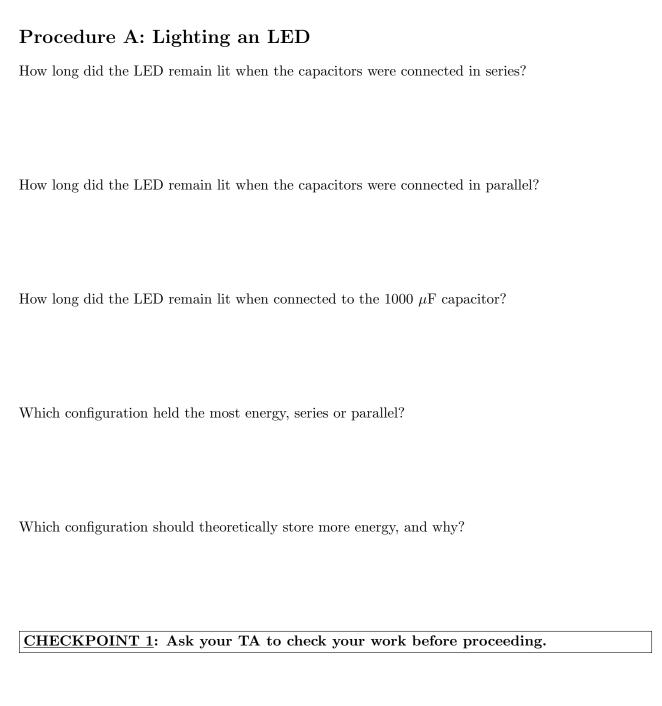
## Capacitors

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.



## Procedure B: Capacitors in Parallel

Complete the table below. Here  $C_1$  refers to the capacitor with the larger value and  $C_2$  refers to the capacitor with the smaller value.

Data Table 1						
	$C_1$	$\sigma_{C_1}$	$C_2$	$\sigma_{C_2}$	$C_{ m p}$	$\sigma_{C\mathrm{p}}$
$C_{ m meas}~(\mu{ m F})$						
$\Delta V_{ m meas}  ({ m V})$						
$Q_{ m calc}~(\mu{ m C})$						
$E_{ m calc} \; (\mu { m J})$						

Calculate the theoretical equivalent capacitance for the two capacitors in parallel.

What is the percent difference between your measured equivalent capacitance and the theoretical value of the equivalent capacitance?

Do the theoretical and experimental values agree within the range of your experimental uncertainty? (Consider your capacitances and their uncertainties exactly as you have entered them.)

Calculate the theoretical total charge.	(Use the	charges	and	their	uncertainties	you	calculated
above for each capacitor.)							

What is the percent difference between the theoretical total charge and the value calculated in the Data Table 1?

Do the theoretical and experimental values agree within the range of your experimental uncertainty? (Consider your charges and their uncertainties exactly as you have entered them.)

CHECKPOINT 2: Ask your TA to check your table and calculations.

## Procedure C: Capacitors in Series

Complete the table below. Here  $C_1$  refers to the capacitor with the larger value and  $C_2$  refers to the capacitor with the smaller value.

Data Table 2

Data Table 2						
	$C_1$	$\sigma_{C_1}$	$C_2$	$\sigma_{C_2}$	$C_{ m s}$	$\sigma_{C{ m s}}$
$C_{ m meas}~(\mu{ m F})$						
$\Delta V_{ m meas} \ ({ m V})$						
$Q_{ m calc}~(\mu{ m C})$						
$E_{ m calc} \; (\mu { m J})$						

Calculate the theoretical equivalent capacitance for the two capacitors in series.
What is the percent difference between your measured equivalent capacitance and the theoretical value of the equivalent capacitance?
Calculate the theoretical value of total voltage. (Use the voltages and their uncertainties you calculated above for each capacitor.)
What is the percent difference between the theoretical value and the calculated value from Data Table 2?
Do the theoretical and experimental values agree within the range of your experimental uncertainty? (Consider your voltages and their uncertainties exactly as you have entered them.)
Do the charges on the individual capacitors and the series arrangement conform to the theoretical prediction of Eq. (9)? (Calculate the percent difference for $Q_{C_1}$ and $Q_{C_8}$ , and the percent difference for $Q_{C_2}$ and $Q_{C_8}$ .)

Physics Labs for Scientists and Engineers - Electricity and Magnetism Worksheet Lab 3-5
1 Hysics Labs for Scientists and Engineers - Electricity and Magnetism Worksheet Lab 5-5
Which circuit configuration held the most energy?
CHECKPOINT 3: Ask your TA to check your table and calculations.