Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lab Day & Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_

## Data Sheet

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Run | | | | |
|  | 1 |  | 2 |  | 3 |
| Flask assembly mass | g |  | g |  | g |
| **Completely filled flask data** |  |  |  |  |  |
| Boiling water temperature, *T*high | °C |  | °C |  | °C |
| Mass of flask assembly *completely* full of water | g |  | g |  | g |
| Mass of just the water in the flask | g |  | g |  | g |
| Volume of water in filled flask, *V*high | mL |  | mL |  | mL |
| **Partially filled flask data** |  |  |  |  |  |
| Room temperature water bath temperature, *T*low | °C |  | °C |  | °C |
| Mass of flask assembly *partially* filled with water | g |  | g |  | g |
| Mass of water in flask at *T*low | g |  | g |  | g |
| Volume of water in flask at *T*low | mL |  | mL |  | mL |
| Volume of gas in the flask at *T*low: *V*low | mL |  | mL |  | mL |
| Graphical estimate of absolute zero | °C |  | °C |  | °C |
| Algebraic estimate of absolute zero | °C |  | °C |  | °C |

## Post Lab Questions

1. What are the two main gases present in the gas samples studied in this lab?
2. This lab states that a drop of water in the 125 mL Erlenmeyer flask will spoil the experiment. Calculate the volume of a drop of water that has been converted to the gas phase by heating to 100 °C.

First, use the following to get moles of water in a drop: A drop has a volume of around 0.05 mL; the density of water is 1.00 g/mL; the molar mass of water is 18 g/mol. (Don’t round this number until after the next calculation.)

Second, find the volume of this as a gas using the ideal gas law, *PV* = *nRT*, where *P* is the pressure, 1 atm (atmospheres), *n* is moles of water, *R* is the ideal gas law constant, 0.08206 (L·atm)/(mol·K), and *T* is the temperature in K (add 273.15 to the Celsius temperature).

1. a) Based on above calculation, how many milliliter of water would be sucked into the flask due to the presence of one drop of water in the flask at beginning?

b) Compared to your experimental data, would one drop of water in the flask at the beginning make Vlow much larger, slightly larger, roughly the same, slightly smaller, or much smaller than the value of Vlow you obtained? Why?

1. Suppose that *V*L was too small, due to, say, using a wet flask. Would this make the value of absolute zero even closer to zero, or even farther away from zero? (Look the plot on the first page of this lab, and figure out what happens to the *x*-intercept if *V*L gets smaller.)