ECS 203 2014: Quiz 1 Solution

Instructions

i. Separate into groups of no more than three persons.

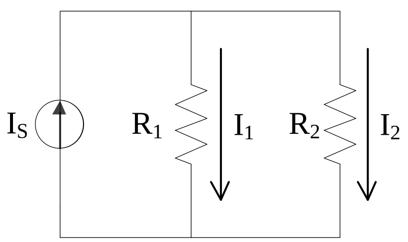
ii. Only one submission is needed for each group. Late submission will not be accepted.

iii. ***Write down all the steps*** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.

iv. **Do not panic.**

Name	ID
Prapun	

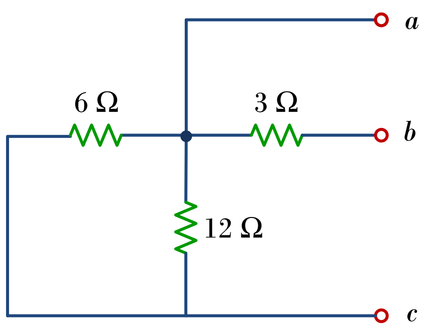
1. Find I_1 when $I_S = 10$ A, $R_1 = 3$ kΩ and $R_2 = 2$ kΩ.



current divider formula

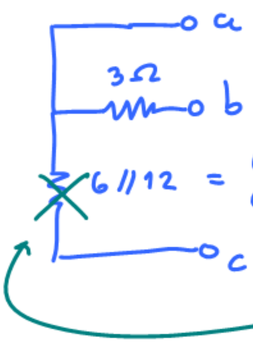
$$I_1 = \frac{\frac{1}{R_1}}{\frac{1}{R_1}+\frac{1}{R_2}} I_s = \frac{R_2}{R_1+R_2} I_s = \frac{2k}{3k+2k} \times 10 = \frac{2}{5} \times 10 = 4\text{ A}$$

2. Consider the circuit below.



a. Find the equivalent resistance with respect to terminals a-b

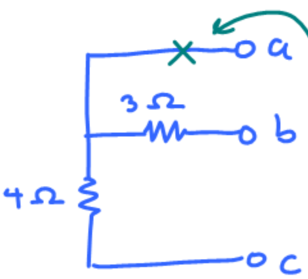
≡



$$6 // 12 = \frac{6\times12}{6+12} = \frac{\cancel{6}\times\cancel{12}^{4}}{\cancel{18}_{\cancel{3}}} = 4\,\Omega$$

w.r.t. terminals a-b, the 4Ω is a "hanging" branch. So, we can ignore it. Then, only the 3Ω resistor is left. Therefore, $R_{eq} = 3\Omega$.

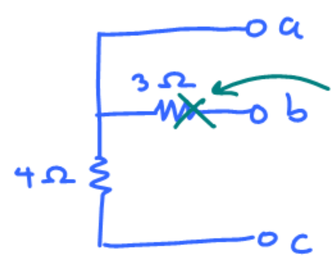
b. Find the equivalent resistance with respect to terminals b-c



w.r.t. terminals b-c, the connection to a is simply a "hanging" line.

(If we put a current source across terminals b-c, there won't be any current going up to "a" because there is no where the current can go after that)

c. Find the equivalent resistance with respect to terminals a-c

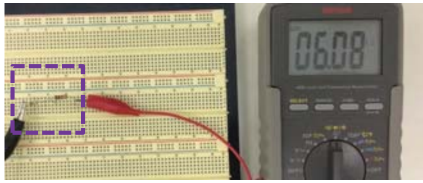


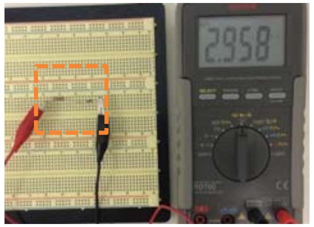
w.r.t. terminals a-c, the 3Ω is a "hanging" branch. So, we can ignore it. Then, only the 4Ω resistor is left. Therefore, $R_{eq} = 4\Omega$

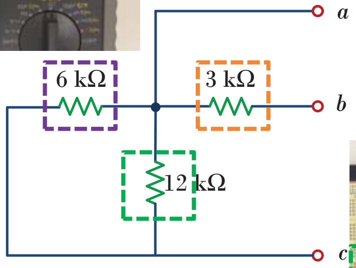
So, 3Ω and 4Ω are actually in series and

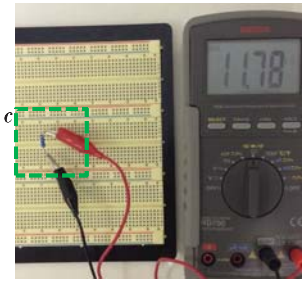
$$R_{eq} = 3 + 4 = 7\,\Omega$$

Quiz 1





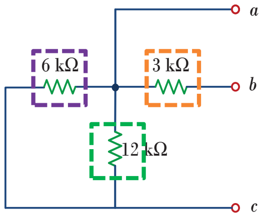


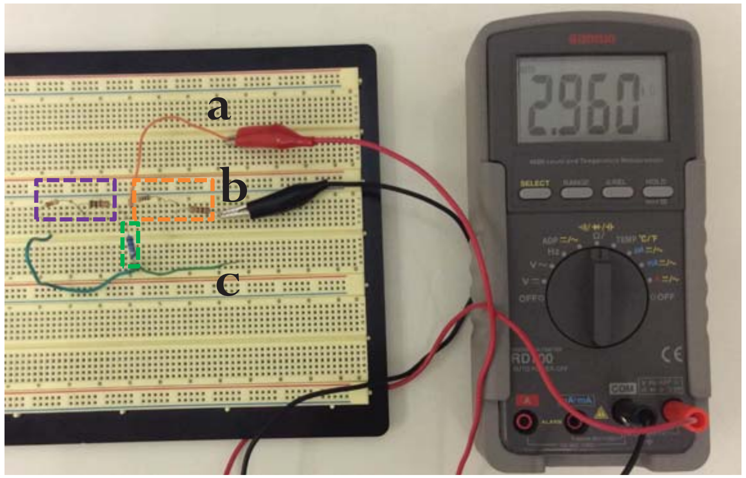


Note that kΩ is used instead of Ω.
(too small)

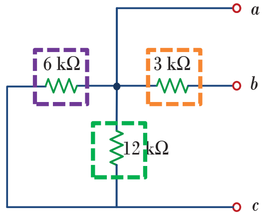
Quiz 1 Solution

$R_{ab} \approx 3\ \text{k}\Omega$

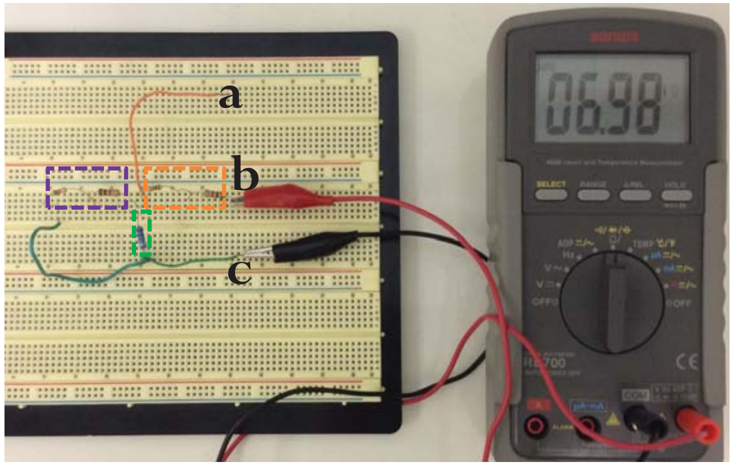




Quiz 1 Solution

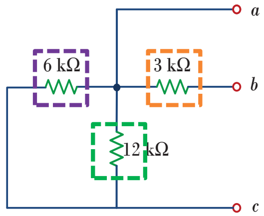


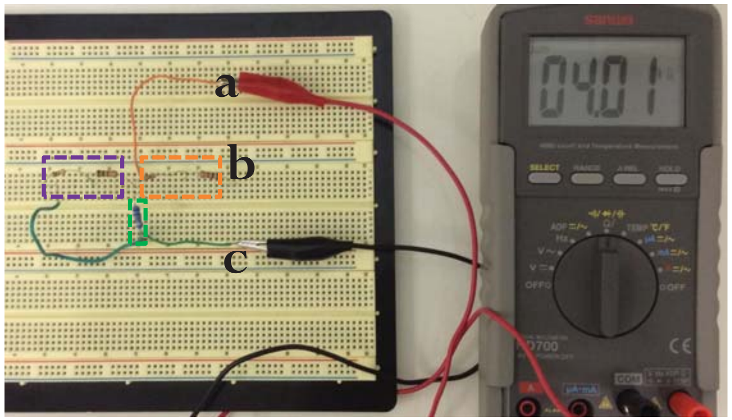
$R_{bc} \approx 7\ \text{k}\Omega$



Quiz 1 Solution

$R_{ac} \approx 4\ \text{k}\Omega$





ECS 203 2014: Quiz 2 Solution

Instructions

i. Separate into groups of no more than three persons. Make sure the group members are not exactly the same as any of your earlier groups.

ii. Only one submission is needed for each group. Late submission will not be accepted.

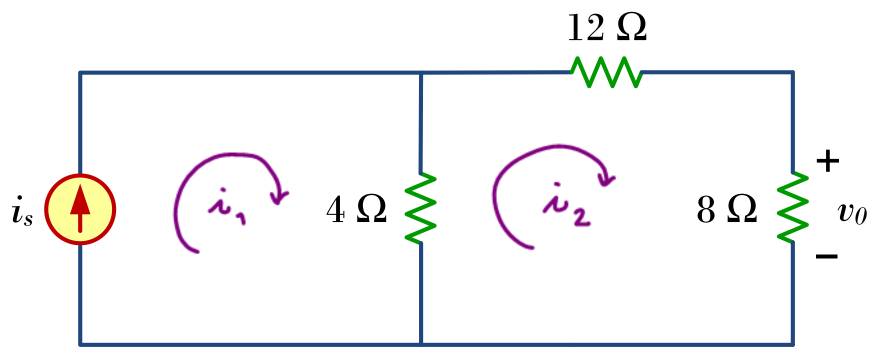
iii. ***Write down all the steps*** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.

Name	ID
Prapun	555

For the circuit below, suppose i_s = 15A.

a. Find all mesh currents.

b. Find v_0



From mesh ①,

$i_1 = i_s = 15$ A

From mesh ②,

$$-(i_2 - i_1)\times 4 - i_2 \times 12 - i_2 \times 8 = 0$$

$$4 i_1 = i_2 \underbrace{(4+12+8)}_{24}$$

$$i_2 = \frac{4}{24} i_1 = \frac{15}{6} = 2.5 \text{ A}$$

(a) $i_1 = 15$ A

$i_2 = 2.5$ A

(b) From Ohm's law, $v_0 = +i_2 \times 8 = \frac{5}{2} \times 8 = 5 \times 4 = 20$ V

direction of i_2 conforms with the passive sign convention when considered with the polarity of v_0.