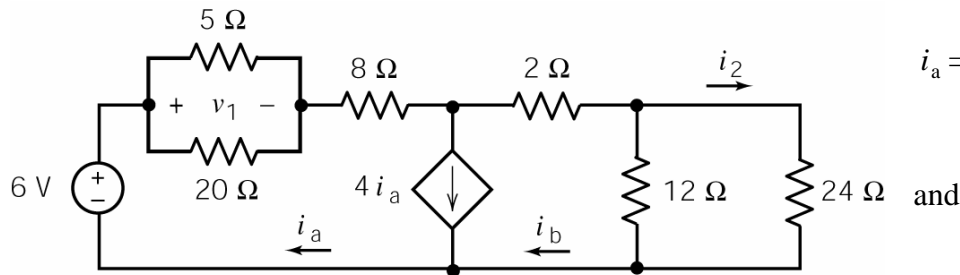


## ES 250 First Midterm Practice Exam 2

1.



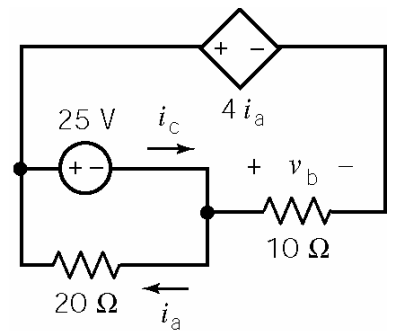
$i_a = \underline{\hspace{2cm}}$  A,  $i_b = \underline{\hspace{2cm}}$  A,  
 $i_2 = \underline{\hspace{2cm}}$  A,  
 $v_1 = \underline{\hspace{2cm}}$  V

2.

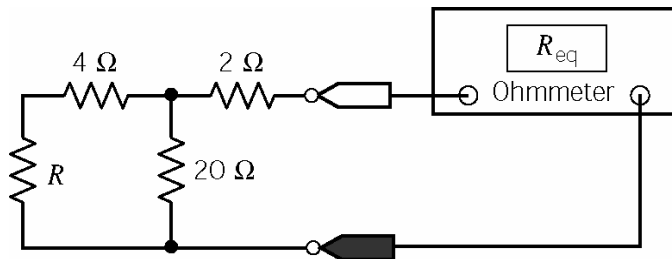
The current in the 20-Ω resistor is  $i_a = \underline{\hspace{2cm}}$  A.

The voltage across the 10-Ω resistor is  $v_b = \underline{\hspace{2cm}}$  V.

The (independent) voltage source current is  $i_c = \underline{\hspace{2cm}}$  A.



3.

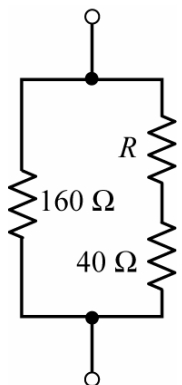


The Ohmmeter measures equivalent resistance.

a. To cause  $R_{eq} = 12 \Omega$ , choose  $R = \underline{\hspace{2cm}}$  Ω.

b. If  $R = 14 \Omega$  then  $R_{eq} = \underline{\hspace{2cm}}$  Ω.

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  $R_p$ :

$$\underline{\hspace{2cm}} \Omega \leq R_p \leq \underline{\hspace{2cm}} \Omega$$

(b) Suppose instead  $R = 0$  (a short circuit). Then  $R_p = \underline{\hspace{2cm}}$  Ω

(c) Suppose instead  $R = \infty$  (an open circuit). Then  $R_p = \underline{\hspace{2cm}}$  Ω

(d) Suppose instead the equivalent resistance is  $R_p = 80 \Omega$ . Then  $R = \underline{\hspace{2cm}}$  Ω

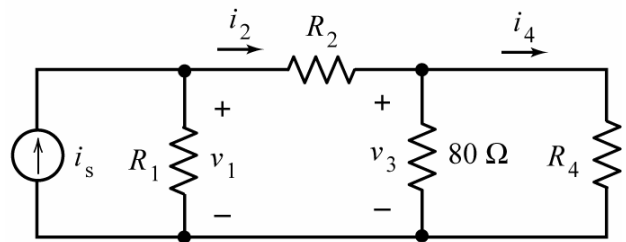
5. In this circuit  $i_2 = \frac{2}{5}i_s$ , and  $v_3 = \frac{2}{3}v_1$  and  $i_4 = \frac{4}{5}i_2$ .

Determine the values of  $R_1$ ,  $R_2$  and  $R_4$ .

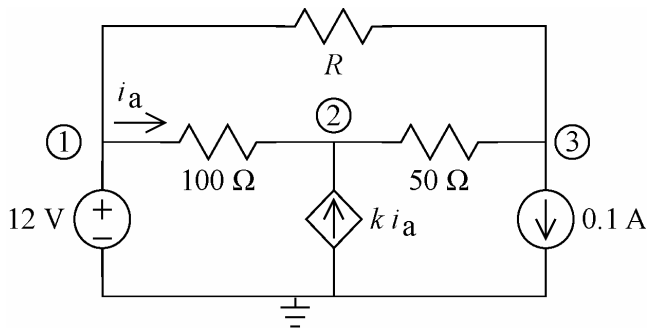
$$R_1 = \text{_____ } \Omega, R_2 = \text{_____ } \Omega$$

and

$$R_4 = \text{_____ } \Omega$$



6.



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

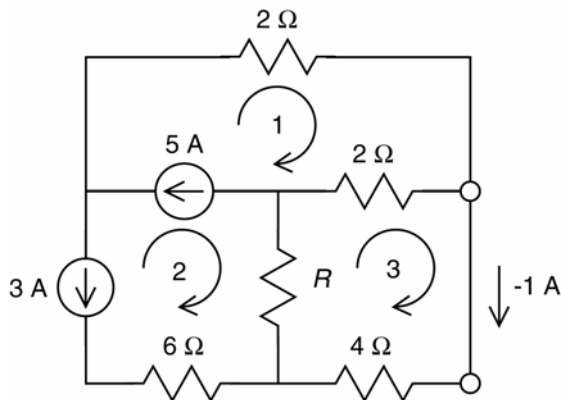
$$v_1 = 12 \text{ V}, v_2 = 10.5 \text{ V} \text{ and } v_3 = 6 \text{ V}$$

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

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

The power supplied by the independent (0.1 A) current source is \_\_\_\_\_ 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:

$$i_1 = \text{_____ A} \text{ and } i_2 = \text{_____ A}$$

Determine the value of the resistance  $R$ :

$$R = \text{_____ } \Omega$$