

**Name:** \_\_\_\_\_  
**Instructor:** \_\_\_\_\_  
**Section:** \_\_\_\_\_

## Pre-lab Questions

1. Show that the capacitive time constant  $RC$  has units of seconds.
  
2. If the capacitance in the circuit is doubled, how is the half-life affected?
  
3. If the resistance in the circuit is doubled, how is the half-life affected?
  
4. If the charging voltage in the circuit is doubled, how is the half-life affected?
  
5. To plot the equation  $V_c = V_0 e^{-t/RC}$  so the graph results in a straight line, what quantity do you have to plot vs. time. What is the expression for the slope of this straight line?

## Experiment

**R:** \_\_\_\_\_

**C:** \_\_\_\_\_

	Half-life (Charging)	Half-life (Discharging)	Average Half-Life	Calculated Half-Life	Percent Error
Part 1					
Part 2					
Part 3					

Table 1

Time (s)	Voltage (V)	Time (s)	Voltage (V)
10		45	
15		50	
20		55	
25		60	
30		65	
35		70	
40		75	

Table 2

## Questions

1. Why should you get the same half-life for charging and discharging cases? Base your answer on examining your graph.
2. Include the values found for the half-lives and the % differences. Does the theoretical value life within the range of precision of your measurements? Explain what causes the differences.
3. Did your answers to the Pre-Lab Question 4 agree with results?
4. Summarize how changing the voltage and capacitance changes the half-life?