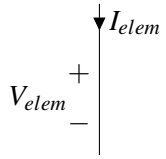
EECS 16A Designing Information Devices and Systems I
Summer 2023 Discussion 2B

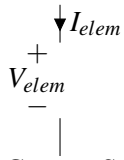
1. Circuit Components and Ohm's Law

(a) We will look at the $I-V$ characteristics of different circuit components. For each of the components listed below, plot the $I_{elem}-V_{elem}$ characteristic curves.

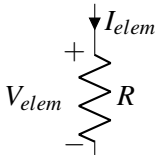
i. Wire



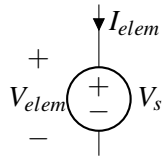
ii. Open Circuit



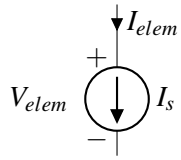
iii. Resistor



iv. Voltage Source

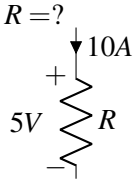


v. Current Source

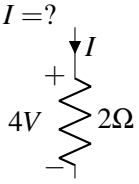


(b) Use Ohm's Law to find the missing component values in the circuits below. You may assume that each circuit is part of a larger circuit where there is a closed path for current to flow.

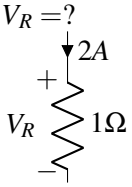
i. $R=?$



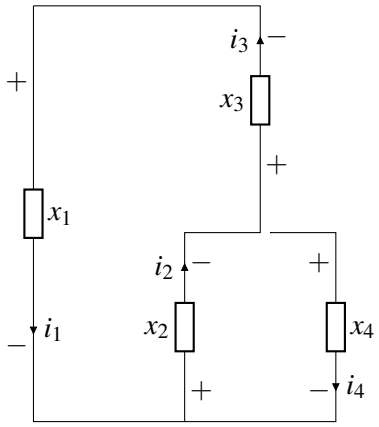
ii. $I=?$



iii. $V_R=?$



2. Label the Nodes

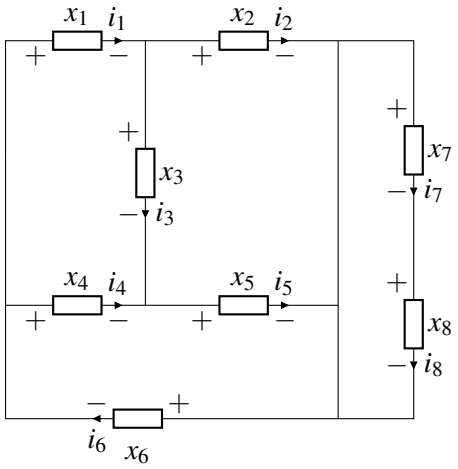


(a) In the circuit shown above, identify and label all the nodes.

(b) Choose a node to be the reference node and find all the potentials across elements in the circuit in terms of the node potentials you labeled in the previous part

(c) (Optional) Write as many KCL equations as you can for the circuit.

(d) (Optional) Write as many KVL equations as you can for the circuit.



(e) In the circuit shown above, identify and label all the nodes.

(f) Choose a node to be the reference node. What is the potential across the elements x_6 and x_7 in terms of node potentials you labeled in the previous part?

(g) (Optional) Write a KCL equation involving i_1 and a KCL equation involving i_5.

(h) (Optional) Write a KVL equation involving V_{x_3} and a KVL equation involving V_{x_6}.

