23S-EC ENGR-3-LEC-1 Homework 1

SANJIT SARDA

TOTAL POINTS

97 / 100

QUESTION 1

Q1 70 pts

1.1 a **10 / 10**

✓ **- 0 pts** *Correct*

- 3 pts Minor mistake

- 6 pts Major mistake

- 10 pts Incorrect

1.2 b **10 / 10**

✓ **- 0 pts** *Correct*

- 1 pts Same mistake

- 3 pts Minor mistake

- 10 pts Incorrect

1.3 c **10 / 10**

✓ **- 0 pts** *Correct*

- 1 pts Same mistake

- 3 pts Minor mistake

- 10 pts Incorrect

1.4 d **10 / 10**

✓ **- 0 pts** *Correct*

- 1 pts Same mistake

- 3 pts Minor mistake

- 10 pts Incorrect

1.5 e **17 / 20**

- 0 pts Correct

- 1 pts Same mistake

✓ **- 3 pts** *Minor mistake*

- 10 pts Multiple mistakes

- 20 pts Incorrect

1.6 f **10 / 10**

✓ **- 0 pts** *Correct*

- 1 pts Same mistake

- 3 pts Minor mistake

- 10 pts Incorrect

QUESTION 2

2 Q2 **15 / 15**

✓ **- 0 pts** *Correct*

- 3 pts Minor mistake

- 10 pts Multiple mistakes

- 15 pts Incorrect

Please leave answers in decimal form

QUESTION 3

3 Q3 **15 / 15**

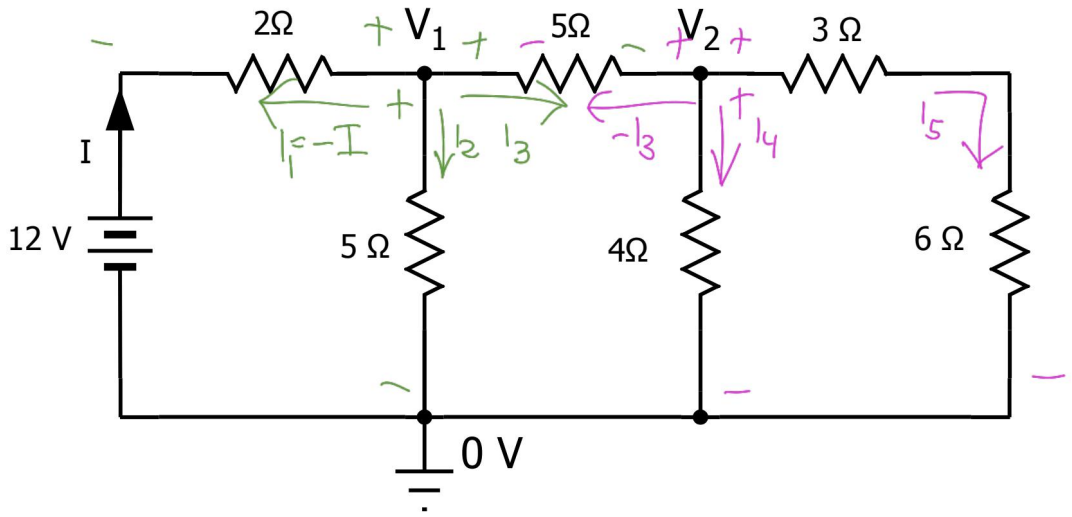
✓ **- 0 pts** *Correct*

- 3 pts Minor mistake

- 10 pts Multiple mistakes

- 15 pts Incorrect

EE3 Fall 2022
Homework Problem 1



1. Watch and study the KVL-KCL video as posted under Week 1. Look up and study the Passive Sign Convention.
   a. Assuming that all of the currents at Node 1 (where V_1 is) are *leaving* the node, write an Ohm's Law expression for the current going through the 2Ω resistor.
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   e. Now, following the procedures in a, b, and c, write Ohm's Law expressions for the three currents leaving Node 2.
   f. Combine the three answers to 1e into a second KCL equation.
2. You now have 2 equations in 2 unknowns. Solve them for V_1 and V_2.
3. Now that you know V_1, you can compute I.

① (a) $I_1 = -I = \frac{V_1 - 12}{2}$ (b) $I_2 = \frac{V_1}{5}$ (c) $I_3 = \frac{V_1 - V_2}{5}$ (d) $\frac{V_1 - 12}{2} + \frac{V_1}{5} + \frac{V_1 - V_2}{5} = 0$

$5V_1 - 60 + 2V_1 + 2V_1 - 2V_2 = 0$

$9V_1 - 2V_2 = 60$

(e) $-I_3 = \frac{V_2 - V_1}{5}$ $I_4 = \frac{V_2}{4}$ $I_5 = \frac{V_2}{3+6}$ (f) $\frac{V_2 - V_1}{5} + \frac{V_2}{4} + \frac{V_2}{9} = 0$

$36V_2 - 36V_1 + 45V_2 + 20V_2 = 0$

$101V_2 - 36V_1 = 0$

② $9V_1 - 2V_2 = 60 \rightarrow V_1 = \frac{60 + 2V_2}{9}$

$101V_2 - 36V_1 = 0 \rightarrow V_2 = \frac{36V_1}{101}$

$\therefore V_1 = \frac{2020}{279}$

$V_2 = \frac{80}{31}$

$I = -I_1 = 6 - \frac{V_1}{2} = 6 - \frac{1010}{279} = 2.38A$

1.1 a **10 / 10**

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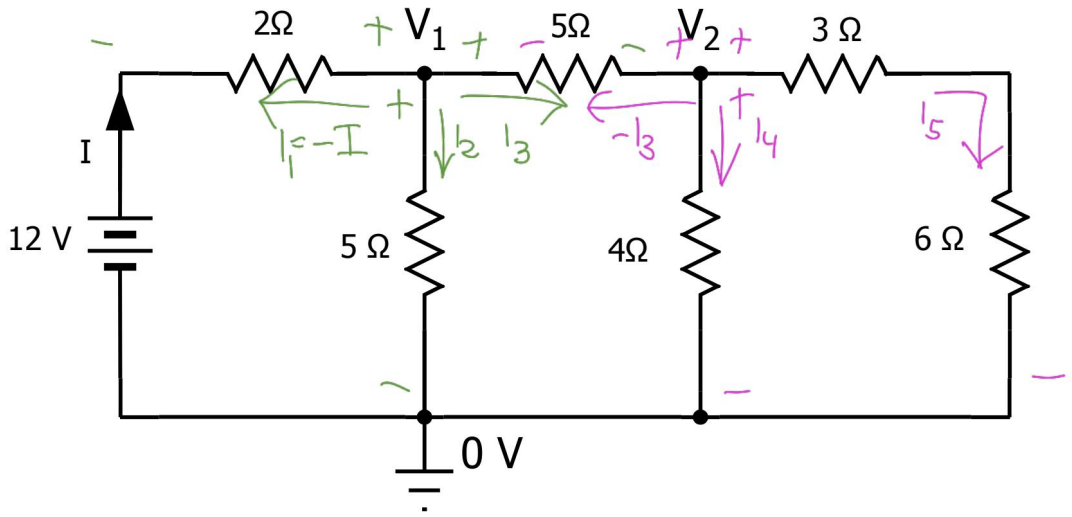
- 10 pts Incorrect

EE3 Fall 2022
Homework Problem 1



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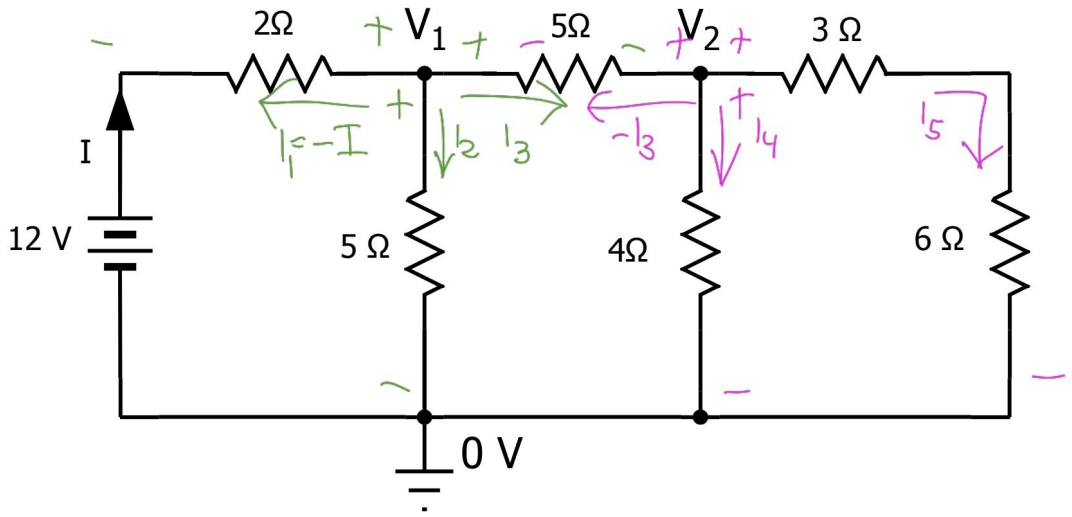

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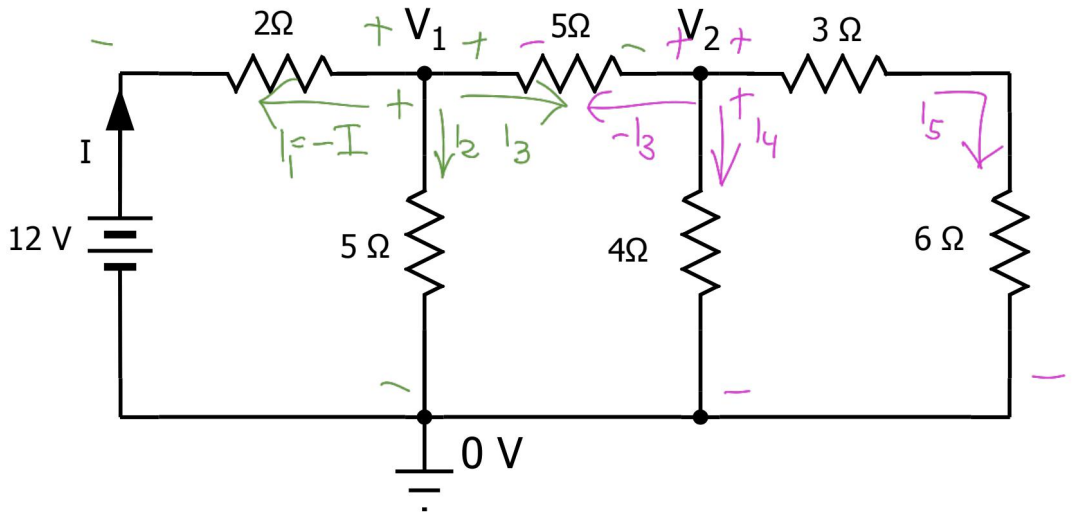

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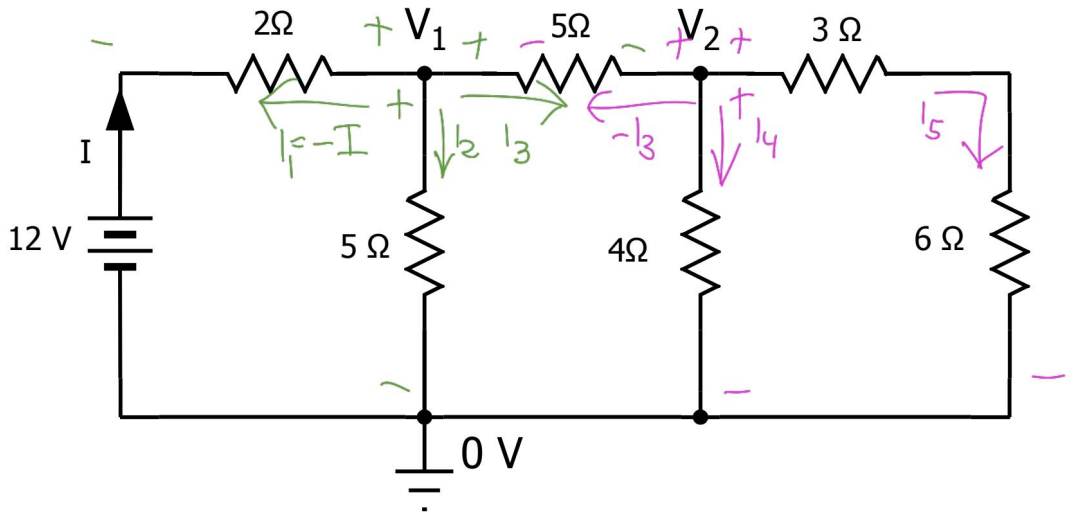

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1.5 e **17 / 20**

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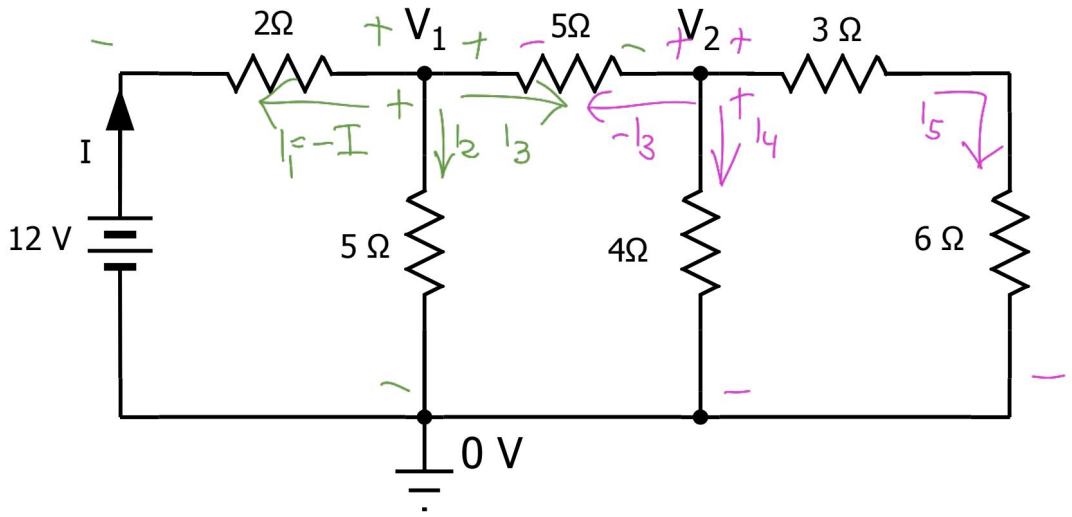

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