Physics II
Lab 5 – Experimental Determination of an Unknown Capacitance

NAME:

SECTION:

PURPOSE: In this experiment, you will determine an unknown capacitance by examining the drop in potential across the capacitor as it discharges through the internal resistance of a voltmeter.

PROCEDURE:

1. Use a voltmeter as a resistor. Discharge a capacitor thorough the voltmeter. Measure the time it takes to discharge to 80%, 60%, . . . of the initial voltage.

2. Do the above ten times.

3. Average as indicated in the table, and find the corresponding standard deviations $\sigma$.

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<tr>
<th>(V(t)/V_0)</th>
<th>(t_1)</th>
<th>(t_2)</th>
<th>(t_3)</th>
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<th>(t_{10})</th>
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4. Plot \([-\ln(V/V_0)]\) as the ordinate and $\bar{t}$ as the abscissa. Use $\sigma$ as the error bars.

5. Draw a straight line, and from the slope deduce the value of $C$. The value of $R$ will be given to you by the instructor.

6. Turn in
   - This sheet of instructions (write your name and section number on it).
   - Your table.
   - Your graph.
   - Your calculation, and final value of $C$.

1Important: Read this in its entirety before doing the lab.