

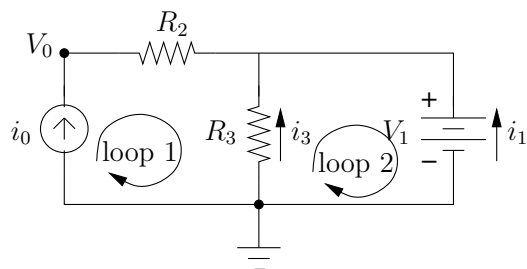
Physics 261
Exam 1

Remember to show your work.

Name:

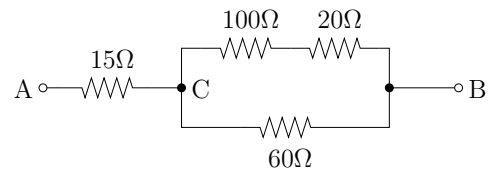
1. (*6 points*) A 12V car battery contains 2×10^5 Coulombs of charge. Two 60 W headlights are left on, connected in parallel to the battery. Assuming the battery voltage remains constant, how long will it take to completely discharge on the battery?

2. In the circuit below, i_0 , V_1 , R_2 , and R_3 are known.



- (a) (2 points) What is the current through R_2 ?
- (b) (4 points) Write Kirchoff's voltage law for loops 1 and 2.
- (c) (2 points) Write Kirchoff's current law for the node at the top.
- (d) (6 points) Solve for V_0 , i_1 , and i_3 in terms of known quantities.

3. (a) (4 points) Find the equivalent resistance from A to B.
- (b) (4 points) Suppose +11 V is connected at A, and ground at B. Find the voltage at C.



4. (a) (4 points) Solve for V_1 using Node Voltage Analysis.
(b) (8 points) Find the Thevenin and Norton equivalents of the circuit, as seen from the two open terminals on the right.

