
M R
Ahmed Mahdy
فيزياء
استاتيكا
دوائر كهربية
الكترونيات
ميكانيكا الانشائات
هيدروليكا
مدرس خصوصي
اونلاين
حضوري
يحصل الطالب علي
. مقاطع فيديوهات لشرح المقرر بشكل وافي
. ملخص للمادة Pdf للمذكرة والمراجعة
. محاضرات مباشرة علي برنامج زووم
لمناقشة الأجزاء الغير مفهومة
. تواصل مستمر مع معلم المادة
للتواصل
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2.15 Calculate v and i_x in the circuit of Fig. 2.79.

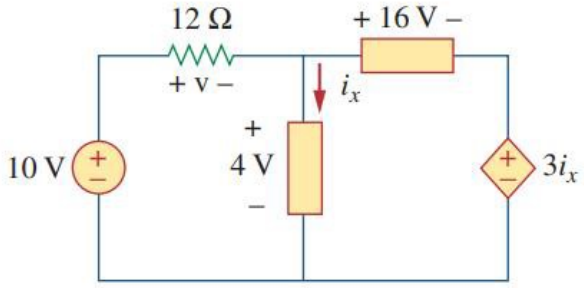


Figure 2.79
For Prob. 2.15.

apply K.V.L in loop 1

$-10 + V + 4 = 0 \Rightarrow V = 6\ V$

apply K.V.L in loop 2

$-4 + 16 + 3i_x = 0 \Rightarrow i_x = -\frac{12}{3} = -4A$

2.17 Obtain v_1 through v_3 in the circuit of Fig. 2.81.

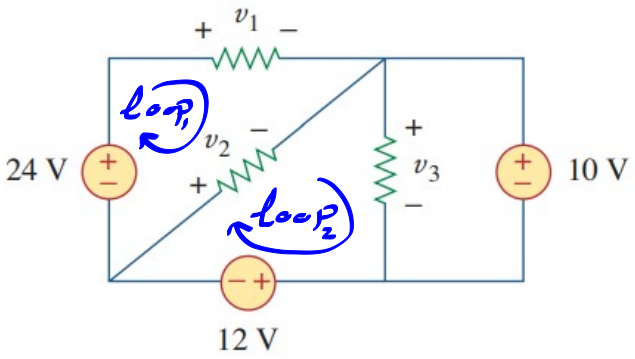


Figure 2.81
For Prob. 2.17.

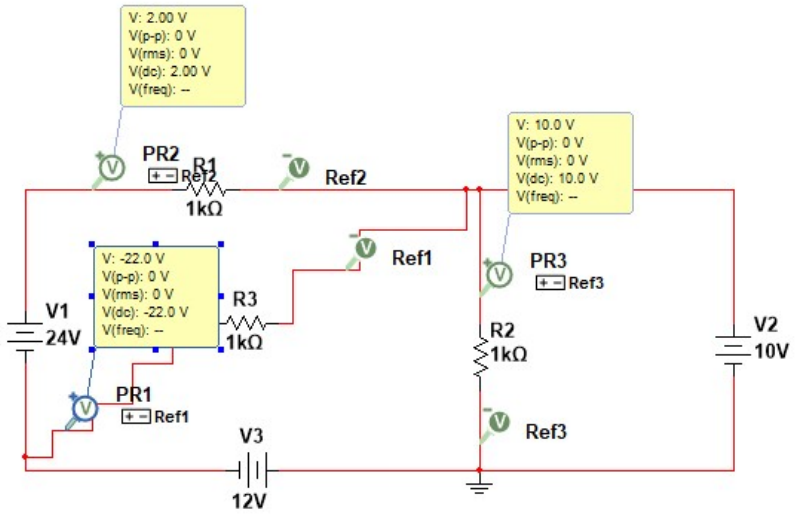
$V_3 = 10V$ نوصيل على التوازي

(apply K.V.L at loop 2

$10 + 12 + V_2 = 0 \Rightarrow V_2 = -22V$

(apply K.V.L at loop 1

$-24 + V_1 - (-22) = 0 \Rightarrow V_1 = 2V$



2.19 From the circuit in Fig. 2.83, find I, the power dissipated by the resistor, and the power supplied by each source.

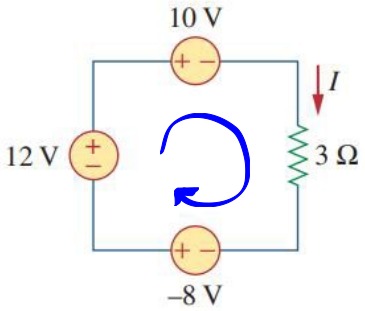


Figure 2.83
For Prob. 2.19.

apply K.V.L

$-12 + 10 + 3I - (-8) = 0$

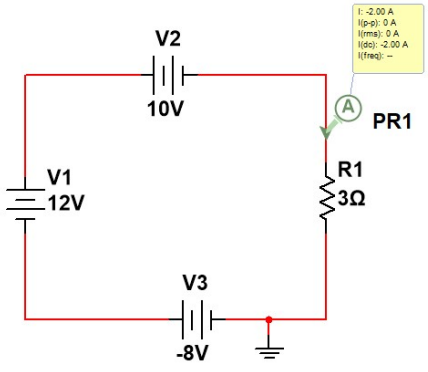
$I = -2A$

$P_{3\Omega} = I^2R = (-2)^2 * 3 = 12\,w$

$P_{10V} = (-2)(10) = -20\,w$

$P_{12V} = (-2)(-12) = +24\,w$

$P_{-8V} = -(-2)(-8) = -16\,w$



2.20 Determine i_o in the circuit of Fig. 2.84.

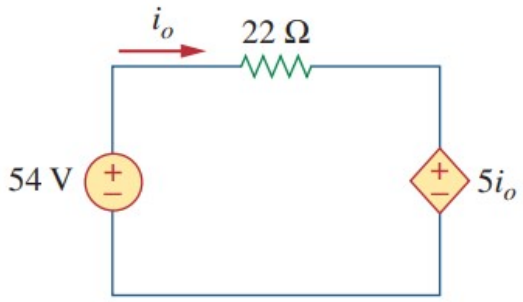
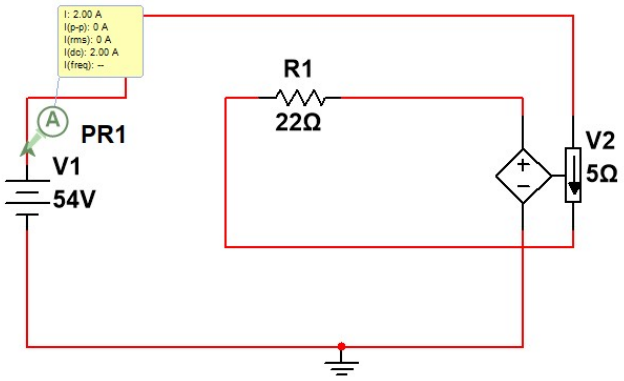


Figure 2.84
For Prob. 2.20.

apply K.V.L

$-54 + 22i_o + 5i_o = 0$

$i_o = 2A$



2.30 Find R_{eq} for the circuit in Fig. 2.94.

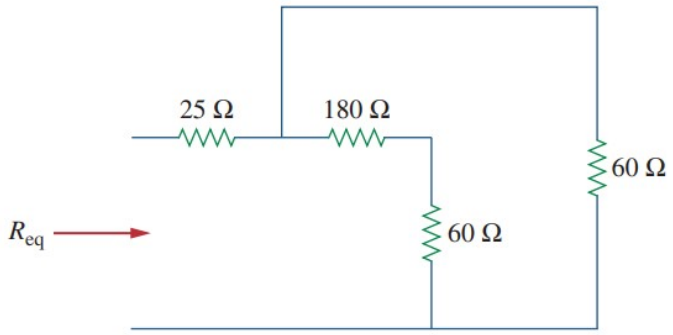
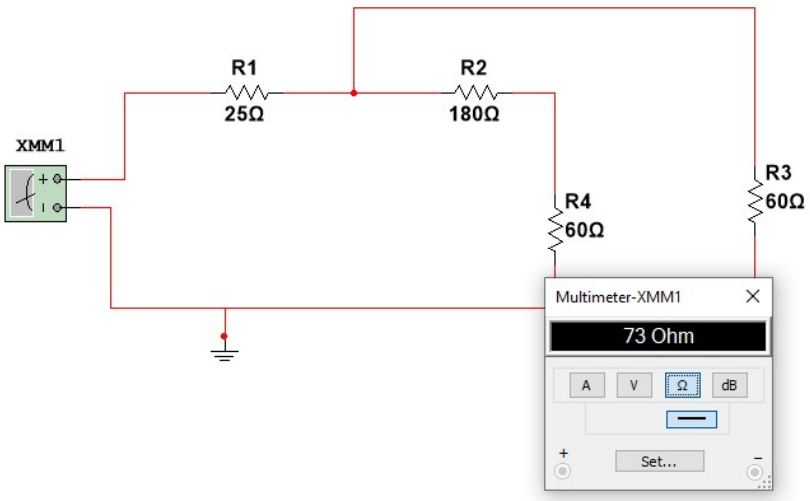


Figure 2.94
For Prob. 2.30.

$180 + 60 = 240\,\Omega$

$240 \,//\, 60 = \frac{240 * 60}{240 + 60} = 48\,\Omega$

$R_{eq} = 25 + 48 = 73\,\Omega$



2.31 For the circuit in Fig. 2.95, determine i_1 to i_5.

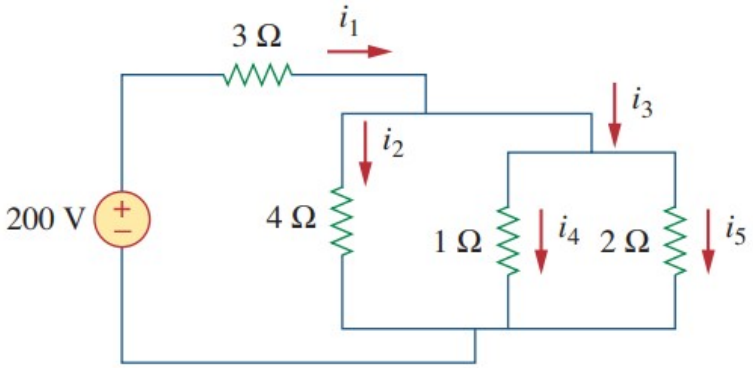


Figure 2.95
For Prob. 2.31.

$1 \,//\, 2 = \frac{1 \times 2}{1+2} = \frac{2}{3}\ \Omega$

$\frac{2}{3} \,//\, 4 = \frac{\frac{2}{3} \times 4}{\frac{2}{3} + 4} = \frac{4}{7}\ \Omega$

$R_{eq} = 3 + \frac{4}{7} = \frac{25}{7}\ \Omega$

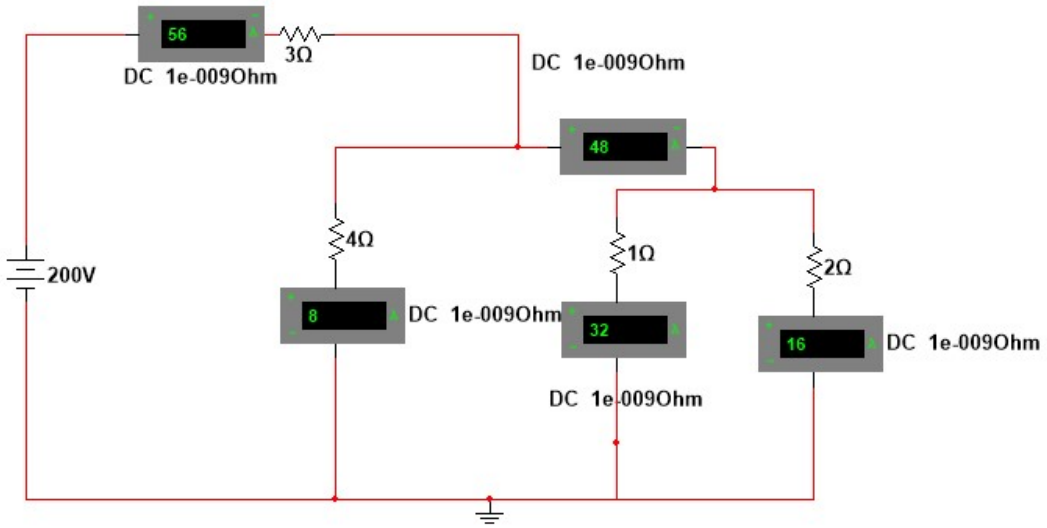
$I_1 = 200 \div \frac{25}{7} = 56\ A$

$I_2 = 56 \times \frac{\frac{2}{3}}{4 + \frac{2}{3}} = 8\ A$

$I_3 = 56 - 8 = 48\ A$

$I_4 = 48 \times \frac{2}{1+2} = 32\ A$

$I_5 = 16\ A$



2.41 If $R_{eq} = 50\ \Omega$ in the circuit of Fig. 2.105, find R.

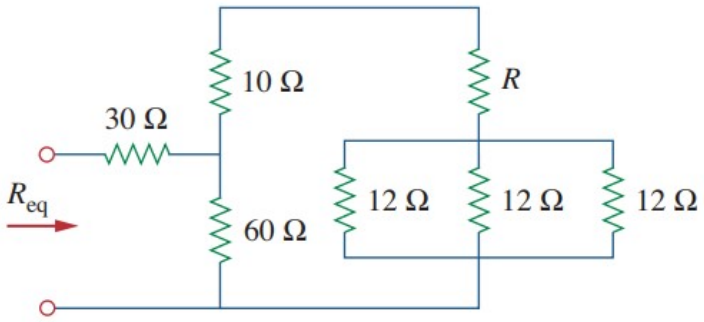


Figure 2.105
For Prob. 2.41.

$12 // 12 // 12 = \frac{12}{3} = 4\ \Omega$

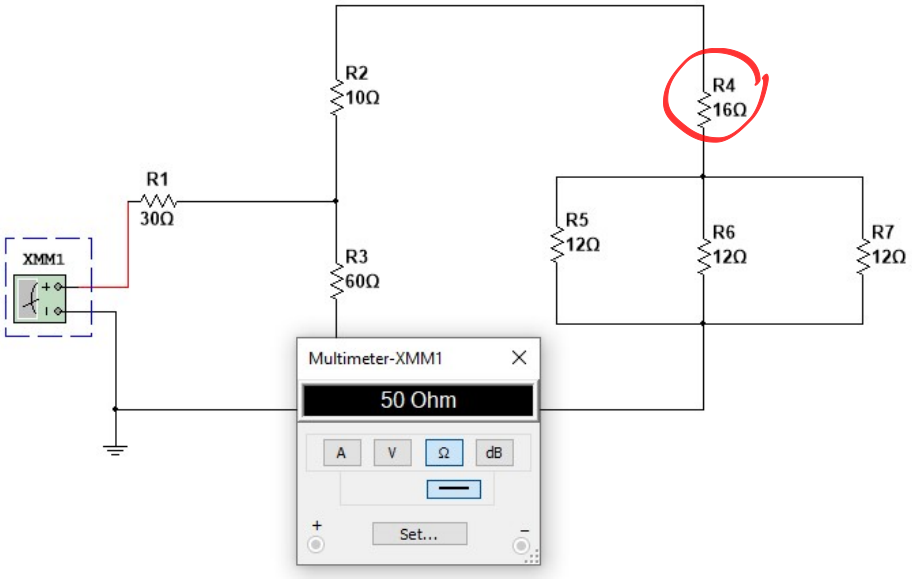
c

$10 + 4 + R // 60 = \frac{(14+R)*60}{14+R+60}$

$R_{eq} = 30 + \frac{(14+R)*60}{74+R} = 50$

$$20 * 24 + 20R = 14 * 60 + 60R$$

$$R = \frac{640}{40} = 16\,\Omega$$



2.46 Find I in the circuit of Fig. 2.110.

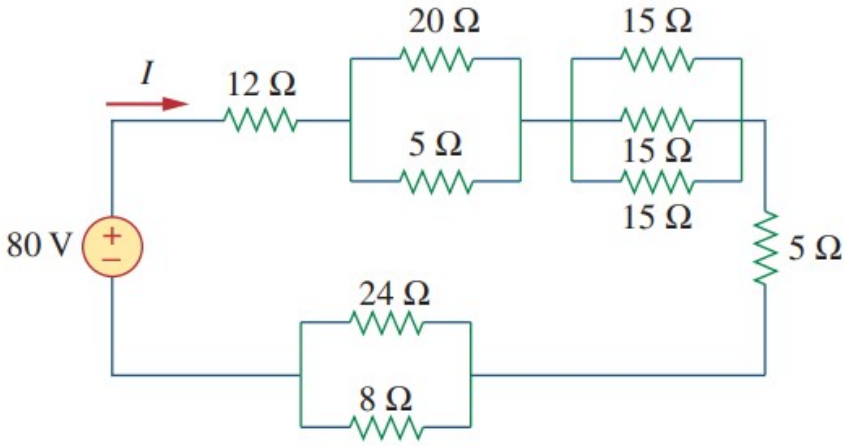


Figure 2.110
For Prob. 2.46.

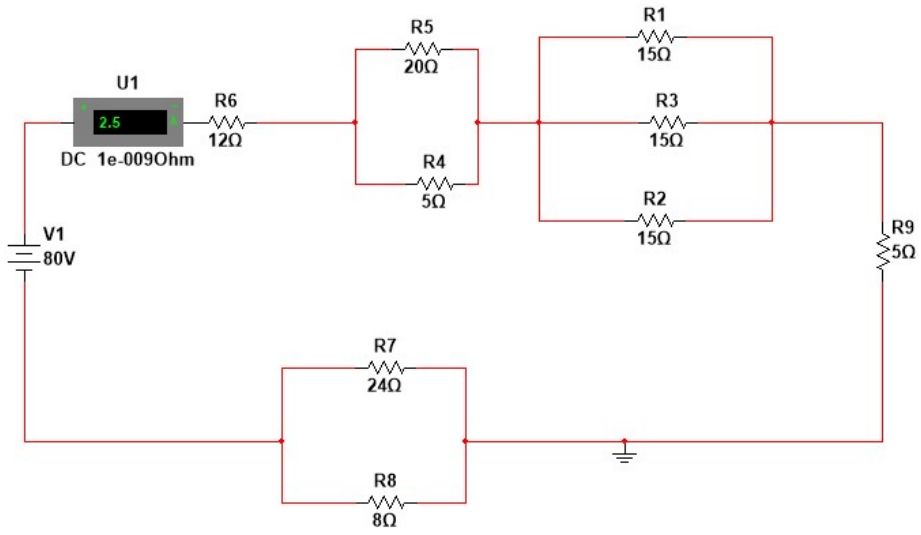
$$20 \,//\, 5 = \frac{20 * 5}{20 + 5} = 4\,\Omega$$

$$15 \,//\, 15 \,//\, 15 = \frac{15}{3} = 5\,\Omega$$

$$24 \,//\, 8 = \frac{24 * 8}{24 + 8} = 6\,\Omega$$

$$12 + 4 + 5 + 5 + 6 = 32\,\Omega$$

$$I = \frac{80}{32} = 2.5A$$



2.55 Calculate I_o in the circuit of Fig. 2.119.

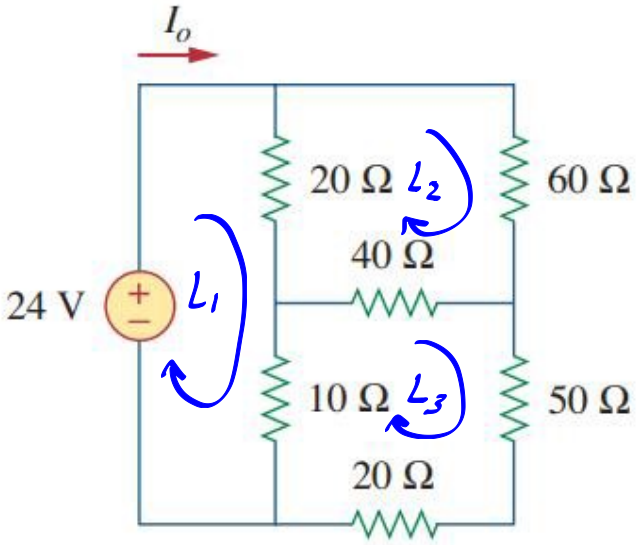


Figure 2.119
For Prob. 2.55.

apply mesh analysis

$$-24 + 20(I_1 - I_2) + 10(I_1 - I_3) = 0$$

$$30I_1 - 20I_2 - 10I_3 = 24 \rightarrow (1)$$

$$20(I_2 - I_1) + 60I_2 + 40(I_2 - I_3) = 0$$

$$-20I_1 + 120I_2 - 40I_3 = 0 \rightarrow (2)$$

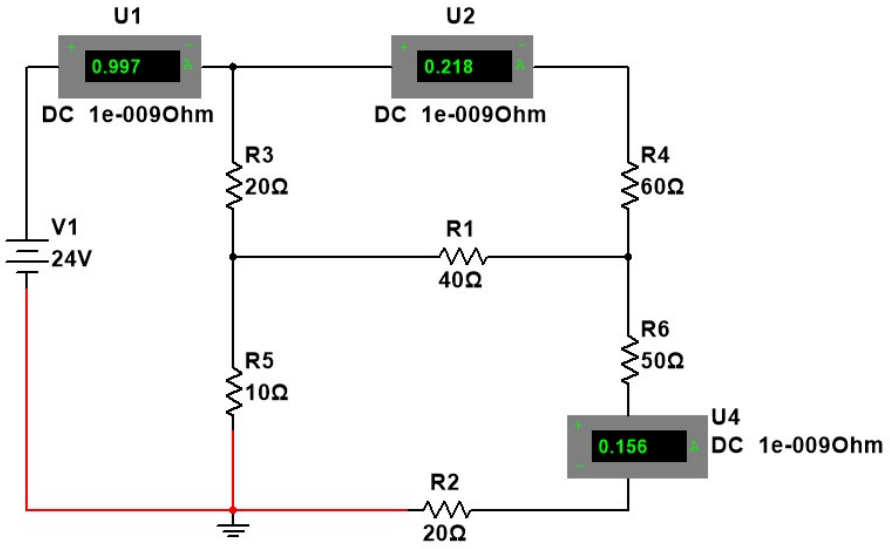
$$50I_3 + 20I_3 + 10(I_3 - I_1) + 40(I_3 - I_2) = 0$$

$$-10I_1 - 40I_2 + 120I_3 = 0 \rightarrow (3)$$

بالحاسبة

$I_1 = 0.977\,A$, $I_2 = 0.218\,A$, $I_3 = 0.156\,A$

$I_o = I_1 = 0.977\,A$



3.9 Determine I_b in the circuit in Fig. 3.58 using nodal analysis.

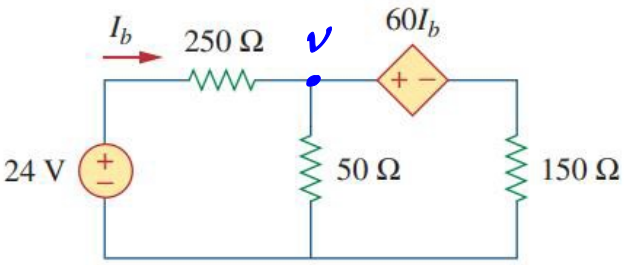


Figure 3.58
For Prob. 3.9.

$$I_b = \frac{24 - V}{250}$$

apply nodal analysis

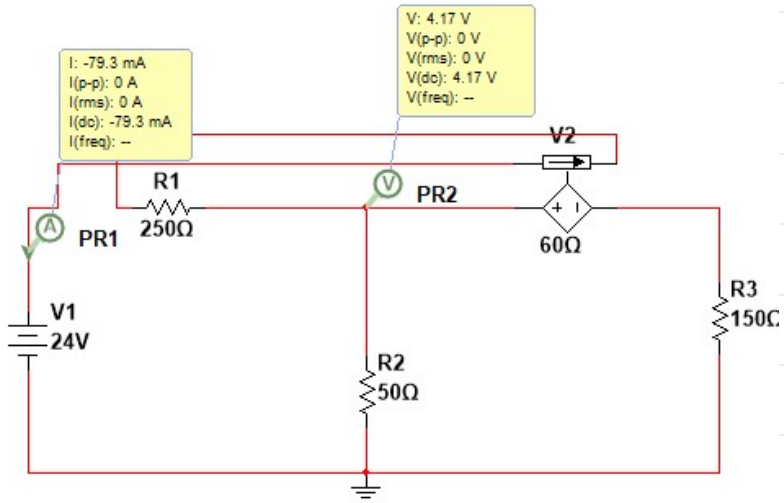
$$\frac{V-24}{250} + \frac{V}{50} + \frac{V - 60I_b}{150} = 0 \quad * 1500$$

$$6(V-24)+30V+10\left(V-60*\frac{24-V}{250}\right)=0$$

$$6V+30V+10V+\frac{600}{250}V=\frac{600*24}{250}+6*24$$

$$V=4.165\ V$$

$$I_b=\frac{24-4.165}{250}=79.34*10^{-3}A=79.34mA$$



3.19 Use nodal analysis to find v_1, v_2, and v_3 in the circuit of Fig. 3.68.

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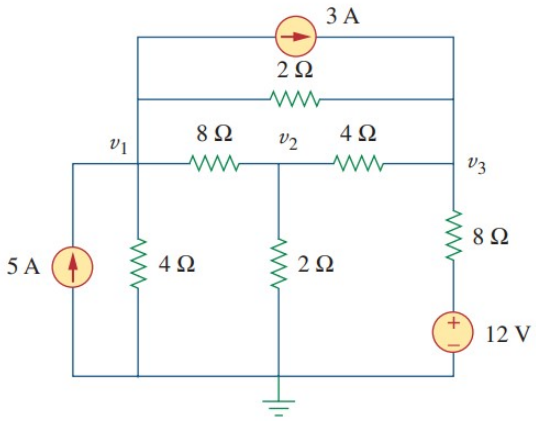


Figure 3.68
For Prob. 3.19.

apply nodal analysis

$$-5+\frac{v_1}{4}+\frac{v_1-v_2}{8}+\frac{v_1-v_3}{2}+3=0 \quad *8$$

$$2v_1+v_1-v_2+4v_1-4v_3=16$$

$$7v_1-v_2-4v_3=16 \rightarrow (1)$$

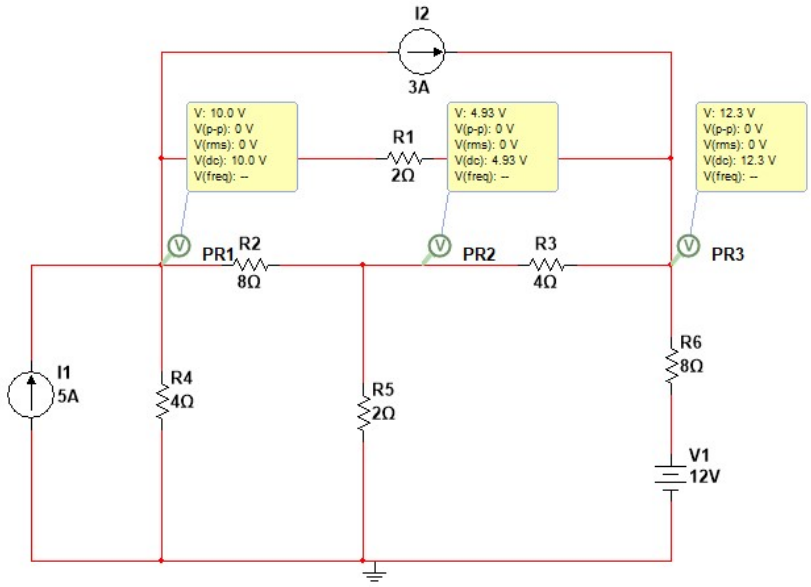
$$\frac{v_2-v_1}{8}+\frac{v_2}{2}+\frac{v_2-v_3}{4}=0 \quad *8$$

$$-v_1+7v_2-2v_3=0 \rightarrow (2)$$

$$-3+\frac{v_3-v_2}{4}+\frac{v_3-v_1}{2}+\frac{v_3-12}{8}=0 \quad *8$$

$$-4v_1-2v_2+7v_3=3*8+12$$

$$v_1=10v,\ v_2=4.93v,\ v_3=12.267v$$



3.20 For the circuit in Fig. 3.69, find v_1, v_2, and v_3 using nodal analysis.

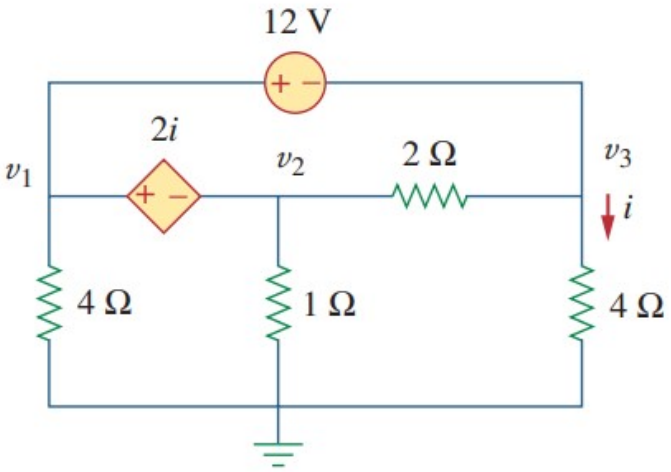


Figure 3.69
For Prob. 3.20.