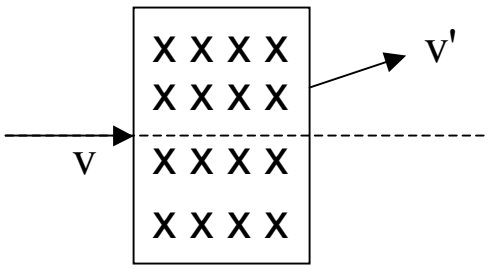
Name: _____ Sec. _____ **P212: Quiz 2 Week 7**

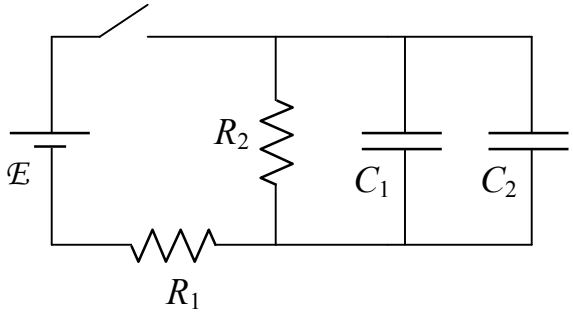
1) A proton (mass m, charge q) moving at velocity v enters a region of constant magnetic field ***B*** directed into the paper as shown. The proton exits the magnetic field region with velocity v' as shown. Compare v_x' (the x-component of this final velocity) with the initial velocity v. **[4]**



(a) $v_x' < v$ (b) $v_x' = v$ (c) $v_x' > v$

In the circuit below, the switch is initially open (as shown) and the capacitors are uncharged.

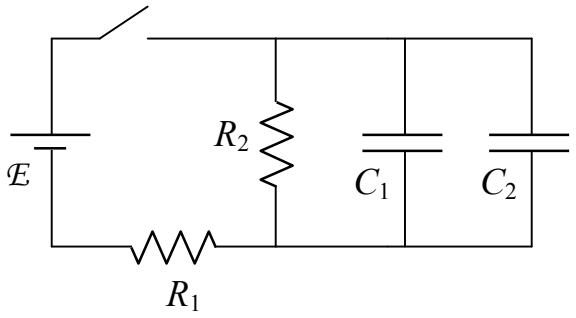
$R_1 = 4\ \Omega$ $C_1 = 40\ \mu F$
$R_2 = 2\ \Omega$ $C_2 = 20\ \mu F$
$\mathcal{E} = 20V$



2) What is the current I_1 through resistor R_1 immediately after the switch is closed? **[3]**

3) What is the current I_1 through resistor R_1 after the switch has been closed for a long time? **[3]**

$R_1 = 4\ \Omega$ $C_1 = 40\ \mu F$
$R_2 = 2\ \Omega$ $C_2 = 20\ \mu F$
$\mathcal{E} = 20\ V$



4) What is the charge Q_1 on capacitor C_1 a long time after the switch is closed? You will receive full credit for a correct algebraic or numerical answer. **[6]**

5) After a long time, the capacitors are fully charged and the switch is reopened. What is the time constant τ for discharging the capacitors? Specify your answer in units of seconds. **[4]**