**TITLE: Gases laws I**

OBJECTIVES: Obtain the mathematical expression of on of the gases laws

MATERIALS:

* Ad hoc system

SECURITY:

* Use goggles.

PROCEDURE:

1. Put the piston in a mid position with valve opened.
2. Close the valve.
3. Take measurements of both volume and pressure decreasing and increasing the volume.

TASKS:

1. Make a table with all your results. Take into account that the apparatus measures manometric pressure, i.e., pressure below or above the atmospheric one. So in order to obtain absolute values of pressure you have to record the actual atmospheric pressure from the lab barometer and add it to the recordings of the apparatus.
2. Find out what relationship exists between the measured variables and what gas law you have probed. REFERENCE!
3. Make any pertinent graph of your data.
4. Explain the meaning of your results and write out your conclusion, including if possible, data from the bibliography.
5. Evaluate the procedure in respect to precision and accuracy of the results. Indicate weaknesses and sources of error and improvements for them.

ASSESSMENT CRITERION: C

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| 7-8 | The student is able to:i. **correctly collect, organize, transform and present** data in numerical and/or visual formsii. **accurately interpret** data and **explain** results **using correct scientific reasoning**iv. **evaluate** the validity of the method based on the outcome of a scientificinvestigationv. **explain** improvements or extensions to the method that would benefit thescientific investigation. | The student registers in a well formatted table (title, labeled columns including magnitudes and units) the raw and/or processed data obtained in the lab.The student plots correctly (title, axes labelled with magnitudes and units, right scale, points well drawn, best fit line present) the raw and/or processed data obtained in the lab.* The calculations are right and an example of them is shown.
* The student explains scientifically the trend/pattern observed.
* The student gets a main conclusion from a right interpretation of the results.
* The conclusion is argued with comments on precision and accuracy of the results, and, when applicable, of the percentage difference between the obtained value and the awaited one.
* The student establishes the validity of the method, discussing its implications and limitations (precision, accuracy, etc.) based on the right interpretation of the results.
* The student explains in detail two or more non trivial sources of error or weaknesses of the method.
* The student explains in detail realistic improvements for each mentioned weaknesses and/or extensions of the method that would benefit the investigation.
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