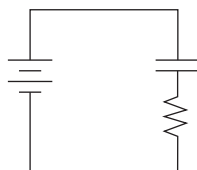


AP Physics 2 Review Questions

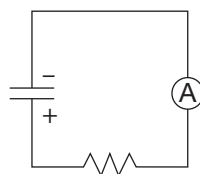
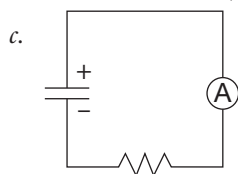
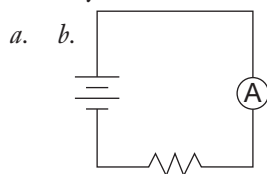
Integrating Content, Inquiry and Reasoning

1. Consider the circuit below.

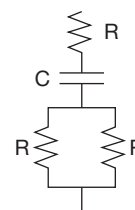
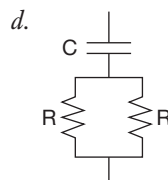
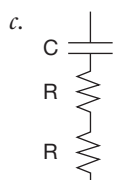
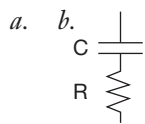


a. The time constant is 2 seconds. The resistor has a value of $1.0 \text{ k}\Omega$. What is the value of the capacitor?

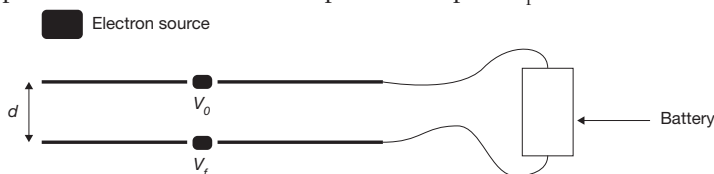
2. Identify the direction of the current at the ammeter (up or down) in the circuits below.



3. Rank the time constant from smallest to largest in the circuits below.



4. Examine the situation below. Two parallel plates are connected to a battery, each plate with an area of 0.35 m^2 , separated by a distance $d = 0.05 \text{ m}$. Each plate has a hole at its center through which electrons can pass. After the plates are fully charged, energetic electrons emitted by an electron source enter the top plate with a speed $v_0 = 4 \times 10^6 \text{ m/s}$, take 3 ns to travel between the plates, and leave the bottom plate with speed $v_f = 7.6 \times 10^6 \text{ m/s}$.



a. Label the battery terminals, at the top and bottom of the battery, with positive and negative symbols. Support your answer with a reference to the direction of the electric field between the plates.

b. Calculate the magnitude of the electric field between the plates.

c. Calculate the voltage of the battery.

d. Calculate the magnitude of the charge on each plate.

e. If a dielectric was added between the plates, how would it affect the magnitude of charge on each plate?

f. The plates are discharged and a resistor is added to the circuit. The plates are allowed to fully charge again. How does this affect the speed of the electrons leaving the bottom plate?