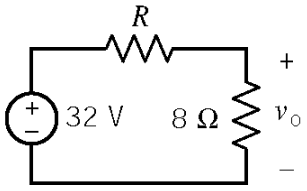
ES 250 First Midterm Practice Exam 1

1.



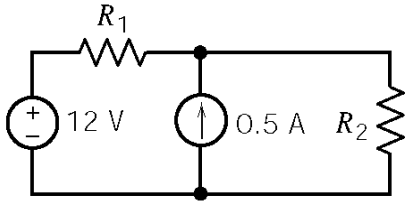
a. To cause $v_o = 17.07$ V choose R = ____7_____Ω.

b. To cause $v_o = 9.143$ V choose R = ____20_____Ω.

c. If R = 14 Ω then v_o =____11.6____ V

d. If $v_o = 14.22$ V the voltage source supplies ___56.9____W of power.

2.



The voltage source supplies 4.8 W of power and the current source supplies 3.6 W of power.

R_1 = ____12_____Ω and R_2 = ____8_____Ω

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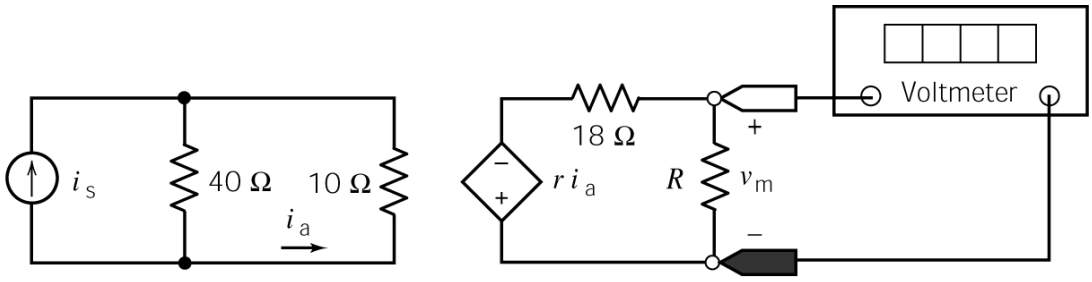
3. The input this circuit is the current of the current source, i_s. The output is the voltage measured by the meter, v_m. The output is proportional to the input, that is $v_m = k\, i_s$, where k is the constant of proportionality.



a. When $i_s = 3$ A, $R = 12$ Ω and $r = 10$ V/A, then i_a = ____2.4___ A and v_m = ____9.6___ V.

b. When $R = 12$ Ω, then r = __6.25___ V/A is required to cause $v_m = 2\, i_s$.

c. When $r = 10$ V/A then R = ____6____ Ω is required to cause $v_m = 2\, i_s$.

d. When $R = 12$ Ω and $i_s = 5$ A, then r = ___7.5___ V/A is required to cause $v_m = 12$ V.

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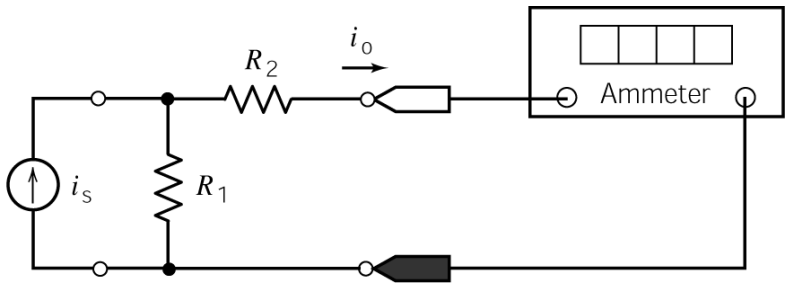
4. The input to this circuit is the source current, i_s. The output is the current measured by the meter, i_o. A current divider connects the source to the meter.



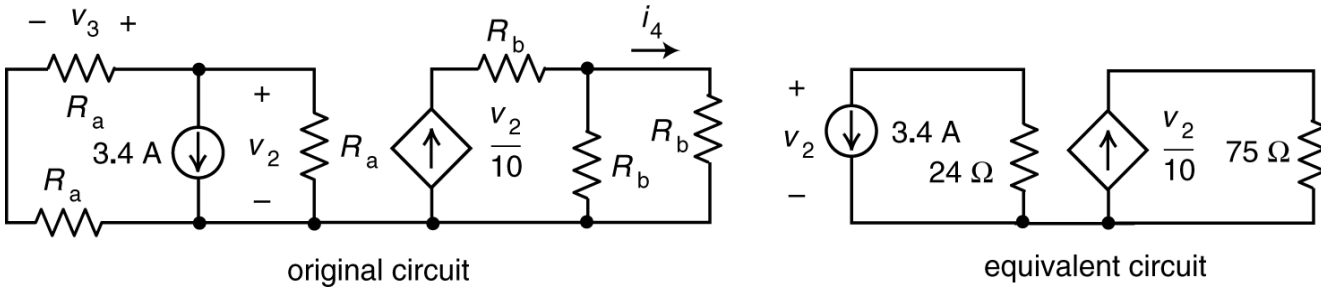
Given these observations:

A. The input $i_s = 5$ A causes the output to be $i_o = 2$ A.

B. When $i_s = 2$ A the source supplies 48 W.

The values of the resistances are $R_1 =$ ___20___ Ω and $R_2 =$ ____30___ Ω.

5.



The equivalent circuit on the right is obtained from the original circuit on the left by replacing series and parallel combinations of resistors by equivalent resistors. The original circuit contains 3 equal resistances labeled R_a and another 3 equal resistances labeled R_b. Determine the values of R_a and R_b. Given that $v_2 = -81.6$ V, determine the values of v_3 and i_4.

$R_a =$ ____36____ Ω, $R_b =$ ____50____ Ω, $v_3 =$ ___–40.8___ V and $i_4 =$ ___–4.08____ A.

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6. Given that

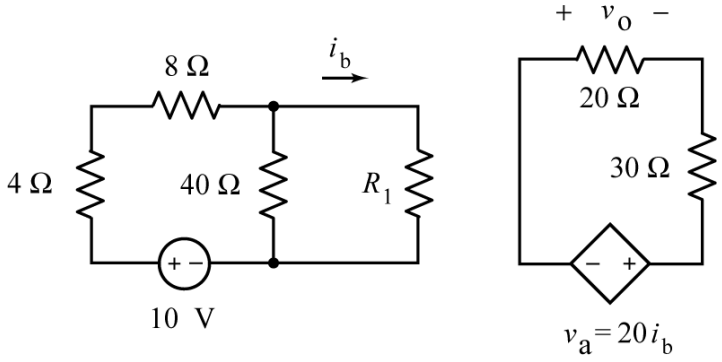
$$v_a = 8 \text{ V},$$

Determine the values of R_1 and v_o:

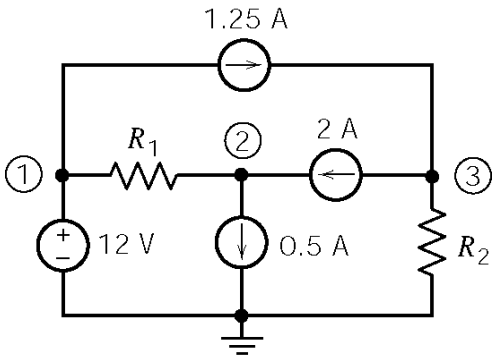
$R_1 =$ ____10____ Ω,

and

$v_o =$ ___–3.2___ V



7.



The encircled numbers are node numbers. The corresponding node voltages are

$$v_1 = 12 \text{ V}, \; v_2 = 21 \text{ V} \text{ and } v_3 = -3 \text{ V},$$

a. The 0.5 A current source **supplies** ____–10.5___ W of power.

b. The 2 A current source **supplies** _____48____ W of power.

c. $R_1 =$ _____6____ Ω and $R_2 =$ ____4_____ Ω

d. The voltage source **supplies** ____–3_____ W of power.