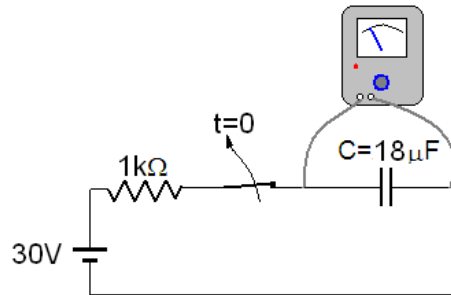


Physics II

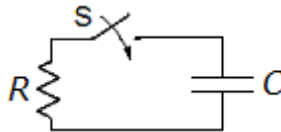
RC Circuits

Problem 1.- The figure depicts the circuit used in the lab “RC circuits”. The switch in the figure has been closed for a long time, so the capacitor is charged to 30 volts. Then at time $t=0$ you open the switch, and the voltage starts dropping (the multimeter behaves as a resistance of $1.0\text{M}\Omega$) find how long it takes for the voltage in the capacitor to get to 4.06 volt.



Problem 2.- A $47\mu\text{F}$ capacitor is charged to an initial potential of $V_0=30$ volts, then it discharges through a $10\text{M}\Omega$ resistor. Calculate how long it takes to reach 11 volts.

Problem 3.- The RC circuit of the following figure has $R=33\text{k}\Omega$ and $C=47\mu\text{F}$. The capacitor is initially charged to a voltage $V_0=100$ volts. Determine how long it will take after closing the switch S for the voltage to drop to 1 volt.

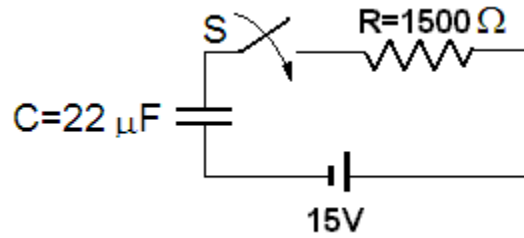


Problem 4.- Suppose you have an oscillator whose period is determined by an RC circuit (like the siren built in the lab). What should you do if you want to increase the period?

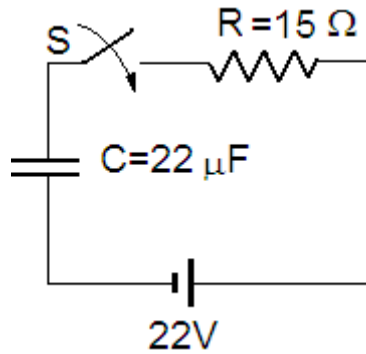
- A) Increase the resistance.
- B) Increase the capacitance.
- C) Reduce the capacitance.
- D) Reduce the resistance.
- E) A or B
- F) C or D

Give a short rationale for your choice.

Problem 5.- Find how long it will take for the voltage in the resistor to drop to 10 V after closing the switch in the following circuit:



Problem 6.- The capacitor was initially uncharged. Find how much time has to pass after closing the switch in the circuit shown for the current to drop to 1 mA.



Problem 7.- In the RC circuit shown below, the capacitor is initially discharged and switch S is closed at time $t=0$. Which of the graphs best describes the voltage in the capacitor V_C ?

