Department of Computer Science and Engineering (CSE)
BRAC University

Practice Problem Set 1

CSE251 – Electronic Devices and Circuits

ALTERNATIVE REPRESENTATION OF CIRCUITS

Circuit drawing, KCL, and KVL

Course Description, COs, and Policies

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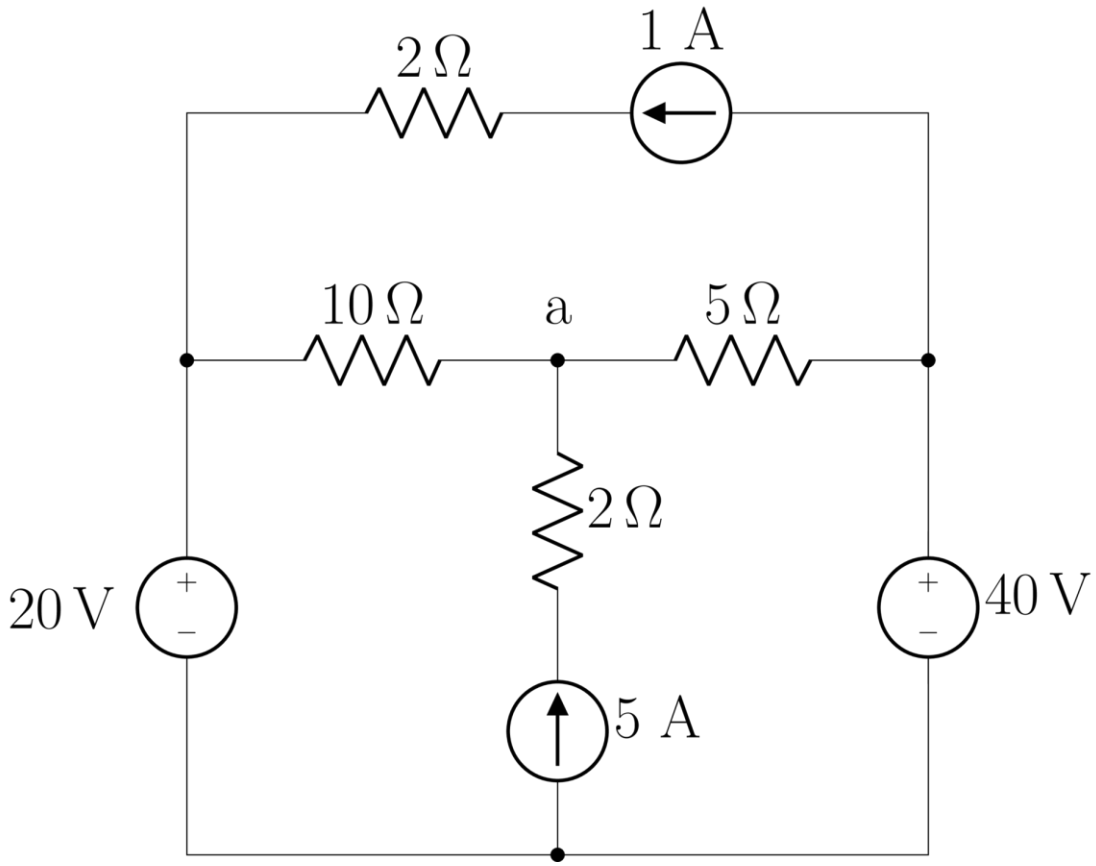
Midterm and Final Questions

For any error or issues, contact purbayan.das@bracu.ac.bd

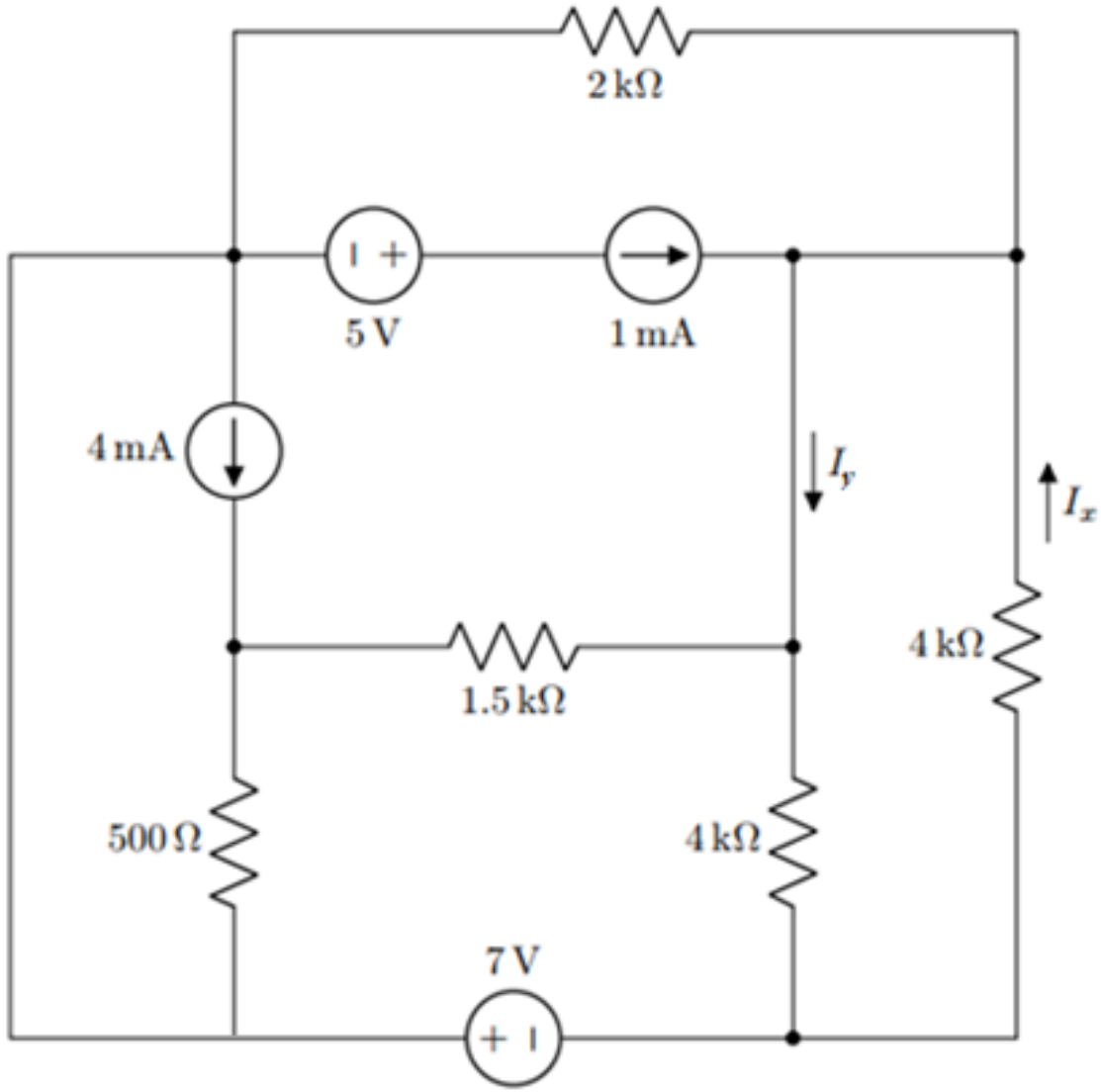
Problem 1

- Draw an alternative representation of the following circuit minimizing the number of floating voltage sources.



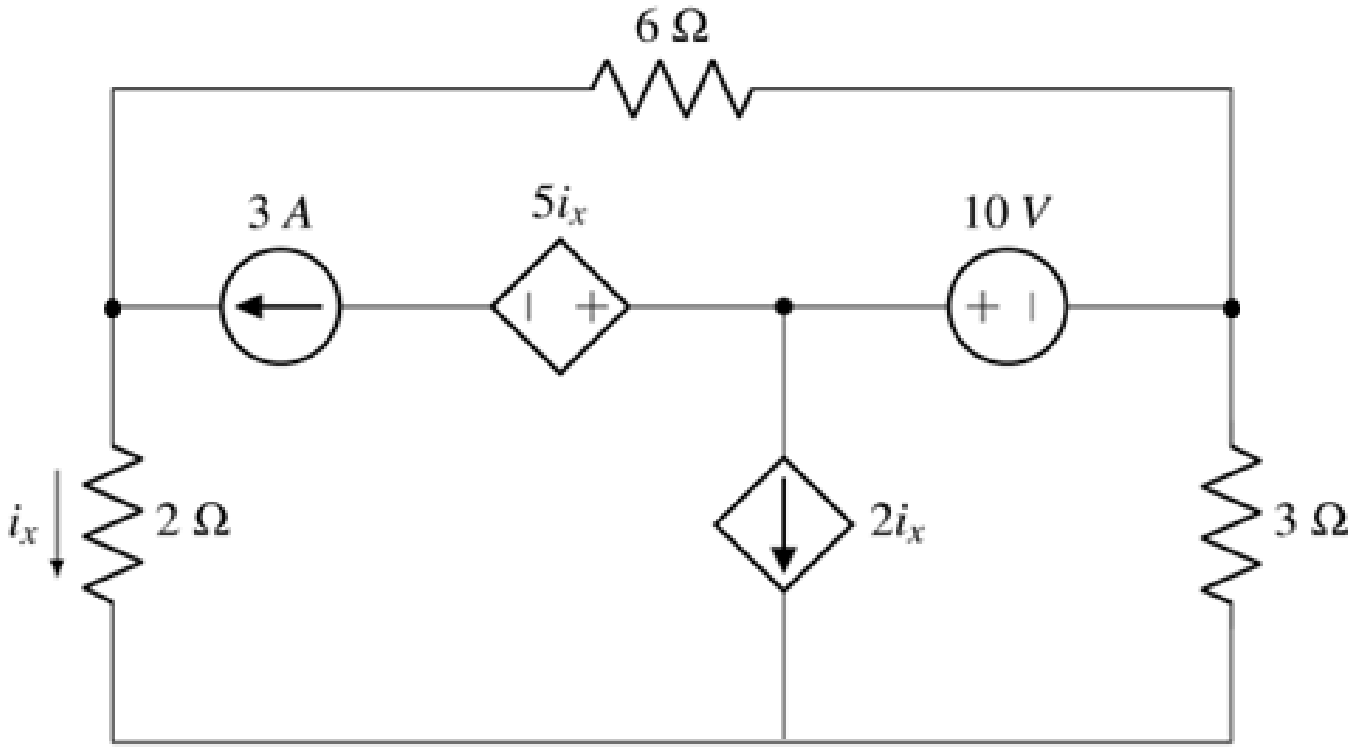
Problem 2

- Draw an alternative representation number of floating voltage sources.
- Using KCL, solve for I_x and I_y.



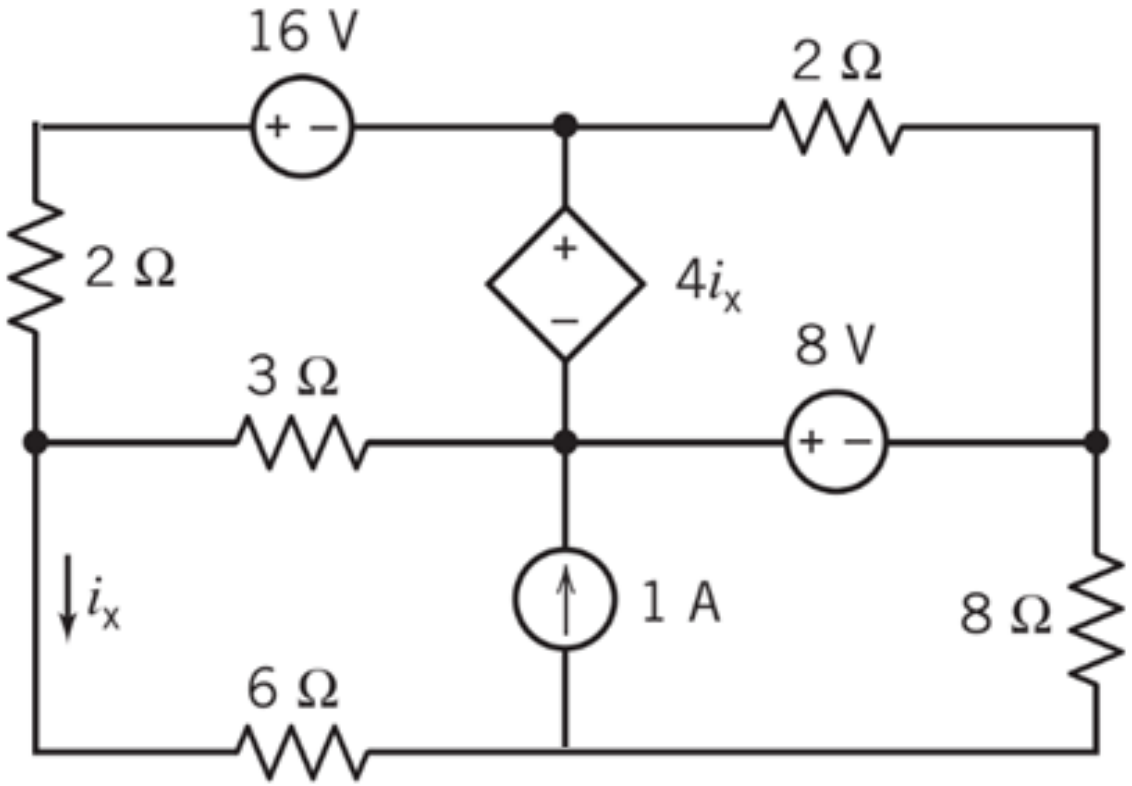
Problem 3

- Draw an alternative representation of the following circuit minimizing the number of floating voltage sources. Using KCL, determine i_x.



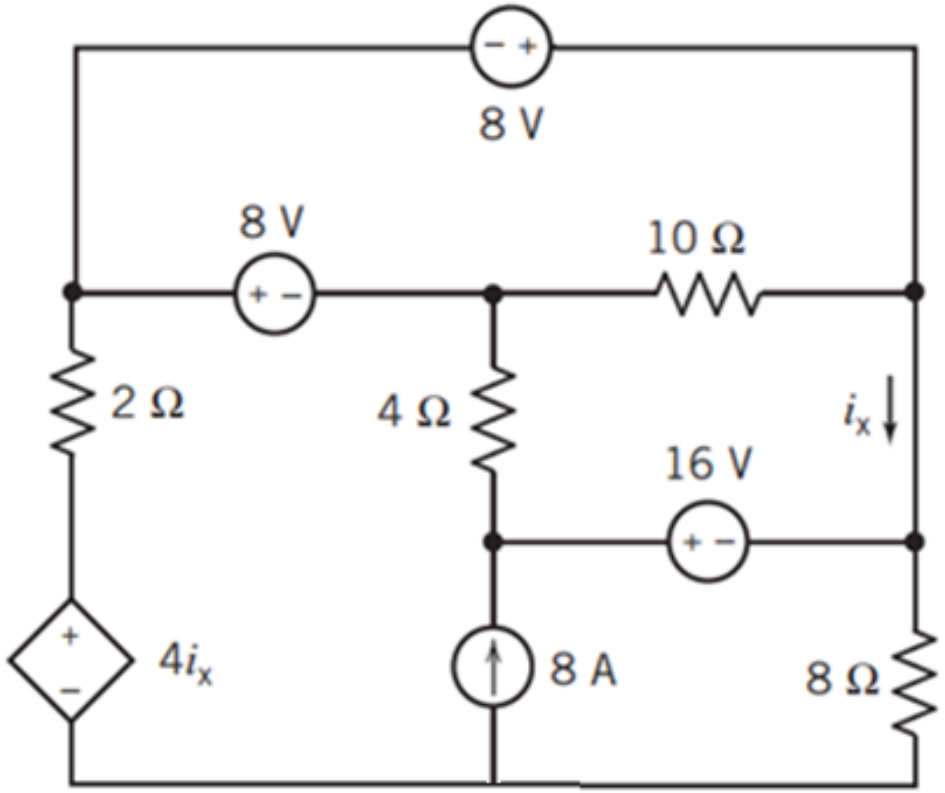
Problem 4

- Draw an alternative representation of the following circuit minimizing the number of floating voltage sources. Write all the KCL equations needed to solve this circuit.



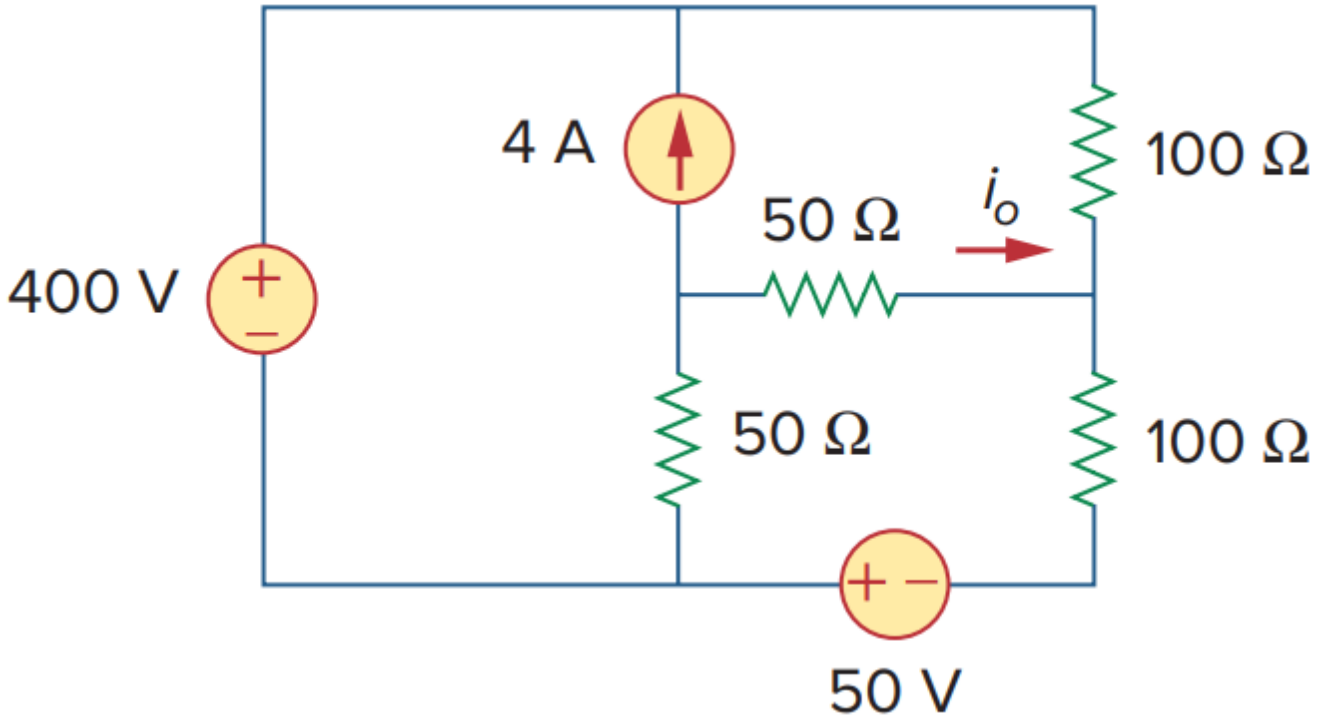
Problem 5

- Draw an alternative representation of the following circuit minimizing the number of floating voltage sources. Using KVL, solve for i_x. Do not use KCL.



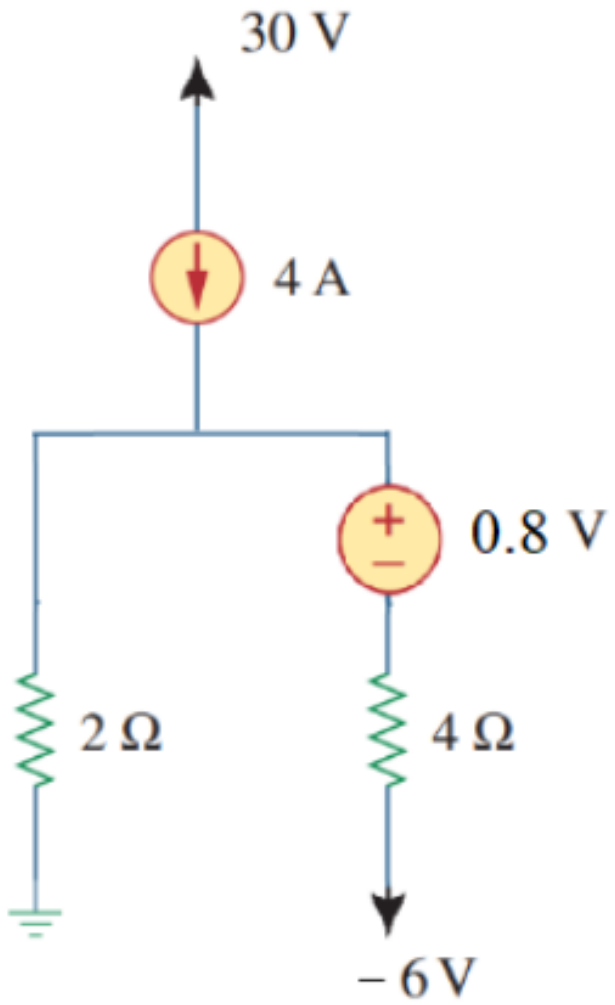
Problem 6

- How many KVL equations we can derive from the following circuit that are solvable? Draw an alternative representation minimizing the number of floating voltage sources. Solve for i_o using circuit laws as necessary.



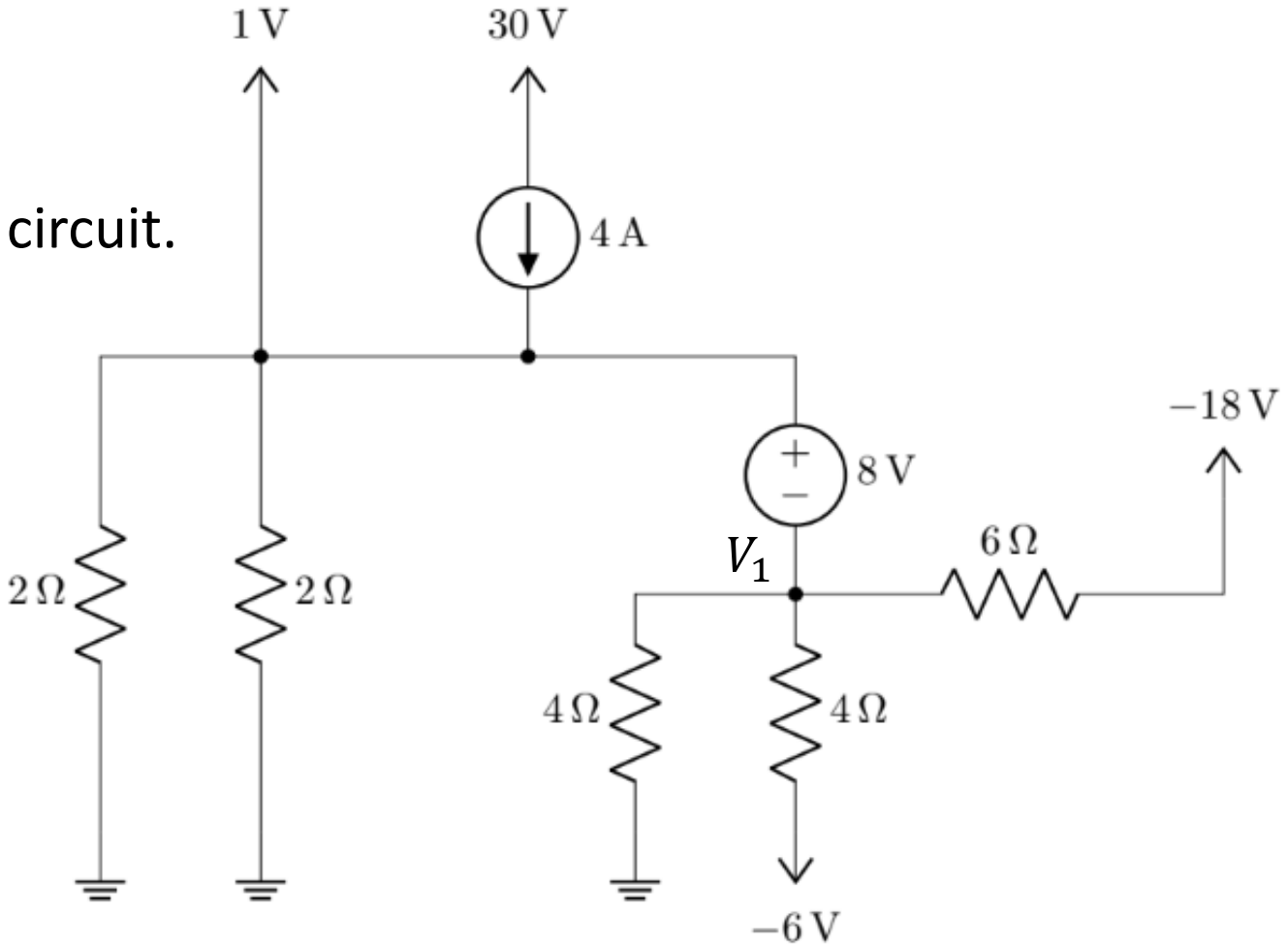
Problem 7

- Draw a loop representation of the adjacent circuit.



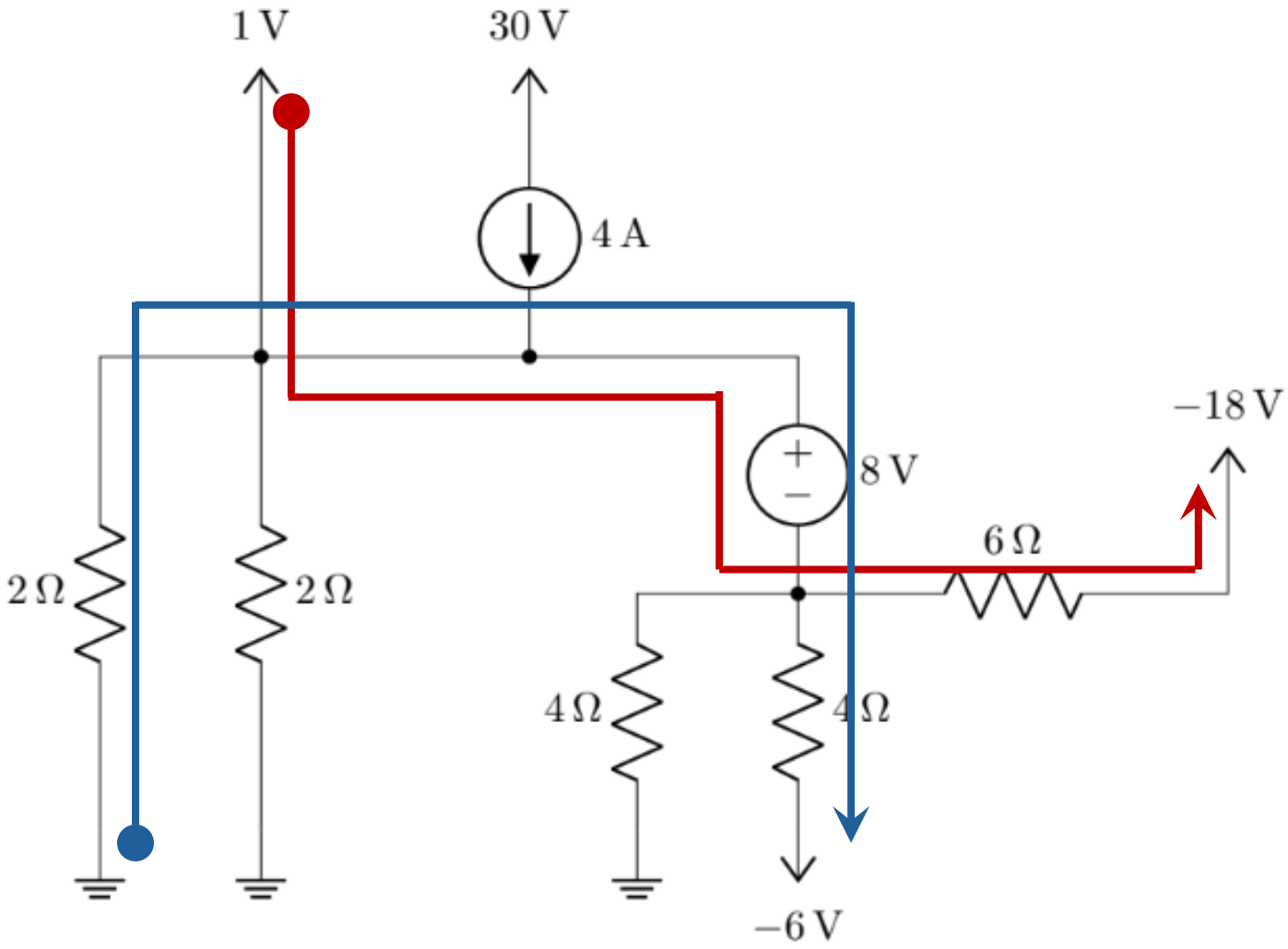
Problem 8

- Determine V_1 using KCL.
- Draw a loop representation of the circuit.



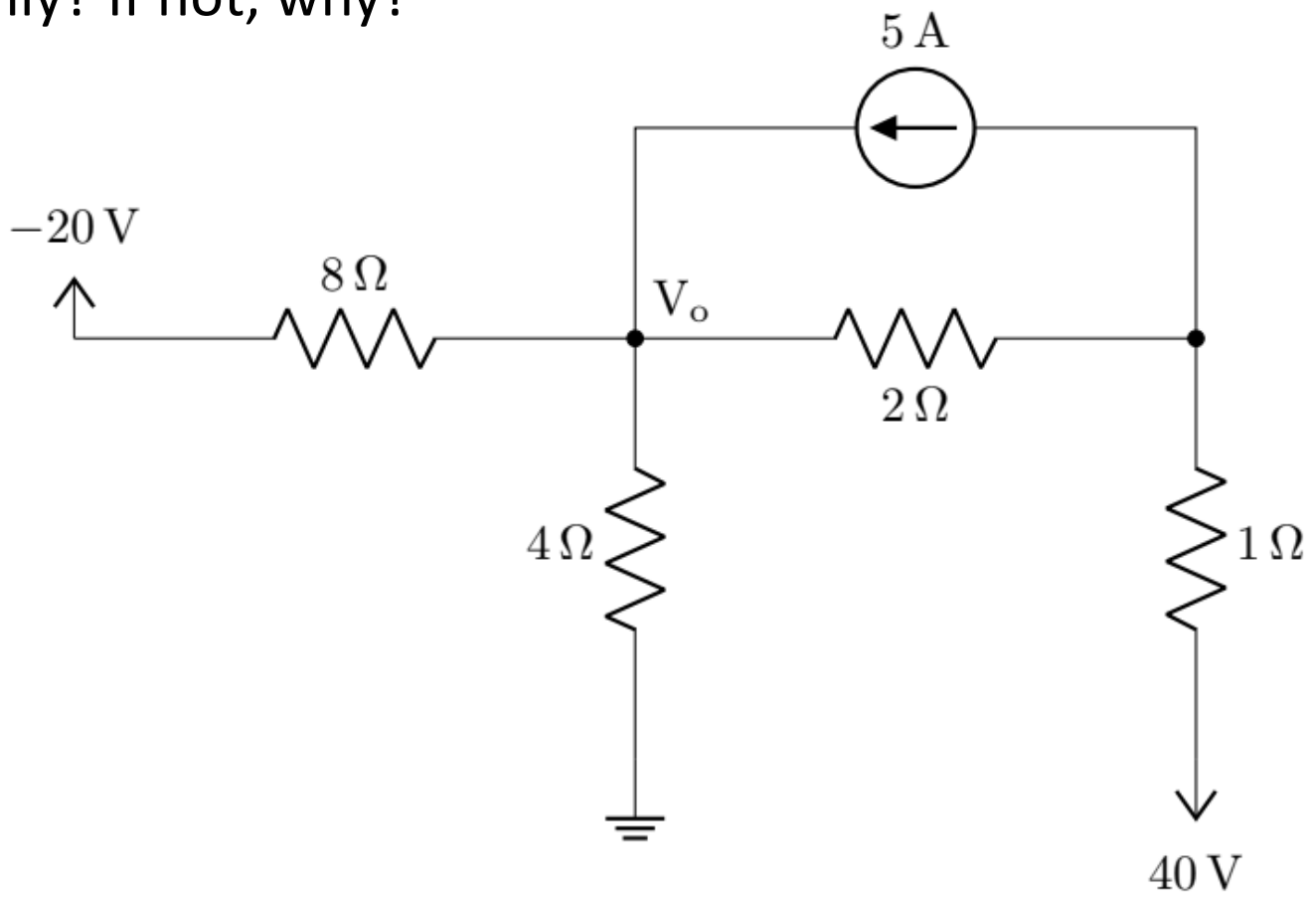
Problem 9

- Write KVL equations along the indicated arrows: maroon and blue.



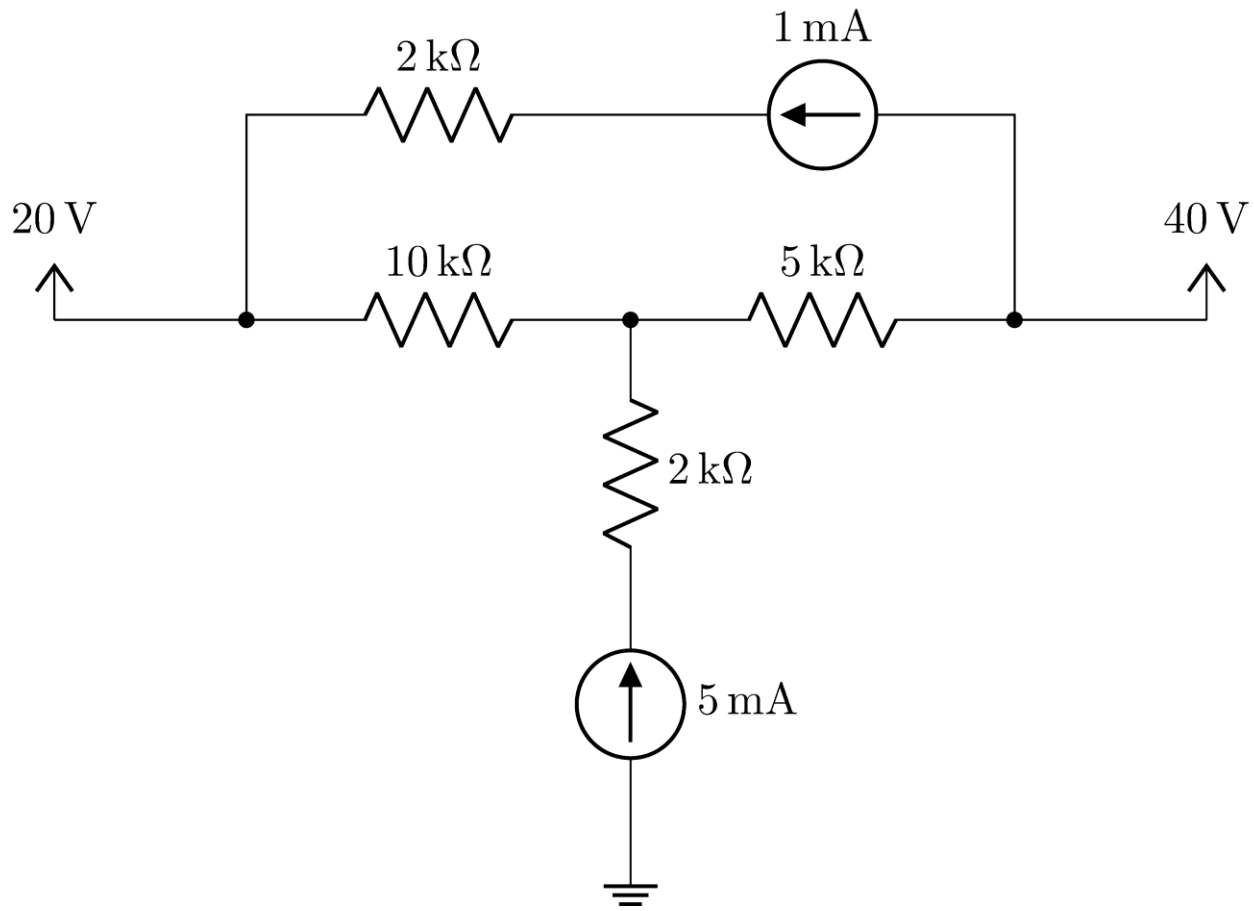
Problem 10

- Determine the voltage V_o and the voltage across the $5\ A$ source using KCL.
- Can you solve it using KVL only? If not, why?



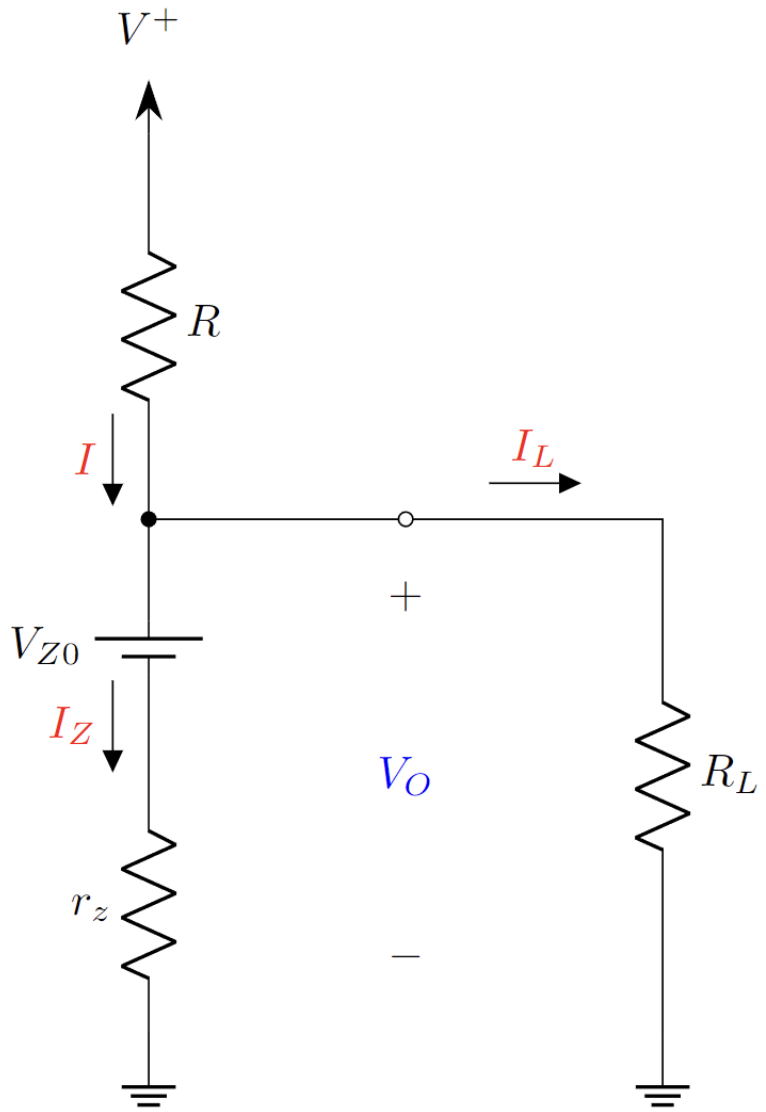
Problem 11

- For the circuit shown below, determine the voltage across the $1\,mA$ current source using KVL. Do not use KCL.



Problem 12

- For $\boldsymbol{R} = 100\ \Omega$, $\boldsymbol{R_L} = 10\ \text{k}\Omega$, $\boldsymbol{r_z} = 20\ \Omega$, $\boldsymbol{V_{ZO}} = 1$ [illegible] V_O, I_L, I, and V^+.



Acknowledgement and References

Some of the problems in this set are taken or adapted from the following sources:

1. Sadiku, M. N. O., Fundamentals of Electric Circuits, McGraw-Hill
2. Dorf, R. C., & Svoboda, J. A., Introduction to Electric Circuits, Wiley

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