

General Physics - E&M (PHY 1308) Lecture Notes

Quiz007

SteveSekula, 14 October 2010 (created 14 October 2010)

Name: _____

no tags

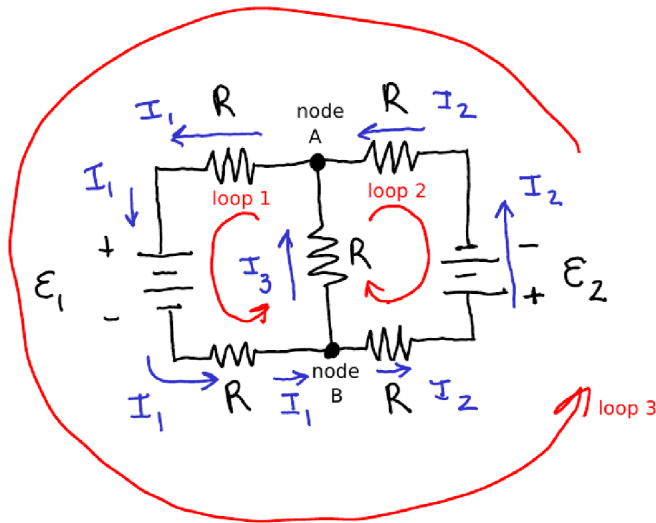
Date: _____

Rules for the Quiz:

- You are given **5 minutes at the beginning** to look over the quiz quietly and jot some notes on a 3x5-inch notecard. Use this time to think about how to attack the quiz problem(s)
 - You are given **20 minutes in the middle** to discuss the quiz with your teammates. Use this time to develop strategies across the group for attacking the problem(s). You are allowed to keep notes from this discussion on the SAME 3x5-inch notecard.
 - You then have **20 minutes at the end** to work individually (NO MORE DISCUSSION) to solve the problem(s). Use your notes on the 3x5-inch card to help you attack the problem(s)
 - You are allowed to use a calculator
 - Your grade will be determined from the weighted-average of your group and not from your individual performance. The highest grade will be weighted the most, and the lowest the least. Low grades will drag the average down, so it is in your best interest to collaborate during the discussion part of this quiz. All members of your team get the same grade, determined from that weighted average.
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Problem: Circuit Analysis with Kirchoff's Laws (30 Points)

The following circuit has been analyzed by the Professor using Kirchoff's Laws. However, there are 3 mistakes in the way the problem has been setup.



Kirchoff's Node Laws:

Node A:

$$0 = I_2 + I_3 - I_1$$

Node B:

$$0 = I_1 + I_2 - I_3$$

Kirchoff's Loop Laws:

Loop 1:

$$0 = -I_1 R + \mathcal{E}_1 - I_1 R - I_3 R$$

Loop 2:

$$0 = I_2 R - \mathcal{E}_2 + I_2 R - I_3 R$$

Loop 3:

$$0 = -I_1 R - \mathcal{E}_1 - I_1 R - I_2 R - \mathcal{E}_2 - I_2 R$$

Part 1 (15 Points): Clearly identify (e.g. by circling them or listing them) the mistakes in the above setup of the problem.

Part 2 (15 Points): Using the correct setup of the Kirchoff's Law problem, calculate the current I_3 . In the above circuit, $\mathcal{E}_1 = 4.0\text{V}$, $\mathcal{E}_2 = 12.0\text{V}$, and $R = 2\Omega$.