DETERMINATION OF THE IDEAL GAS CONSTANT

Name: ________ Date: ________ Station #: ________
Partner: _____________

Objective: To determine the value of ideal gas constant (R) by the decomposition of $KClO_3$.

Procedure: As in CHEM 1105 lab manual, pages ______________________.

Observations:

Data:

	Run 1	Run 2
Mass of test tube and mixture before heating		
Mass of test tube and mixture after heating		
Mass of beaker and water after reaction		
Mass of empty beaker		
Temperature of water in the flask after reaction		
Vapor pressure of water at the temp. of water		
Atmospheric pressure		

Calculations:

Do Calculations for both runs (show one run in detail and the result from the other)

1. The mass of O_2 produced.

   Run 1

   Run 2

2. The moles of O_2 produced.

   Run 1

   Run 2

3. The mass of water expelled.

   Run 1

   Run 2

4. The volume of water expelled (assume a density of 1.00 g/mL).

   Run 1

   Run 2

5. The temperature of the solution (in degrees Kelvin).

   Run 1

   Run 2

6. The pressure of the O_2 gas in atmospheres.

   Run 1

   Run 2

7. The value of R, from ideal gas equation

   Run 1

   Run 2

Discussion:

Are your values for R reasonably close (i.e., within 10%) to the expected value? Explain.
Calculate the percent deviation of your value of ideal gas constant, R, from the true value.

$$\%\ \text{deviation} = \left|\frac{(\text{Accepted Value}) - (\text{Experimental Value})}{\text{Accepted Value}}\right| \times 100\%$$

Conclusion:

Questions:

1) In general terms, under what conditions of temperature and pressure is the ideal gas equation valid? Why?

2) Calculate, using your experimental value for R, the volume occupied by a mole of gas at S.T.P. (standard temperature and pressure). Calculate the percent error given that the accepted value is 22.4 litres.

$$\%\ \text{deviation} = \left|\frac{(\text{Accepted Value}) - (\text{Experimental Value})}{\text{Accepted Value}}\right| \times 100\%$$