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فيزياء
استاتيكا
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. 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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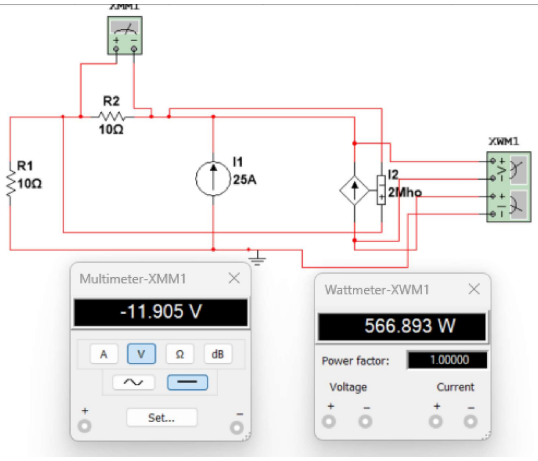
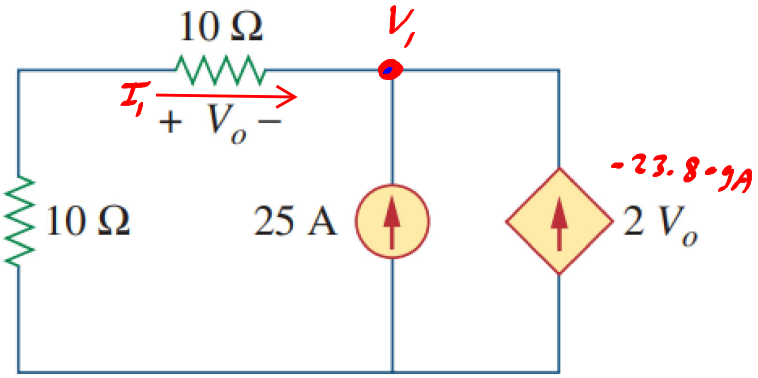
Question 1:

$I_1 = \frac{V_o}{10}$ *

Find (a) the voltage Vo in the circuit in Fig. 1, and (b) the power absorbed by the dependent source.





(a) apply K.C.L

$-\frac{V_o}{10} - 25 - 2V_o = 0 \Rightarrow V_o = -11.905\ V$

(b) $P = I.V = I^2R = \frac{V^2}{R}$

apply nodal analysis at node 1

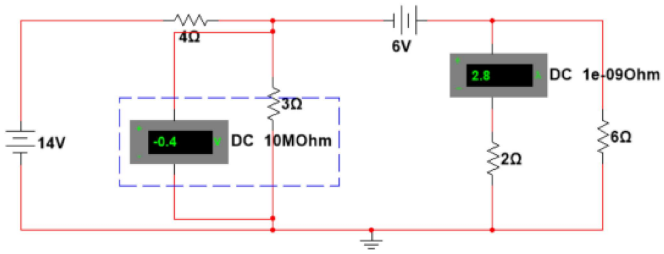
$\frac{V_1}{20} - 25 + 2(+11.905) = 0$

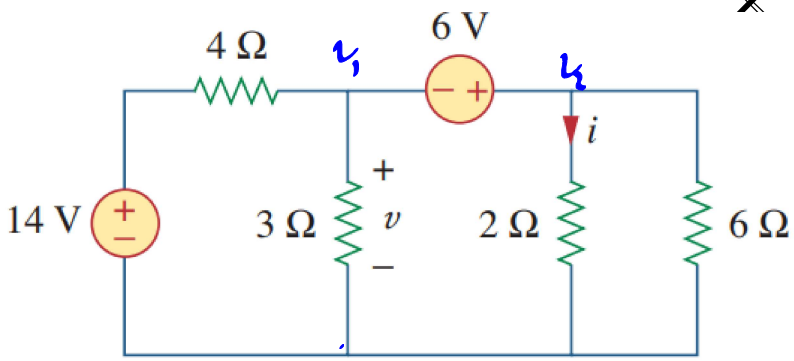
$V_1 = 23.8\ V$

$P = I.V = (-23.809)(23.8) = 566.65\ W$

Question 2:

Find **voltage** v and **current** i in the circuit of Fig. 2, using **nodal analysis** method.





$v_2 - v_1 = 6 \Rightarrow v_2 = 6 + v_1 \rightarrow ①$

$\frac{v_1 - 14}{4} + \frac{v_1}{3} + \frac{6+v_1}{2} + \frac{6+v_1}{6} = 0 \rightarrow ②$

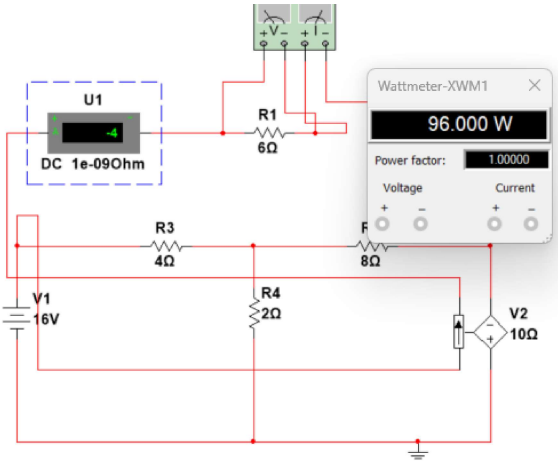
$v_1 = -0.4V, \quad v_2 = 5.6V$

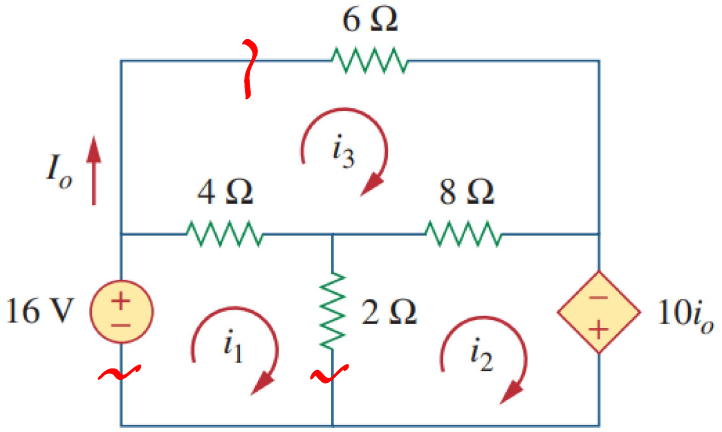
$v = -0.4V$

$I = \frac{v_2}{2} = \frac{5.6}{2} = 2.8A$

Question 3:

Using **mesh analysis**, find **current *Io*** in the circuit of Fig. 3. Then, calculate the power dissipated in 6 ohms.





$I_3 = I_o$ *

$-16 + 4(I_1 - I_3) + 2(I_1 - I_2) = 0$

$6I_1 - 2I_2 - 4I_3 = 16 \rightarrow (1)$

$2(I_2 - I_1) + 8(I_2 - I_3) - 10I_3 = 0$

$-2I_1 + 10I_2 - 18I_3 = 0 \rightarrow (2)$

$6I_3 + 8(I_3 - I_2) + 4(I_3 - I_1) = 0$

$-4I_1 - 8I_2 + 18I_3 = 0 \rightarrow (3)$

$I_1 = -2.57A$, $I_2 = -7.71A$, $I_3 = -4A$

$I_o = I_3 = -4A$

$P = I.V = \frac{V^2}{R} = I^2R = (-4)^2 * 6 = 96W$

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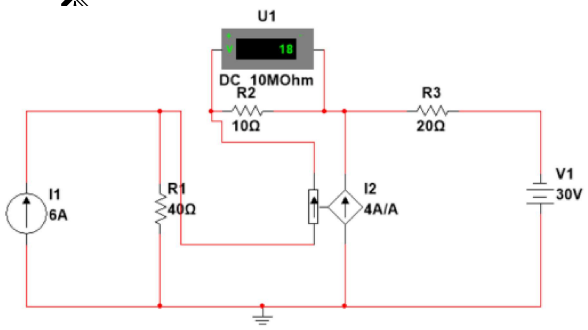
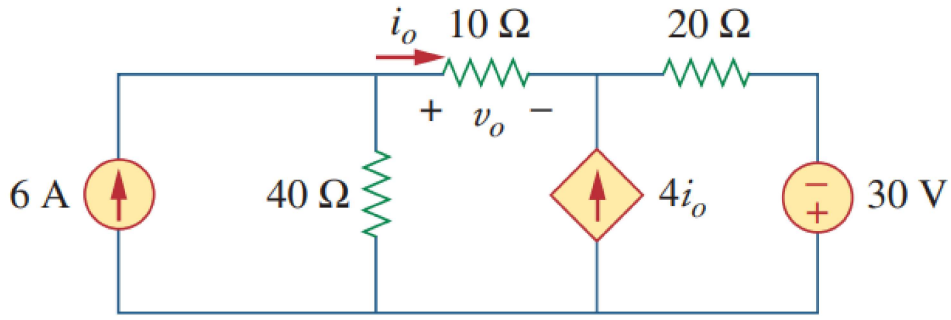
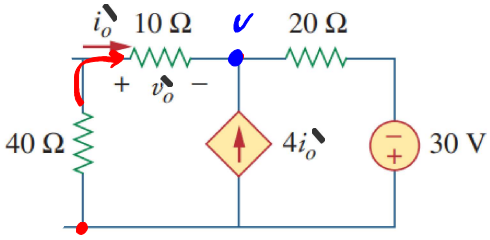
Question 4:

Use the **superposition principle** to find **voltage *Vo*** and **current *Io*** in the circuit of Fig. 4.





$I_o' = \frac{-V}{50}$ *



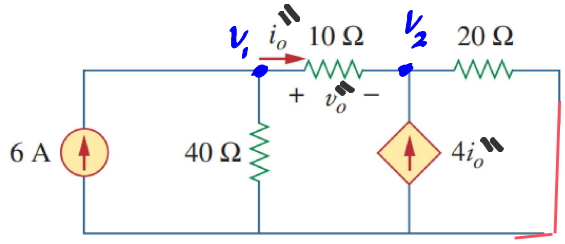
$\frac{V}{50} - 4I_o' + \frac{V+30}{20} = 0$

$V = -10V$

$I_o' = \frac{10}{50} = 0.2A$

$V_o' = 0.2 \times 10 = 2V$

$I_o'' = \frac{V_1 - V_2}{10} \times$



$-6 + \frac{V_1}{40} + \frac{V_1 - V_2}{10} = 0$

$5V_1 - 4V_2 = 240 \rightarrow (1)$

$\frac{V_2 - V_1}{10} - 4I_o'' + \frac{V_2}{20} = 0$

$2V_2 - 2V_1 - 8V_1 + 8V_2 + V_2 = 0$

$-10V_1 + 11V_2 = 0 \rightarrow (2)$

$V_1 = 176V, \quad V_2 = 160V$

$I_o'' = \frac{176 - 160}{10} = 1.6A$

$V_o'' = 176 - 160 = 16V$

$i_o = i_o' + i_o'' = 0.2 + 1.6 = 1.8\,A$

$v_o = v_o' + v_o'' = 2 + 16 = 18\,V$