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

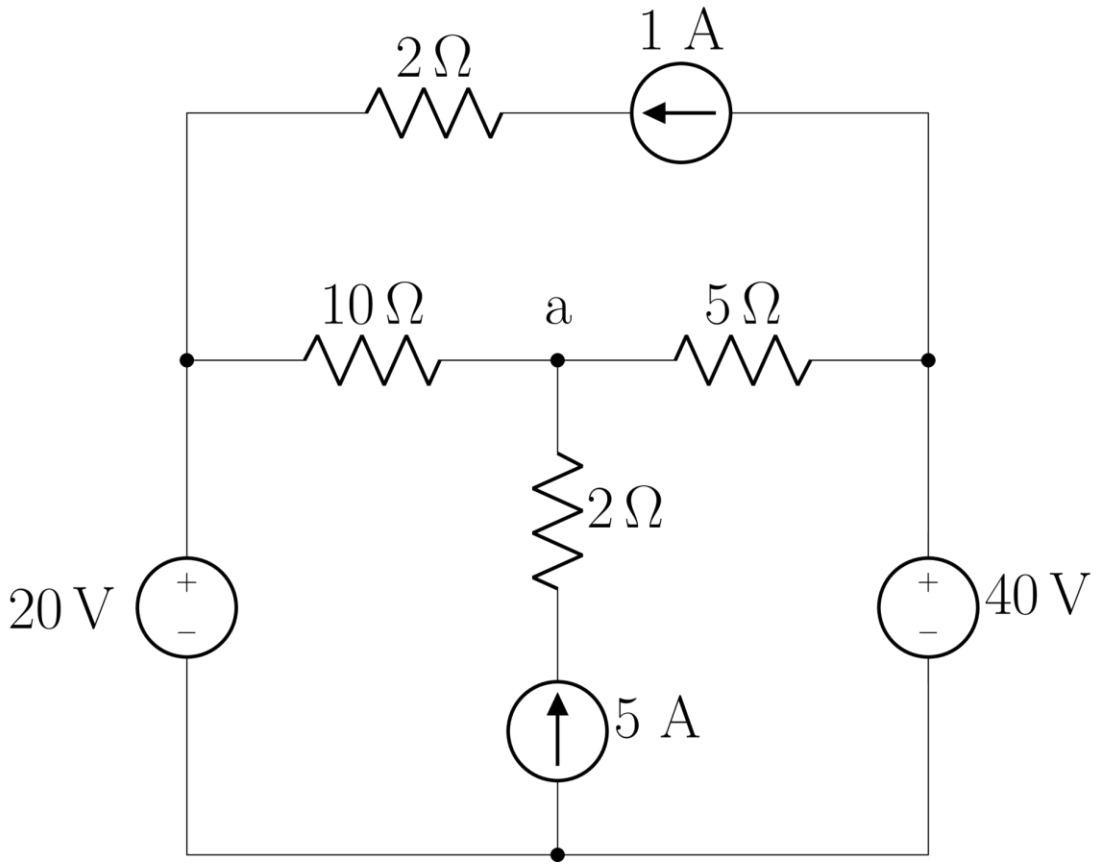
BRAC UNIVERSITY
Inspiring Excellence

Midterm and Final Questions

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

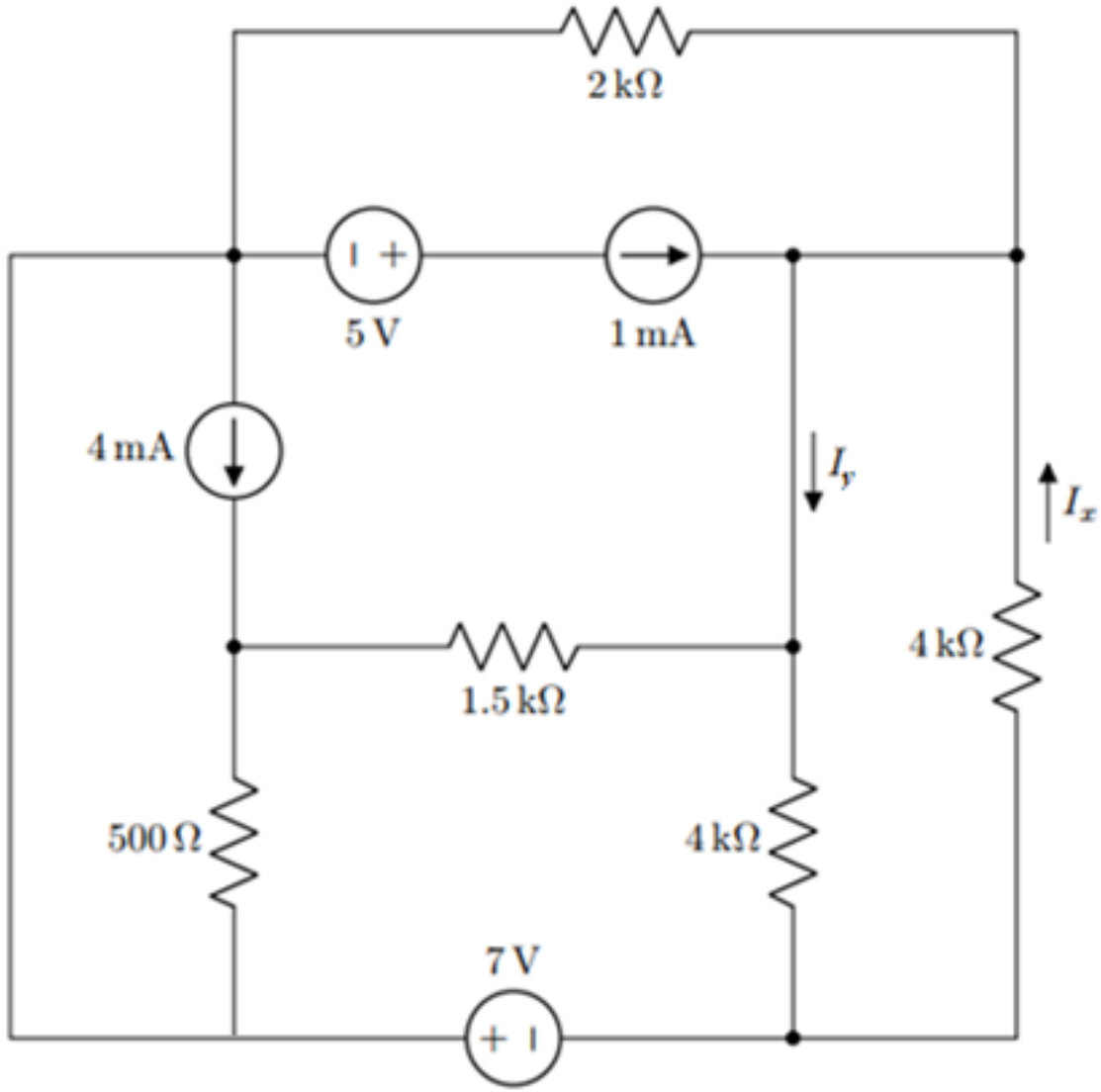
Problem 1

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



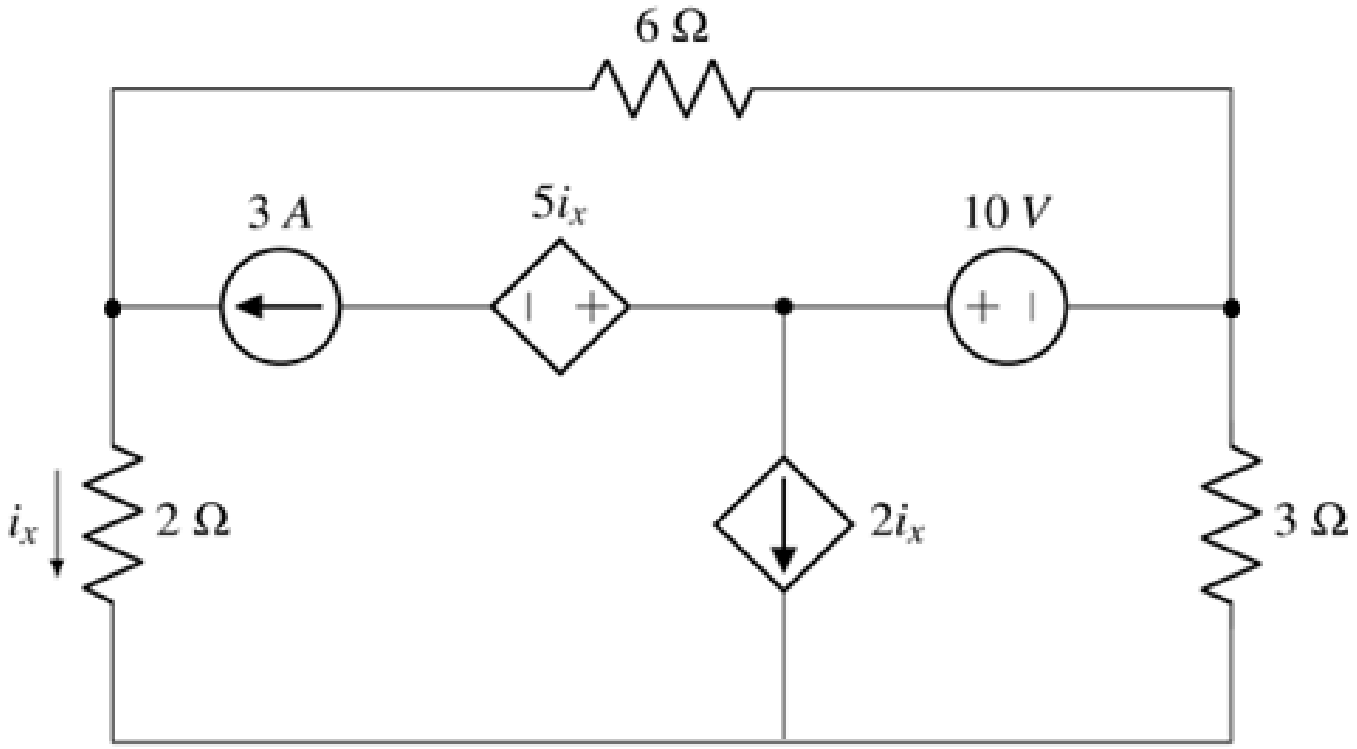
Problem 2

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



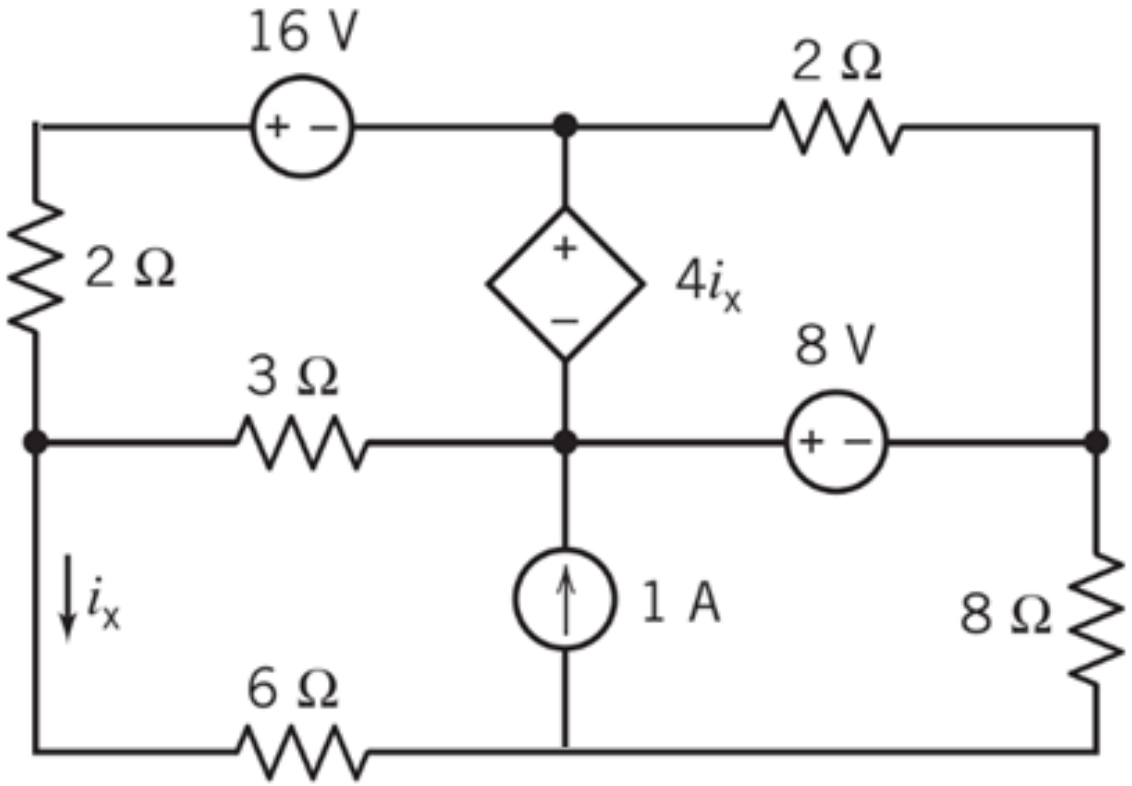
Problem 3

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



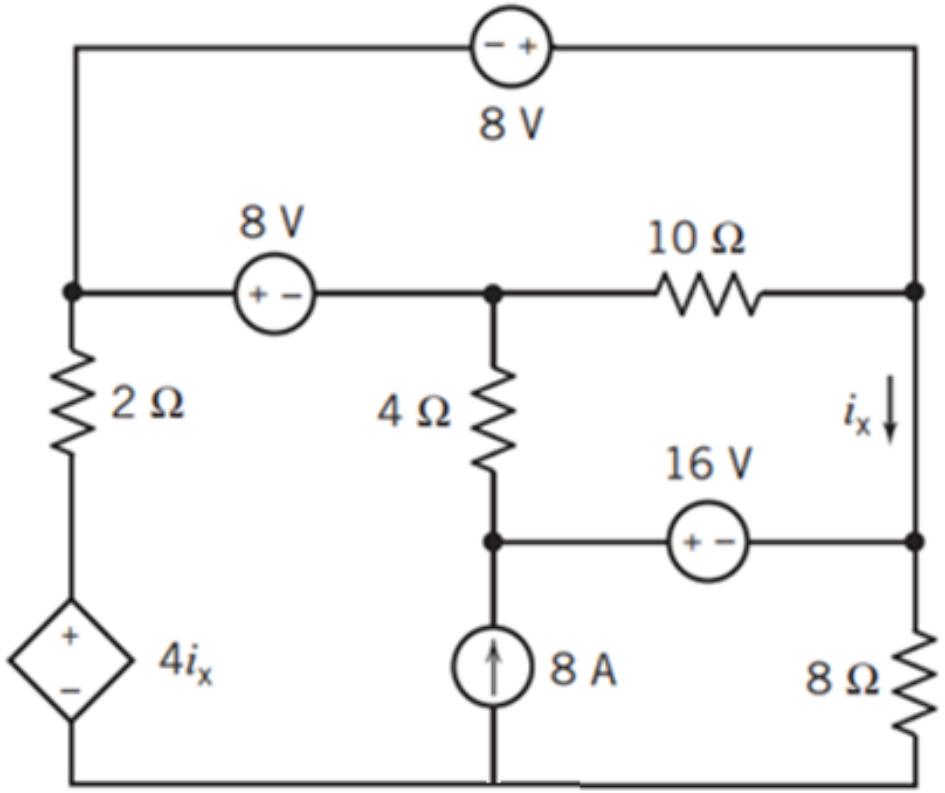
Problem 4

- 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.



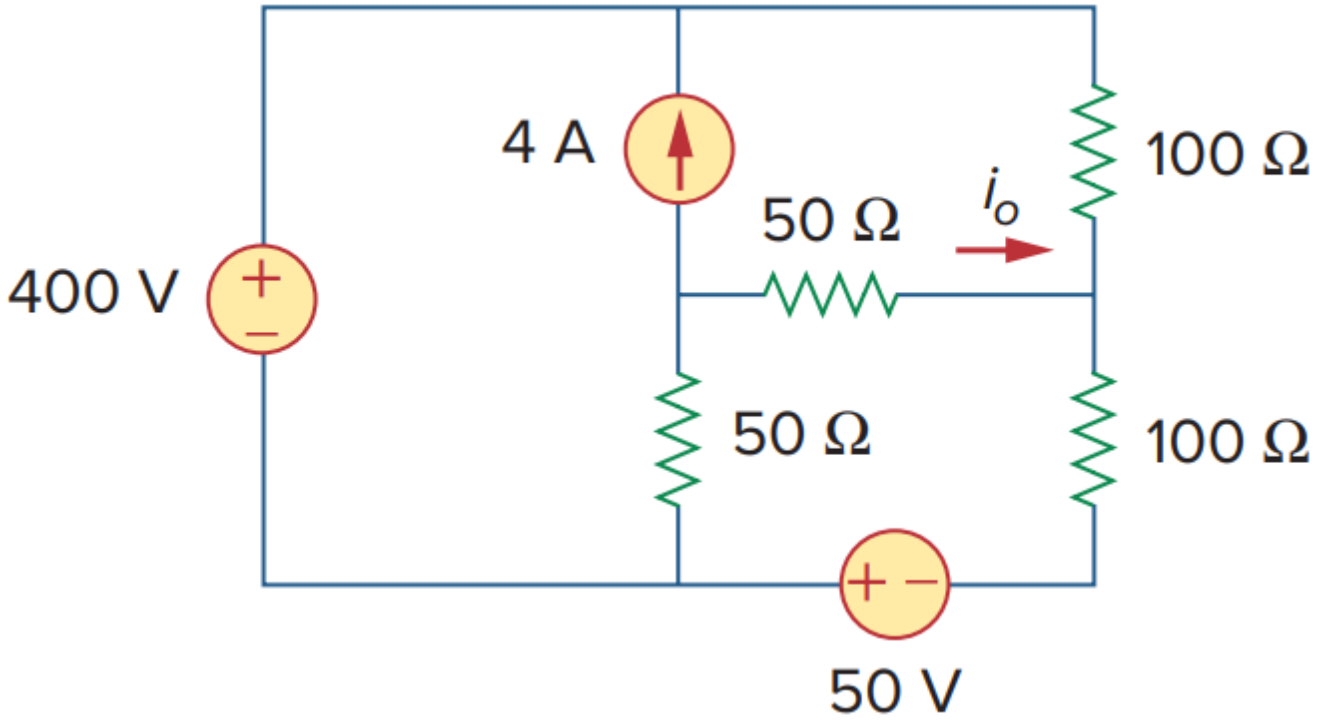
Problem 5

- Draw an alternative representation of the following circuit minimizing the number of floating voltage sources. Using KVL, solve for i_x.



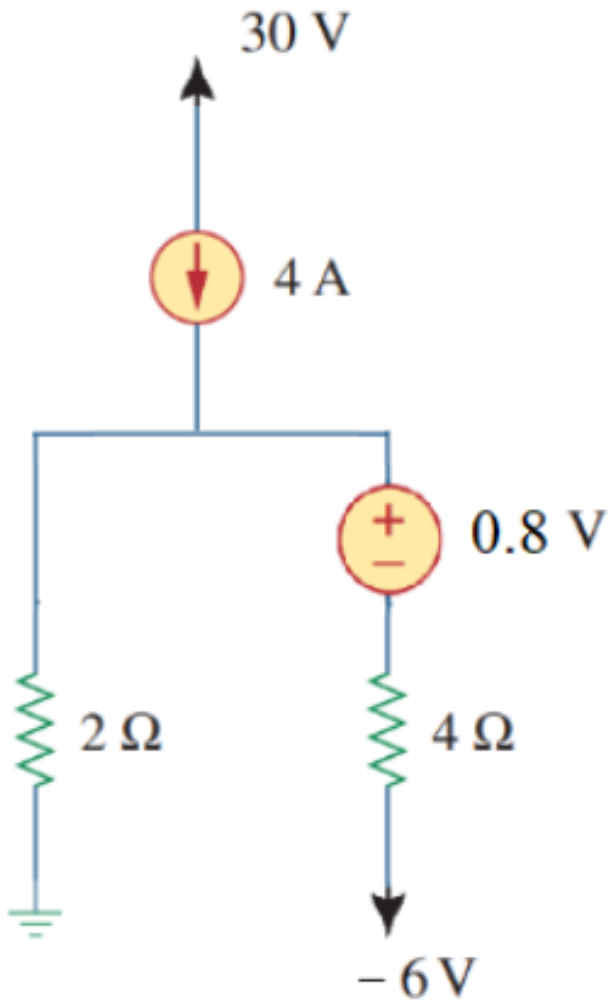
Problem 6

- 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.



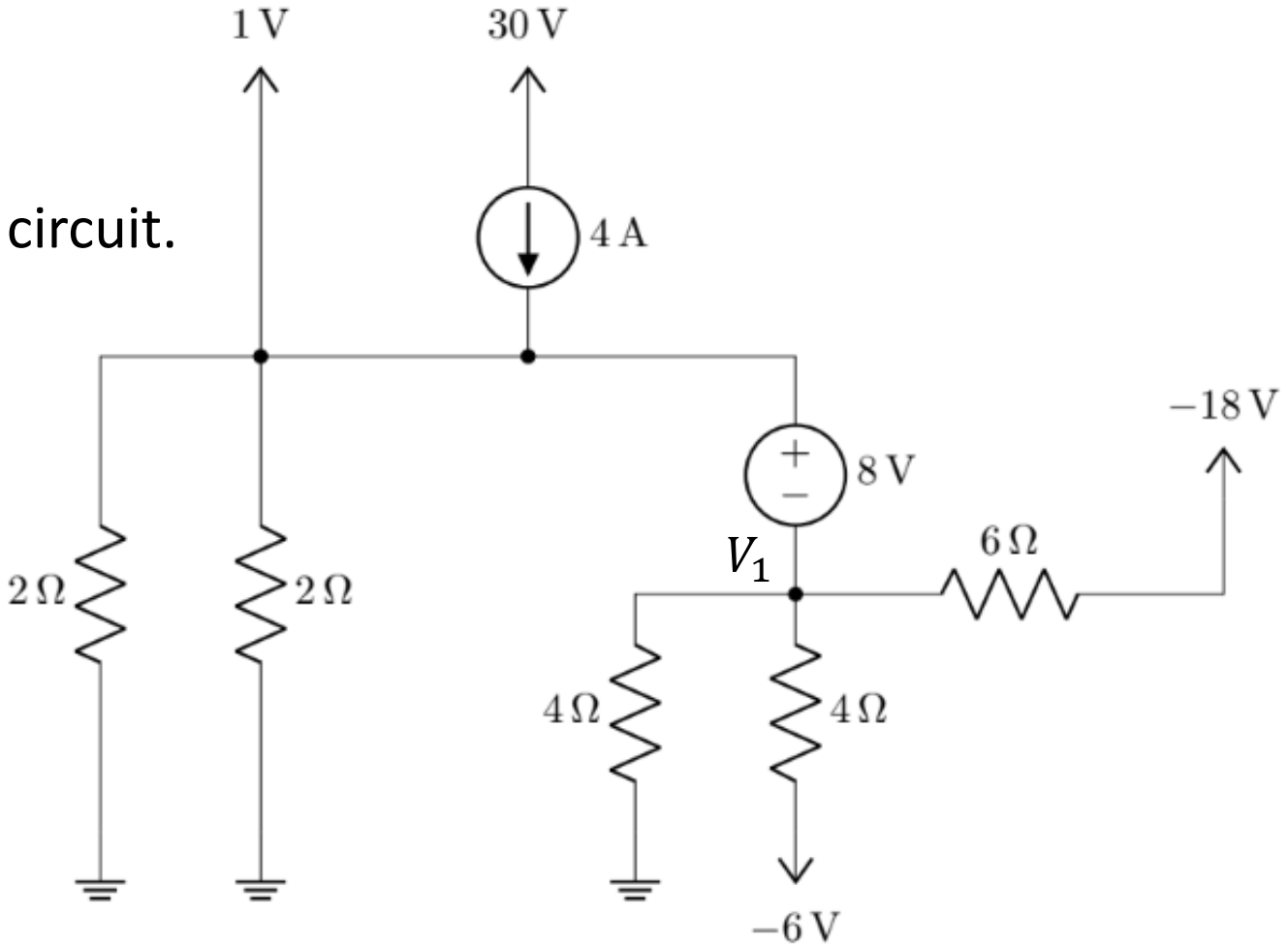
Problem 7

- Draw a loop representation of the adjacent circuit.



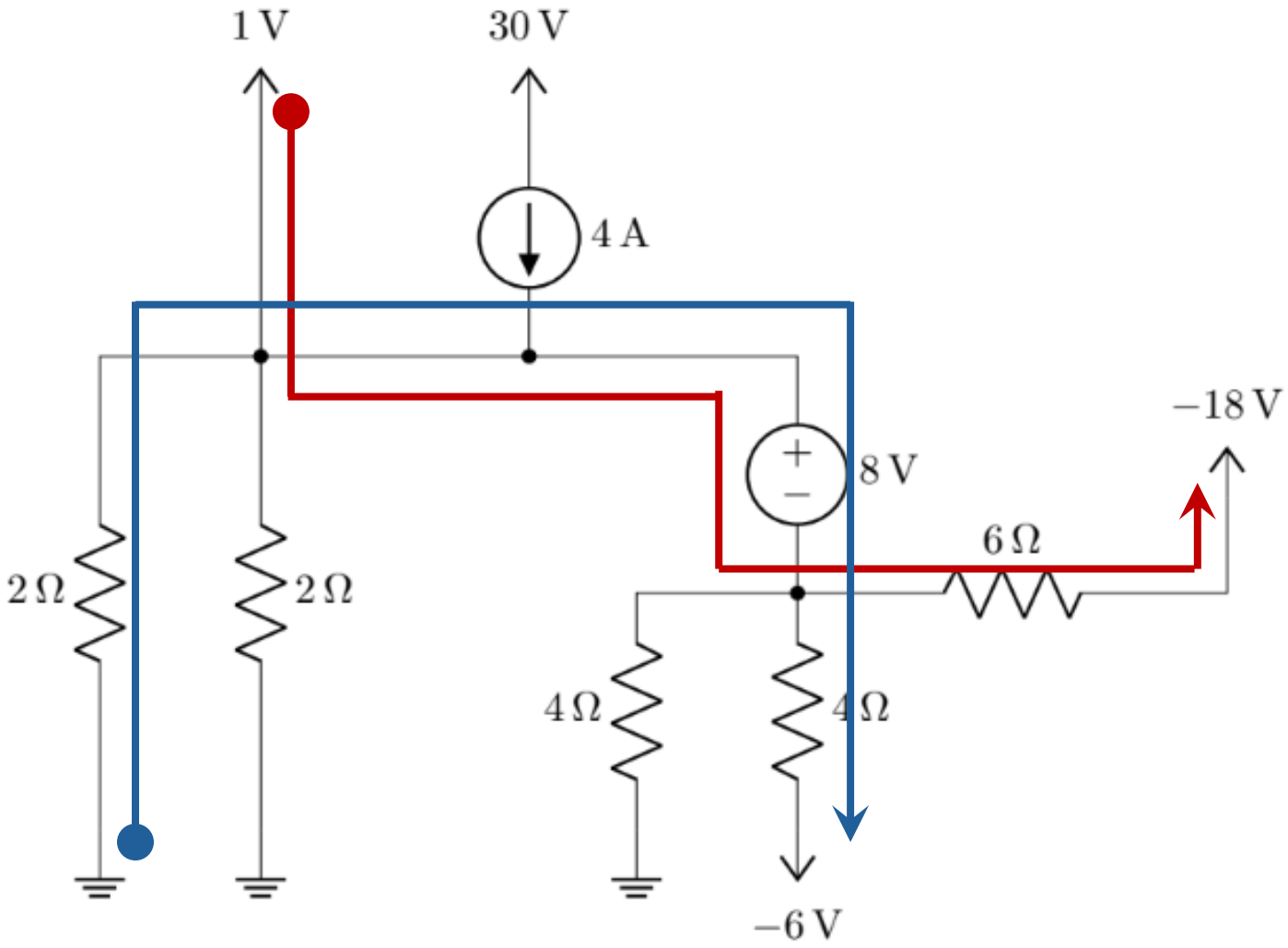
Problem 8

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



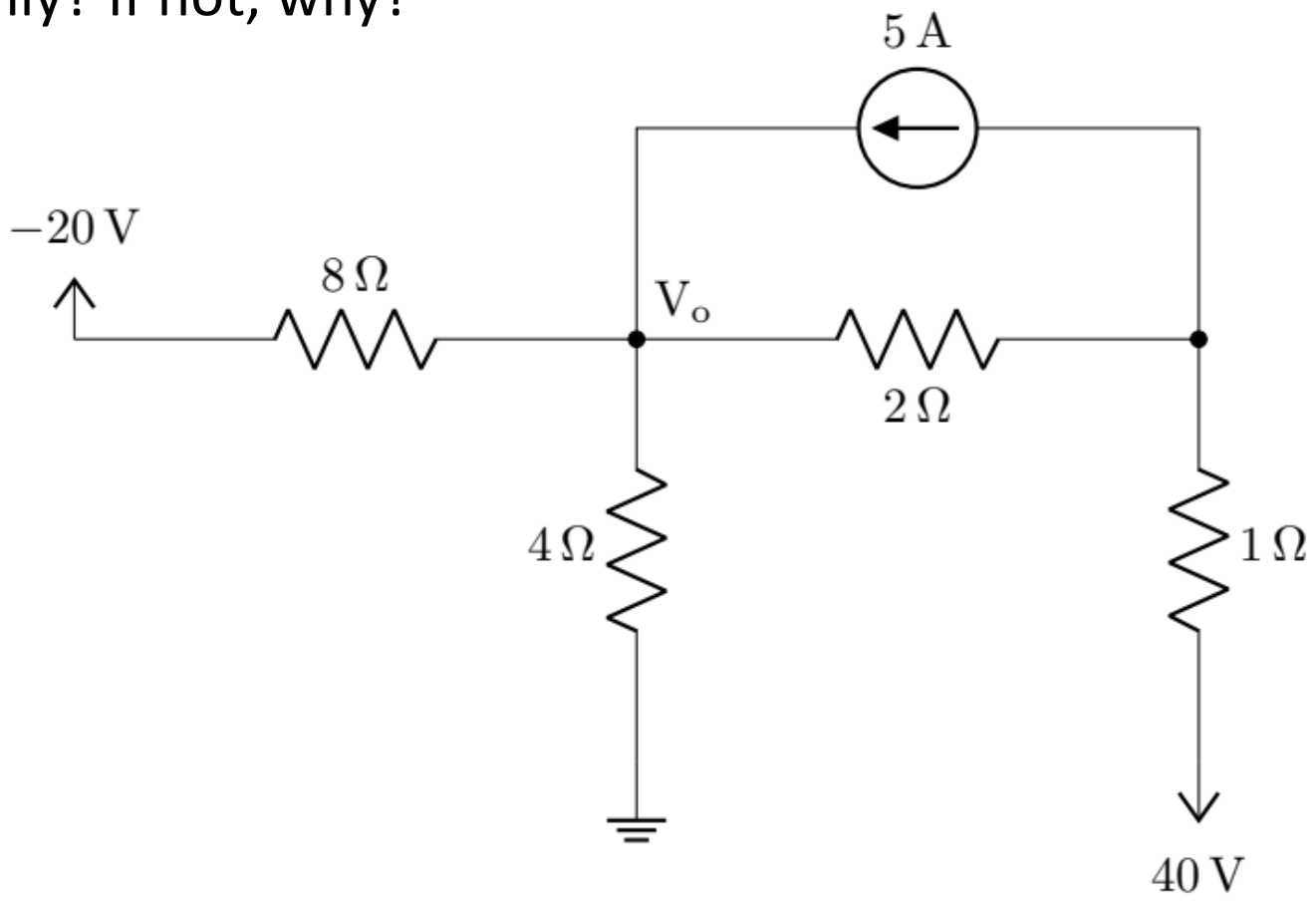
Problem 9

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



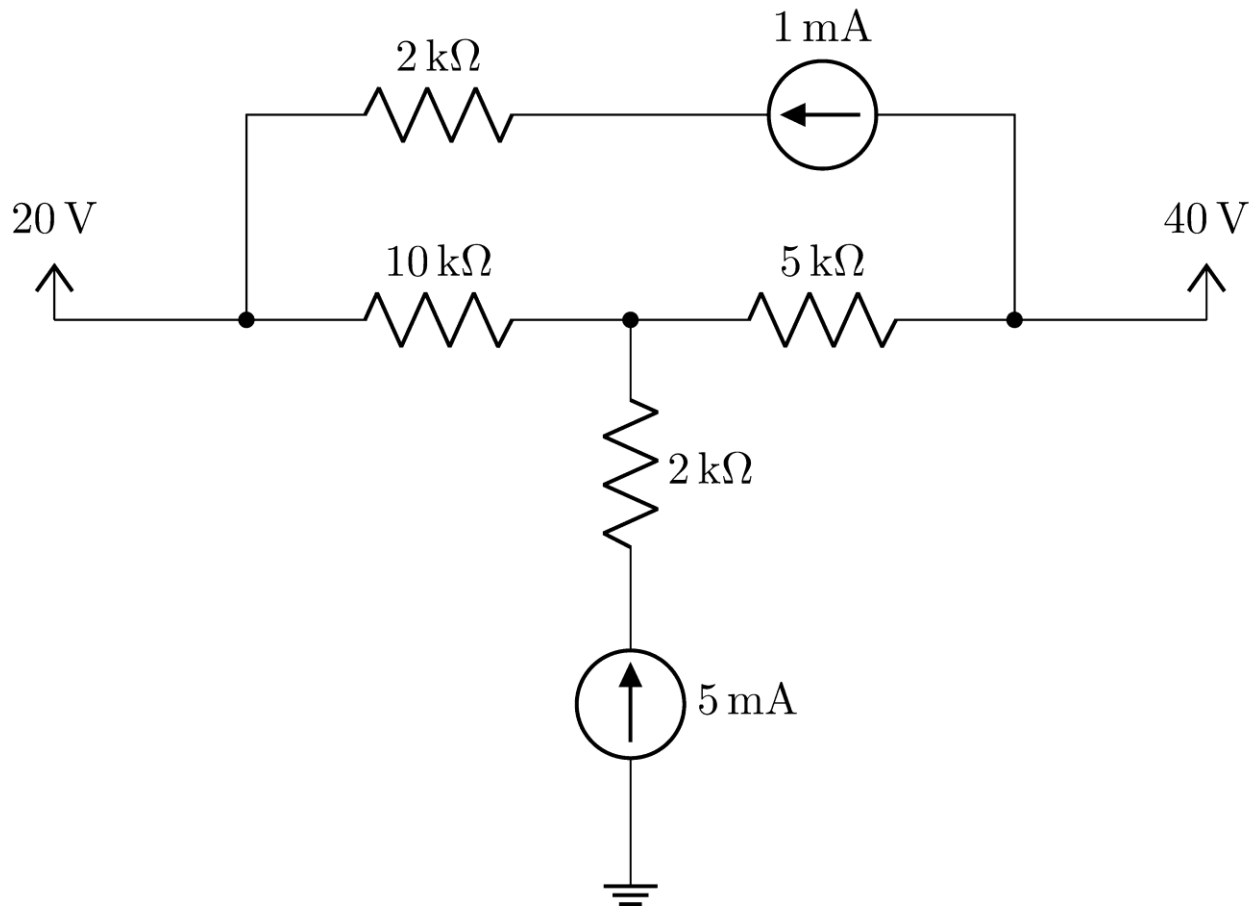
Problem 10

- 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?



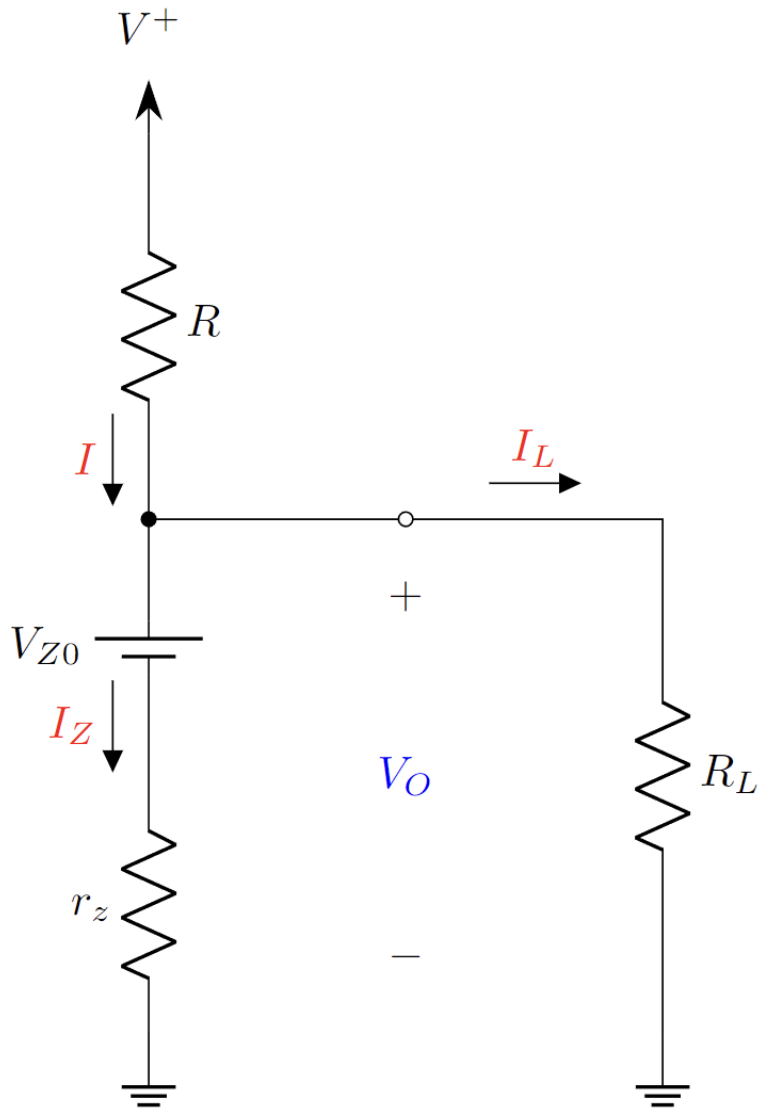
Problem 11

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



Problem 12

- For $\boldsymbol{R = 100\ \Omega}$, $\boldsymbol{R_L = 10\ \text{k}\Omega}$, $\boldsymbol{r_z = 20\ \Omega}$, $\boldsymbol{V_{ZO} = 3\ \text{V}}$, and $\boldsymbol{I_Z = 1\ \text{mA}}$, determine 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

BRAC UNIVERSITY
Inspiring Excellence