

DETERMINATION OF ABSOLUTE ZERO AND VERIFYING BOYLE'S LAW

Date: _____

Name: _____

Partner: _____

Objective: To determine absolute zero and verifying Boyle's law

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

VERIFYING BOYLE'S LAW

Observations:

Data:

Table 1: Pressure and Volume Data

Reading Number	Volume (mL)	Pressure (atm)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Calculations:

- 1) Attach graphs made in **Excel** of **Pressure** (atm) versus **Volume** (mL) and **Pressure** (atm) versus **1/Volume** (mL⁻¹).
- 2) Which graph gives a linear relationship?
- 3) Show whether Volume and Pressure have a direct or inverse relationship by calculating a constant **k** (the slope of the graph) from P*V or P/V.

Results:

Boyle's Law was verified by a constant **k**= _____ for P*V or P/V. Circle the correct formula.

Discussion:

Write a short paragraph discussing your results.

Questions:

Steam is stored inside an industrial vessel of 4.2 m³. After compression, the volume of steam reduces to 1.1 m³. Assume the temperature to be constant. Find the initial pressure if the final pressure is 4 bar?

DETERMINATION OF ABSOLUTE ZERO

Observations:

Data:

Table 2: Height of Column of Air and Temperature

Reading Number	Height of Column of Air (mm)	Temperature (°C)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Calculations:

- 1) Attach a graph made in **Graphical Analysis or Excel** of **Column Height** (mm) versus **Temperature** (°C).
- 2) The temperature that corresponds to absolute zero will be the one for which the column length is zero. Determine the slope and y-intercept of the line and using the equation $y=mx + b$ determine the value of Absolute Zero.

3) Show all your calculations for the slope and y-intercept when determining Absolute Zero.

Results:

Table 3: Absolute Zero Results

	Slope	Y-Intercept	Absolute Zero
Value determined			
Units			

Discussion:

Write a short paragraph discussing your results. Compare your experimental data to the accepted value, (-273.15 °C.)

