Kirchoff’s Laws and RC Circuits
Physics 106

Concepts:
1. Kirchhoff’s Rules
2. RC Circuits

Units
I Current: Amps (A)
R Resistance, Ohms (Ω)
\( P \) Power: kilowatt, (kW)

Kirchhoff’s Rules:
1. What goes in must come out.
2. The change in potential for a closed loop is zero.

Homework Hint:
For instructions on how to solve systems of linear equations on a TI-85 or TI-86 go to http://epsstore.ti.com/OA_HTML/csksxvm.jsp?nSetId=80019

RC Circuits:

Charging
Charging a capacitor: 
\( q = Q(1 - e^{-t/RC}) \), where \( q \) is the charge at time \( t \), \( Q \) is the total possible charge for the capacitor, \( R \) and \( C \) are the Resistance and Capacitance. Sometimes \( R \) and \( C \) are combined into one constant \( \tau \).

Discharging
Discharging a capacitor: 
\( q = Qe^{-t/RC} \)
Find
a. the current

b. the potential of wire A relative to ground
c. the voltage drop across the 1500 Ω resistor.

Don’t worry about Conduction of Electrical Signals by Neurons Electrical Safety !!!!!????????