Report

Name_____

Section_____

Unknown #_____

A. Determination of % $KClO_3$ in the Mixture

DATA

(1) Weight of test tube, beaker, and sample _____g

(2) Weight of test tube and beaker _____g

(3) Weight of sample _____g

(4) Weight of test tube, beaker and residue (first heating) _____g

Weight of test tube, beaker and residue (second heating) _____g

Weight of test tube, beaker and residue (third heating) _____g

(5) Weight loss after first heating _____g
(Use in Part B - Molar Volume)

(6) Total weight loss on heating _____g
(Use in Part A - % $KClO_3$)

CALCULATIONS (YOU MUST SHOW YOUR METHOD OF SOLUTION)

(1) Weight of $KClO_3$ in the sample _____g

(2) % $KClO_3$ in the sample _____%

True Value_____

Absolute error_____

Percent error_____

B. Determination of the Molar Volume of Oxygen at STP DATA

(1) Volume of O_2 collected _____mL

(2) Temperature of water in bottle _____^oC

(3) Barometer reading _____torr

(4) Room temp. at barometer _____^oC

(5) Correction applied to barometer _____torr

(6) Corrected barometer reading _____torr

(7) Vapor pressure of water at temp. in (2) _____torr

(8) Pressure of dry O_2 _____torr

CALCULATIONS (YOU MUST SHOW YOUR METHOD OF SOLUTION)

(1) Volume of dry O_2 at STP _____mL

(2) Molar Volume of O_2 at STP _____L/mole

Use your found volume of dry oxygen at STP and your found number of moles (calculated from weight loss during first heating).

(3) Absolute error in molar volume _____L/mole

(4) Percent error in molar volume _____%

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C. Density of O_2 at STP

CALCULATIONS (YOU MUST SHOW YOUR METHOD OF SOLUTION)

(1) Density of dry O_2 at STP _____g/L

(2) Absolute error in density _____g/L

(3) Percent error in density _____%

D. Determination of value of R

CALCULATIONS (YOU MUST SHOW YOUR METHOD OF SOLUTION)

(1) Calculated value for R _____

Use the observed volume of oxygen and the appropriate values for number of moles, pressure and temperature.

(2) Absolute error in R value _____

(3) Percent error in R value _____%

Questions Name_____

1. If you have 0.121 moles of gas in an open container at STP how many moles will you have at 25.°C and 730. torr?

2. Will the percent $KClO_3$ found in this experiment be higher than the true value, lower than the true value, or unchanged if the following errors are made?
EXPLAIN YOUR ANSWERS.

   (a) You fail to let the apparatus cool to room temperature before equalizing the pressure.

   (b) The balance is properly zeroed when you weigh the test tube with and without the $KClO_3$ but reads 0.005 just before you reweigh the test tube after the final heating.

3. What is meant by the term "molar volume of a gas"? What is the theoretical value for the molar volume of an ideal gas at STP?

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4. Will the molar volume of oxygen found in this experiment be higher than the true value, lower than the true value, or unaffected by the following errors?
   EXPLAIN YOUR ANSWERS.
   (a) Same as (a) in question 2.

   (b) When you attempt to equalize the pressure after decomposing the potassium chlorate you close the pinch damp with the level of water in the beaker somewhat higher than the level of water in the liter bottle.

5. For a given number of moles of gas will the density increase, decrease, or remain the same when:
   (a) the pressure is increased and the temperature remains constant.

   (b) the temperature is increased and the pressure remains constant.

Problems Name_____

1. 2.037 g of a mixture of $NaClO_3$ and NaCl was heated until all of the $NaClO_3$ had decomposed. The weight of the residue was 1.610 g. Calculate the % $NaClO_3$ in the mixture.

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2. In the above experiment a student collected 343. mL of gas by water displacement at 23.^oC and 731. torr. Calculate the molar volume of O_2 at STP from these results. Also calculate the percent error in the student's value.

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3. How much $KClO_3$ must be decomposed to provide 400. mL of oxygen gas collected at STP?

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4. The volume of a sample of gas that weighs 0.324 g is 295. mL at 26.^{o}C and 732. torr. Calculate the density of the gas at STP.

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5. What is the molecular weight of a gas if 0.528 g of it occupies 457. mL when collected at STP?

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