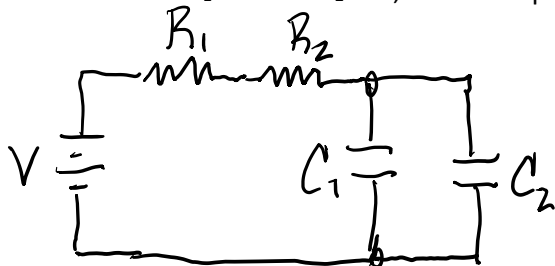
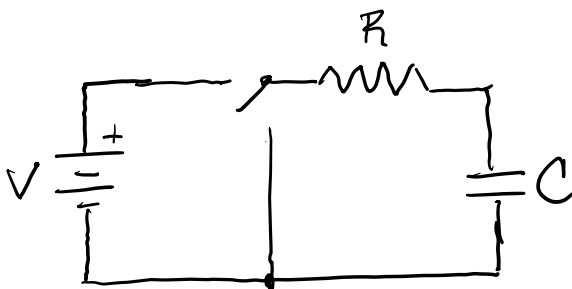


Practice Quizzam 5

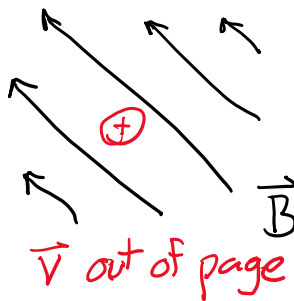
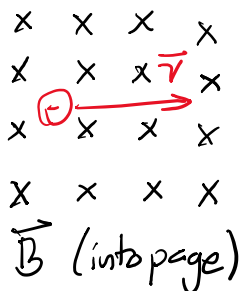
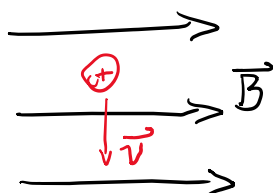
1. What is the time constant of the RC circuit drawn below? The battery voltage is $V=12\text{V}$, the resistances are $R_1=3\Omega$ and $R_2=7\Omega$, and the capacitances are $C_1=6\text{F}$ and $C_2=3\text{F}$.



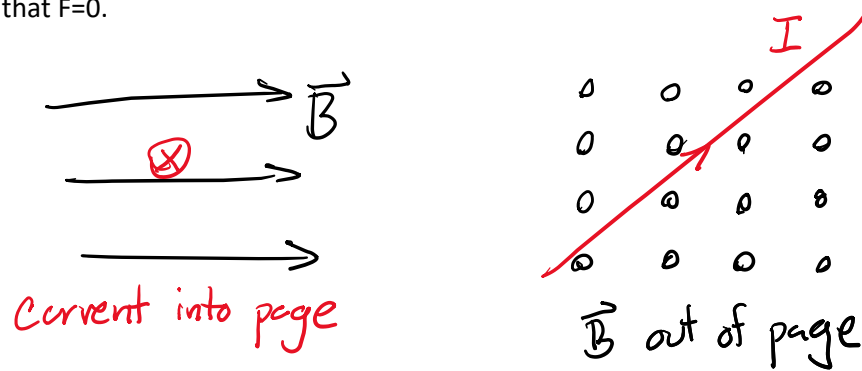
2. In the circuit below, the switch can close either of the two circuits. When switched to the upper position, the capacitor is charging, and when in the lower position, the capacitor is discharging. The battery voltage is $V=5\text{V}$, the resistance is $R=3\Omega$, and the capacitance is $C=4\text{F}$.



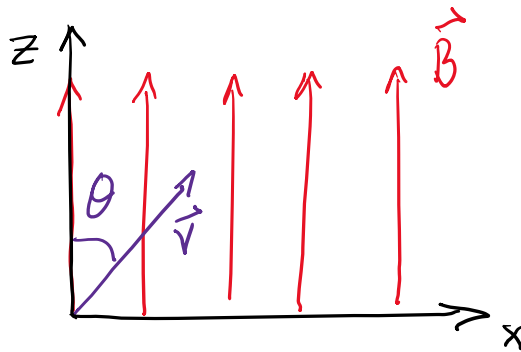
- a. What is the charge on the capacitor after the switch has been in the upper position for a long time?
 - b. The switch is then moved to the lower position. What is the current through the resistor immediately after this is done (at time $t = 0$)?
3. For each of the following moving charges in a magnetic field, sketch the resulting magnetic force vector or state that $F=0$. (Recall we represent a vector into the page as an 'x', and one out of the page as a dot).



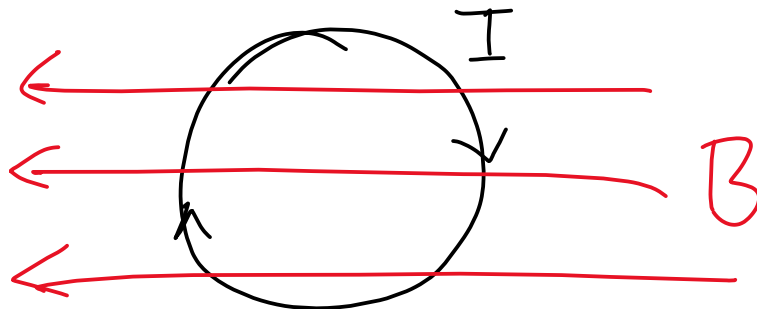
4. For each of the following currents in a magnetic field, sketch the resulting magnetic force vector or state that $F=0$.



5. A proton is moving in the xz -plane with a velocity of 10m/s , at an angle of $\theta=30^\circ$ with respect to a constant magnetic field with strength $B=5\text{T}$ in the positive z -direction, as shown below. What is the resulting magnetic force? (Note: the positive y -direction is into the screen)



6. The circular current loop shown below, with radius $r=5\text{cm}$ carries a current of $I=4\text{A}$ in the clockwise direction. What is the magnitude and direction of its magnetic moment?



7. The current loop in the previous problem is placed in a magnetic field with strength of 5T pointing to the left. What is the torque this field exerts on the current loop?

8. Two parallel plates are placed a distance of 4cm apart from each other, with a potential difference of 500V between them. There is a small hole in the negative plate across from it. On the other side of this plate, there is a magnetic field of strength $B=1\text{T}$ with field lines parallel to the plates. If a proton is released from rest at the positive plate, it will accelerate out of the hole and then move in a circular path in the magnetic field, as shown below. What is the radius of this circular path?

