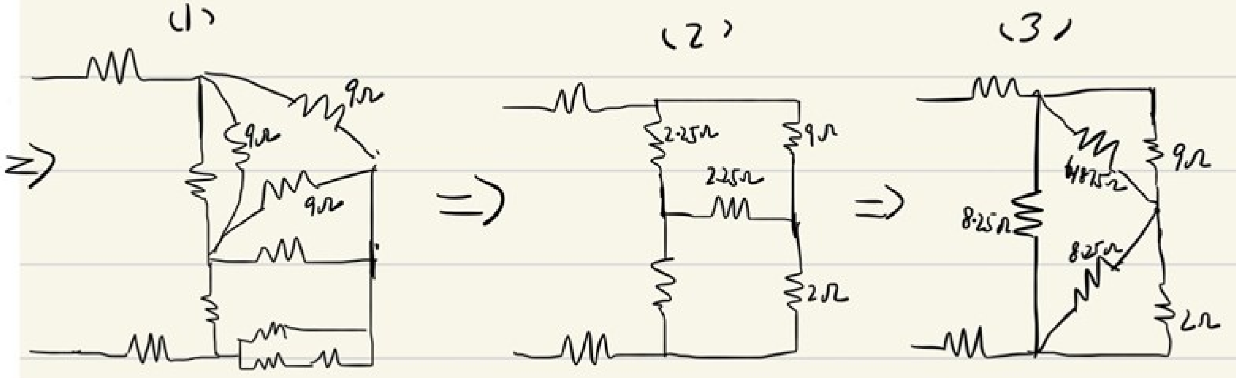
***2.52** For the circuit shown in Fig. 2.116, find the equivalent resistance. All resistors are 3 Ω.

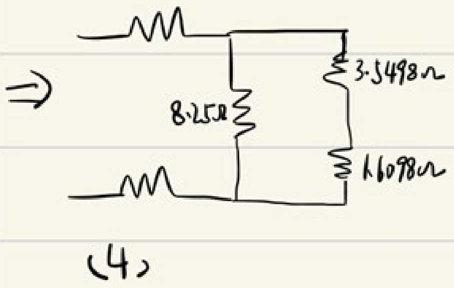
Solution1



Solution:







(1) $R_\Delta = \frac{3\times3+3\times3+3\times3}{3} = 9\Omega$

(2) $R_{Y_1} = \frac{(3+3)\times3}{3+3+3} = 2\Omega$ $\quad R_{Y_2} = \frac{3\times9}{3+9} = 2.25\Omega$

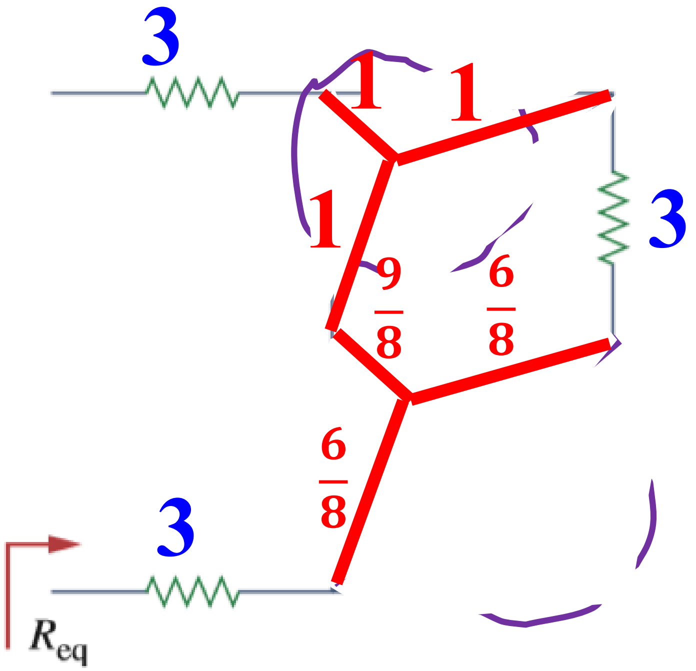
(3) $R_{\Delta a} = \frac{3\times2.25+3\times2.25+2.25\times2.25}{3} = 6.1875\Omega$ $\quad R_{\Delta b} = R_{\Delta c} = \frac{3\times2.25+3\times2.25+2.25\times2.25}{2.25} = 8.25\Omega$

(4) $R_{\parallel_3} = \frac{2\times8.25}{2+8.25} \approx 1.6098\Omega$ $\quad R_{\parallel 4} = \frac{9\times6.1875}{9+6.1875} \approx 3.5498\Omega$

$$R_{eq} = 3 + 8.25 \,//\, (1.6098+3.5498) + 3 \approx 9.1743\Omega$$

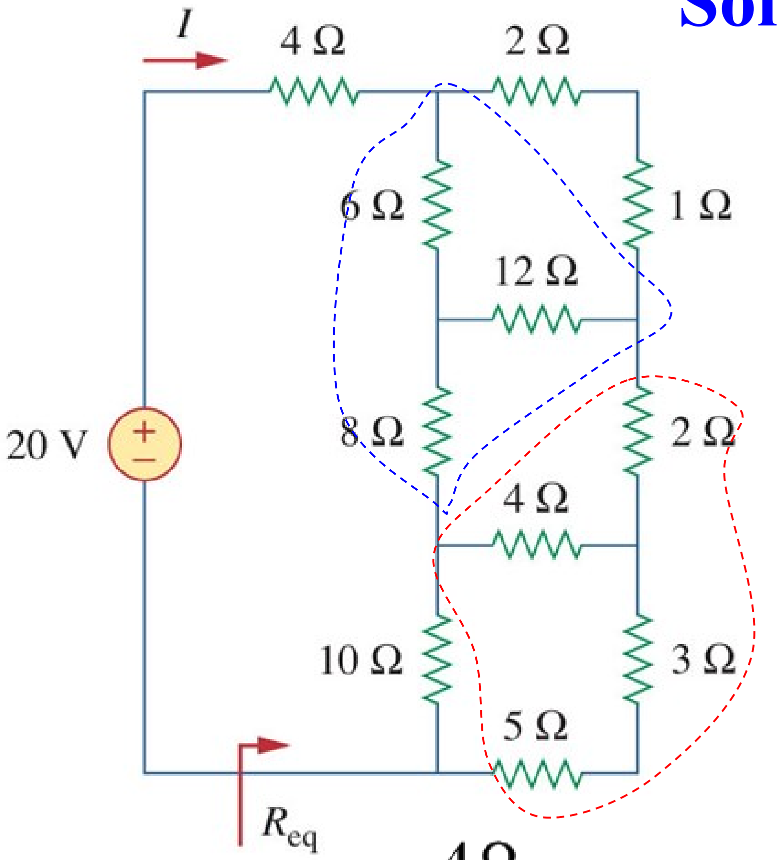
$$\frac{507}{55}$$

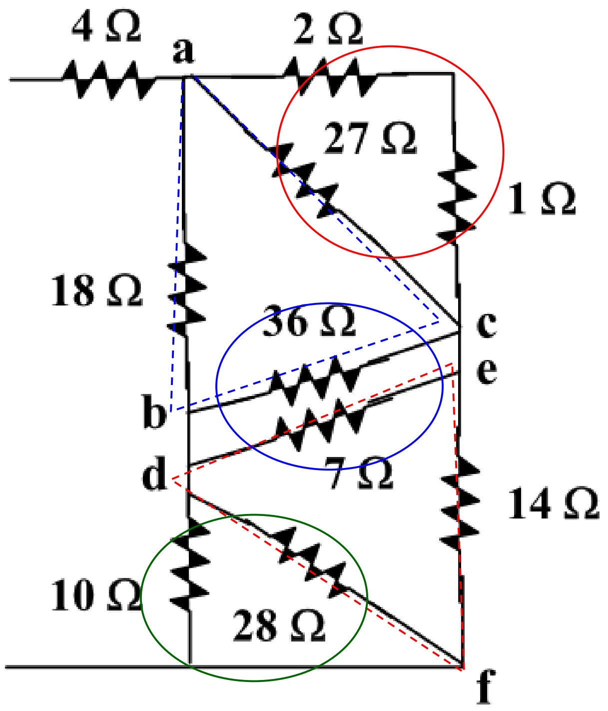
Solution2

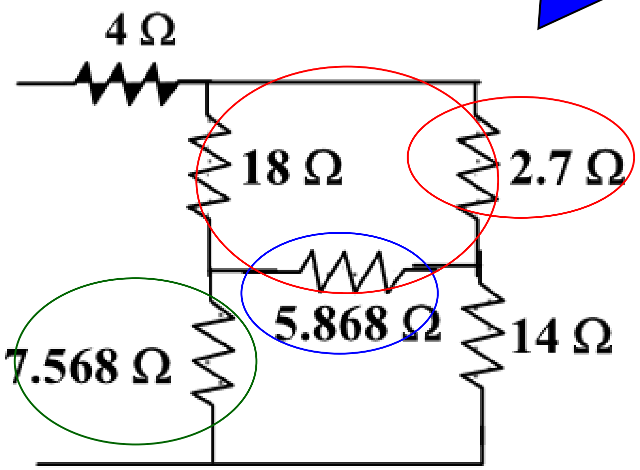


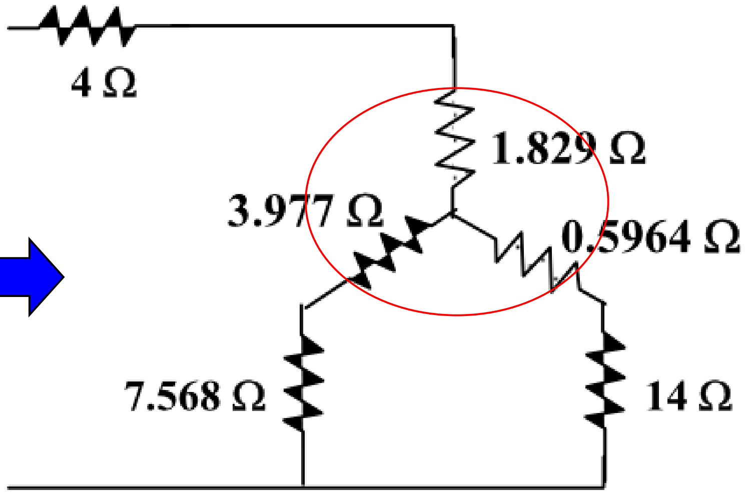
2.57　第5版P75
第6版数据有变

Solution1



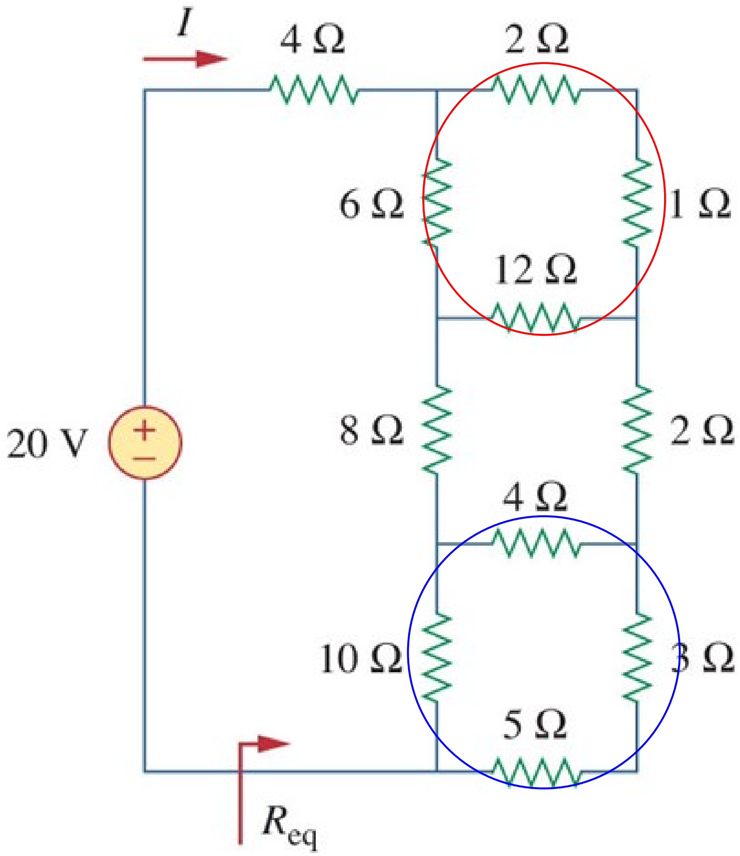


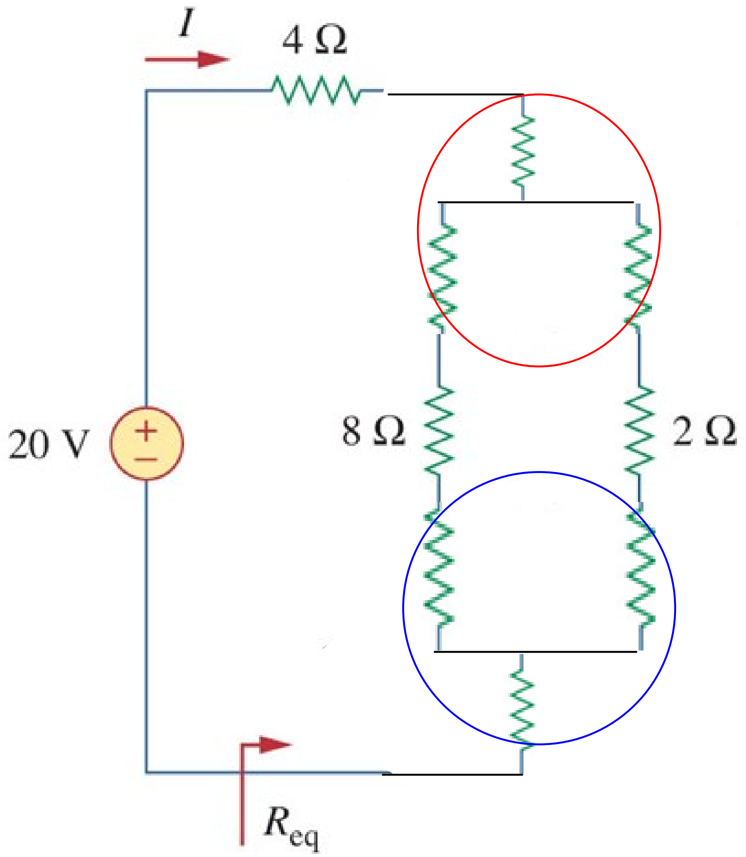




2.57 P75

Solution2





2.59 An enterprising young man travels to Europe carrying three light bulbs he had purchased in North America. The light bulbs he has are a 100-W light bulb, a 60-W light bulb, and a 40-W light bulb. Each light bulb is rated at 110 V. He wishes to connect these to a 220-V system that is found in Europe. For reasons we are not sure of, he connects the 40-W light bulb in series with a parallel combination of the 60-W light bulb and the 100-W light bulb as shown in Fig. 2.123. How much power is actually being delivered to each light bulb? What does he see when he first turns on the light bulbs?

Is there a better way to connect these light bulbs in order to have them work more effectively?

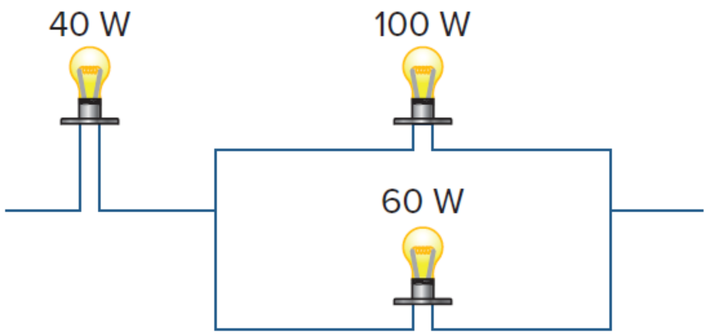
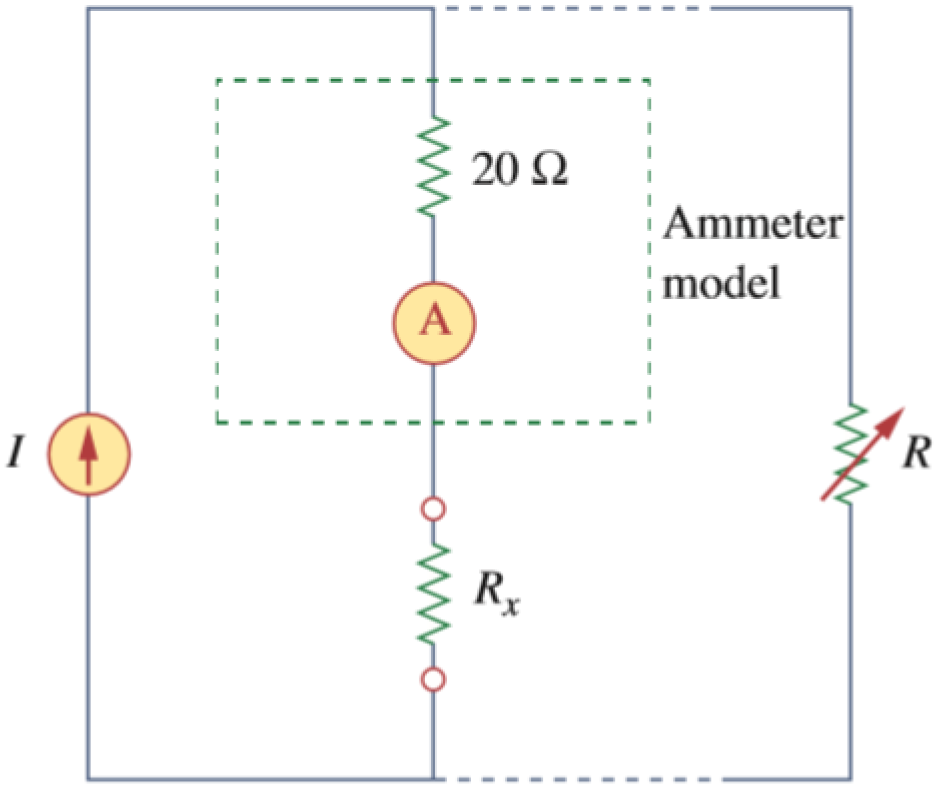


Figure 2.123

2.73 An ammeter model consists of an ideal ammeter in series with a 20-Ω resistor. It is connected with a current source and an unknown resistor R_x as shown in Fig. 2.133. The ammeter reading is noted. When a potentiometer R is added and adjusted until the ammeter reading drops to one half its previous reading, then $R = 65\ \Omega$. What is the value of R_x?

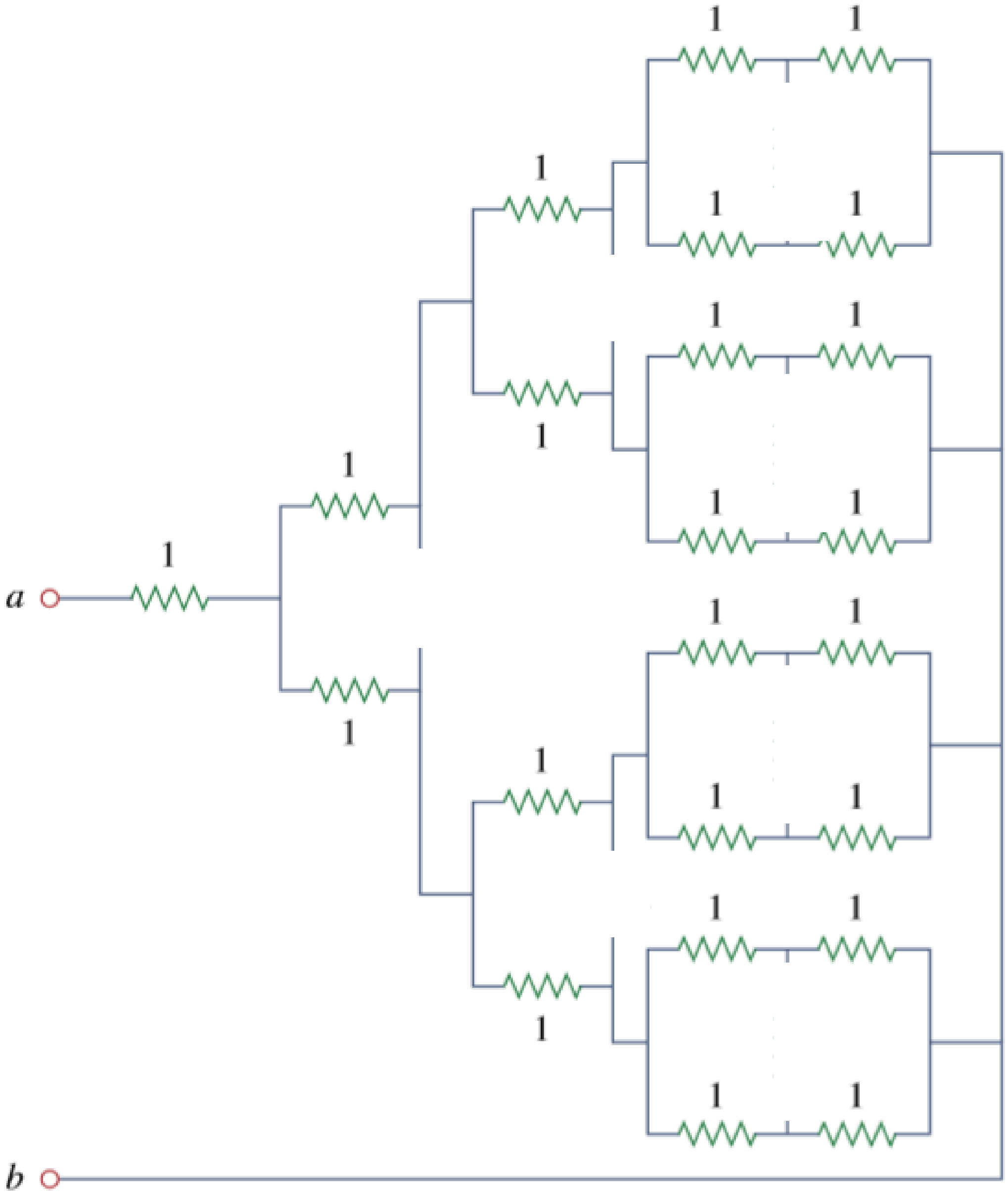


$\because$ the new note is ½ of the previous one

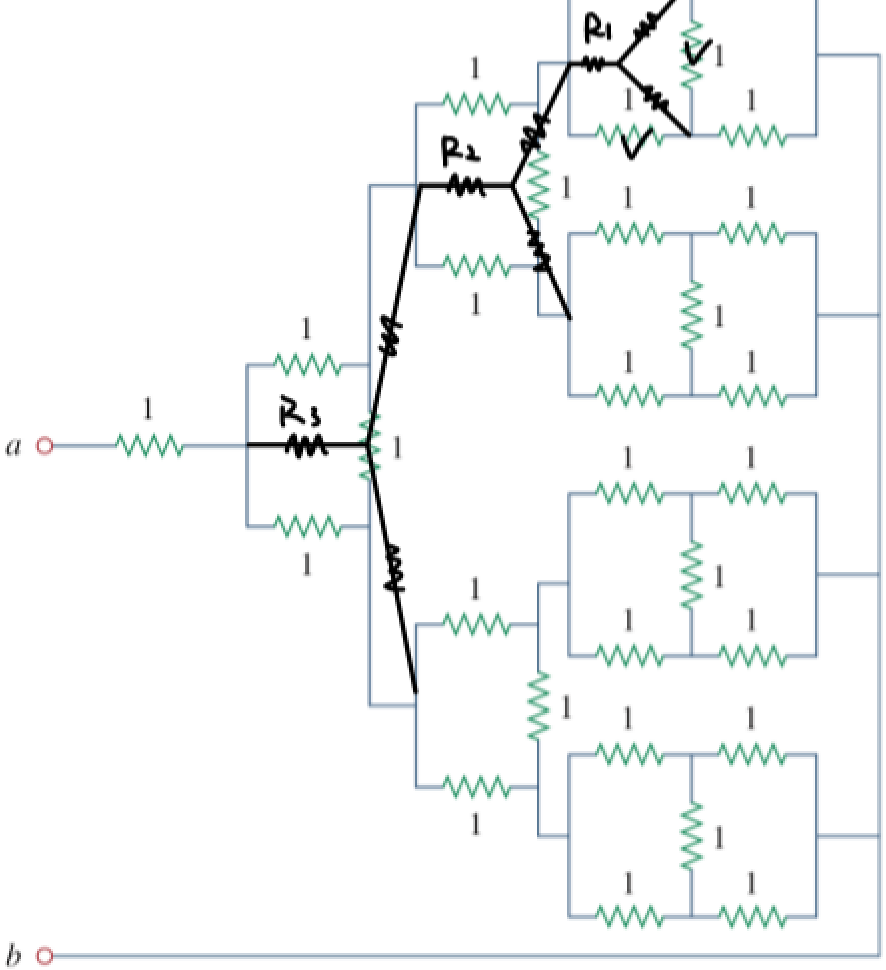
$\therefore\ 20 + R_x = R = 65\,\Omega$

$\therefore\ R_x = 45\,\Omega$

2.76 Repeat Prob. 2.75 for the eight-way divider shown in Fig. 2.136.



2.75 Find R_{ab} in the four-way power divider circuit in Fig. 2.135. Assume each $R = 4\ \Omega$.



Change the circuit into the new one

$R_1 = \frac{1}{1+1+1} = 1/3$

$\therefore R_2 = \frac{1}{3} + (1+\frac{1}{3}) // (1+1/3) = 1 = R_3$

$\therefore R_{eq} = 1+1 = 2\,\Omega$

2.83 Two delicate devices are rated as shown in Fig. 2.142. Find the values of the resistors R_1 and R_2 needed to power the devices using a 36-V battery.

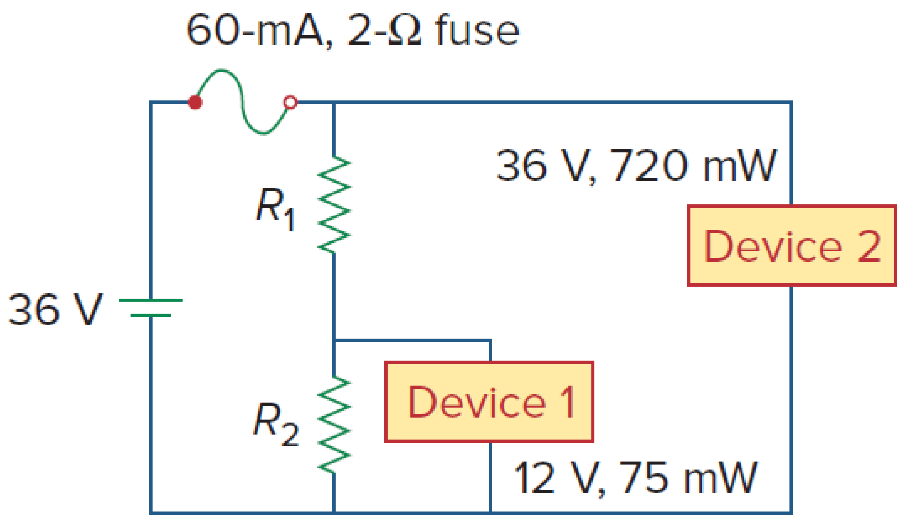


Figure 2.142