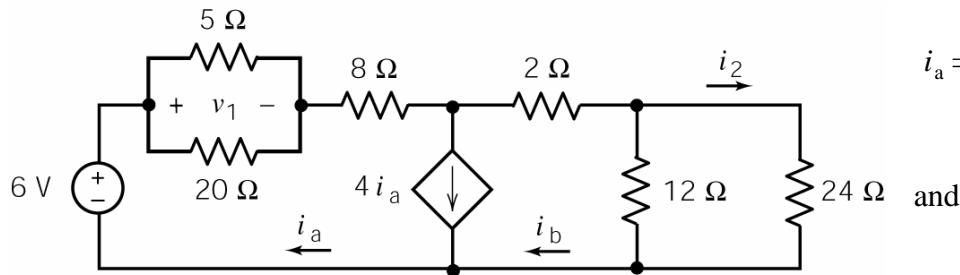


ES 250 First Midterm Practice Exam 2

1.



$$i_a = \underline{-0.333} \text{ A}, \quad i_b = \underline{1} \text{ A},$$

$$i_2 = \underline{0.333} \text{ A},$$

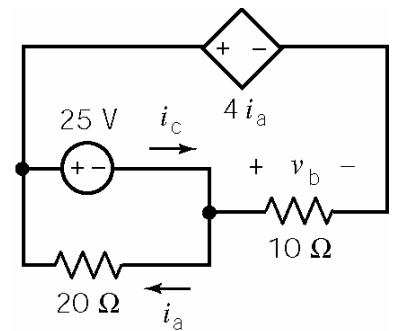
$$v_1 = \underline{-1.333} \text{ V}$$

2.

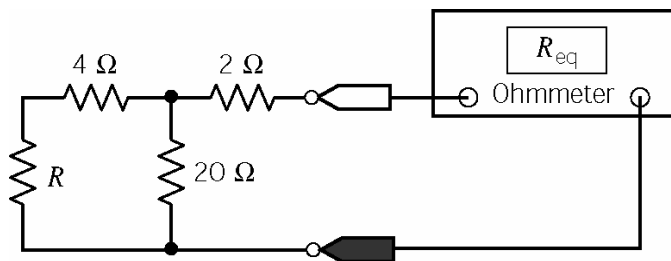
The current in the 20-Ω resistor is $i_a = \underline{-1.25} \text{ A}$.

The voltage across the 10-Ω resistor is $v_b = \underline{-30} \text{ V}$.

The (independent) voltage source current is $i_c = \underline{-4.25} \text{ A}$.



3.

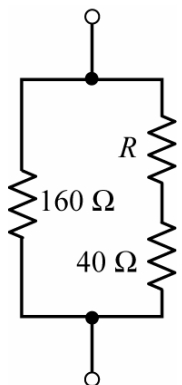


The Ohmmeter measures equivalent resistance.

a. To cause $R_{eq} = 12 \Omega$, choose $R = \underline{16} \Omega$.

b. If $R = 14 \Omega$ then $R_{eq} = \underline{11.5} \Omega$.

4.



Consider this combination of resistors. Let R_p denote the equivalent resistance.

(a) Suppose $40 \Omega \leq R \leq 400 \Omega$. Determine the corresponding range of values of R_p :

$$\underline{53.33} \Omega \leq R_p \leq \underline{117.33} \Omega$$

(b) Suppose instead $R = 0$ (a short circuit). Then $R_p = \underline{32} \Omega$

(c) Suppose instead $R = \infty$ (an open circuit). Then $R_p = \underline{160} \Omega$

(d) Suppose instead the equivalent resistance is $R_p = 80 \Omega$. Then $R = \underline{120} \Omega$

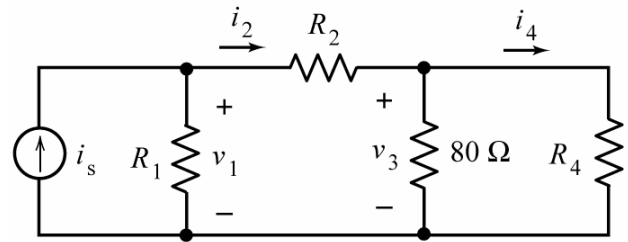
5. In this circuit $i_2 = \frac{2}{5}i_s$, and $v_3 = \frac{2}{3}v_1$ and $i_4 = \frac{4}{5}i_2$.

Determine the values of R_1 , R_2 and R_4 .

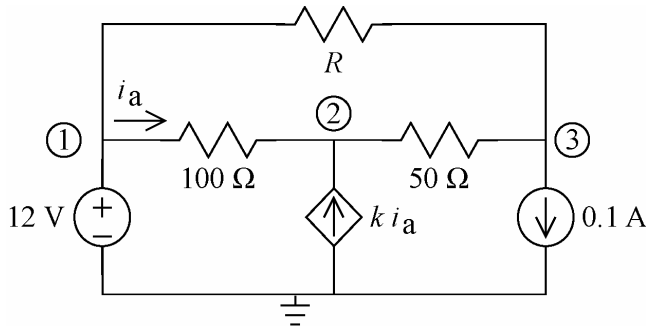
$$R_1 = \underline{16} \Omega, R_2 = \underline{8} \Omega$$

and

$$R_4 = \underline{20} \Omega$$



6.



Encircled numbers are node numbers. The corresponding node voltages are:

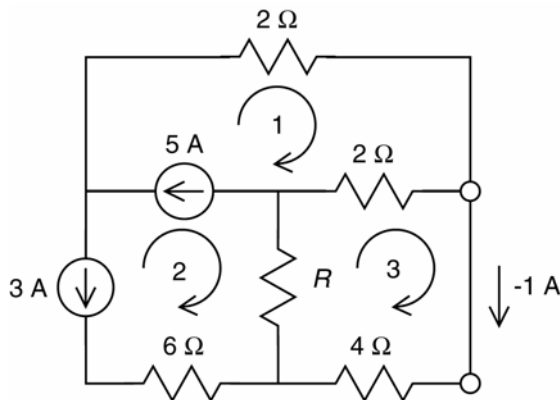
$$v_1 = 12 \text{ V}, v_2 = 10.5 \text{ V} \text{ and } v_3 = 6 \text{ V}$$

The value of the gain of the CCCS is $k = \underline{5.00} \text{ A/A}$.

The resistance of the resistor at the top of the circuit is $R = \underline{600} \Omega$. (Round to an integer.)

The power supplied by the independent (0.1 A) current source is $\underline{-0.6} \text{ W}$.

7.



Let i_1 , i_2 and i_3 denote the mesh currents in meshes 1, 2 and 3, respectively.

Determine the values of these mesh currents:

$$i_1 = \underline{2} \text{ A} \text{ and } i_2 = \underline{-3} \text{ A}$$

Determine the value of the resistance R :

$$R = \underline{5} \Omega$$