Chemistry 1210
Determination of Molar Mass by Freezing Point Depression

Date:_________  Partner:_______________________Lab day/time:_________
  Partner:_______________________

OBJECT:

PROCEDURE:

OBSERVATIONS:

DATA:

Test tube # _______
Mass of Diphenyl Ether (DPE) + Tube  __________
Mass of Tube  __________
Mass of Diphenyl Ether (DPE)  __________

Mass of Menthol + boat  __________
Mass of boat  __________
Mass of Menthol  __________
DATA (Continued)

<table>
<thead>
<tr>
<th>Pure DPE</th>
<th></th>
<th>DPE plus Menthol</th>
<th></th>
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<tbody>
<tr>
<td>Run 1</td>
<td>Time</td>
<td>Temp</td>
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</tr>
<tr>
<td>Run 2</td>
<td>Time</td>
<td>Temp</td>
<td>Run 1</td>
</tr>
</tbody>
</table>

| Run 1    | Time   | Temp  | Run 2    | Time   | Temp  |
| Run 2    | Time   | Temp  | Run 1    | Time   | Temp  |
| Run 2    | Time   | Temp  | Run 2    | Time   | Temp  |
| Run 2    | Time   | Temp  | Run 2    | Time   | Temp  |

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\[ T_f \text{ of DPE} \] 

\[ T_f \text{ of DPE + Menthol} \]

**GRAPH** – On the same sheet, create two graphs of Temperature (in Celsius) vs Time (in seconds) using the best run for pure DPE and the best run for DPE + Menthol. Label \( T_f \) for both liquids and (by hand if you wish) any supercooling.

**CALCULATIONS:**

Calculate the \( \Delta T_f \):

Calculate the molar mass of Menthol

Calculate the % difference between your molar mass of menthol and the true value

**CONCLUSION:**
**DISCUSSION:** (Compare your experimental value with the true one. Give two sources of experimental error and explain how each error would affect your final result.)

**QUESTION** – If in determining the freezing point of pure DPE your uncertainty was ±0.05°C and in determining the freezing point of your Menthol-DPE solution the uncertainty was also ±0.05°C, calculate the resulting error in your molar mass of menthol for your set of experimental data. Show your calculations and express the answer as a range of possible calculated molar masses.