

Gas Laws Rubric

	Level 4	Level 3	Level 2	Level 1	Level 0
<p>Q1. Reporting P_i and P_f for the reactions with known amounts of CaCO_3 (1 point)</p> <p>Using the values from Tables 1 and 3 in your Data Sheet, fill in the table below with the correct number of significant figures.</p>	<p>The table is complete, and the data is reported with the correct number of significant figures (1 points).</p>	<p>All the data is included and there is one error in the significant figures (0.75 points).</p>	<p>All the data is included, there are two errors in the significant figures (0.5 points).</p>	<p>All the data is included, there are three errors in the significant figures (0.25 points).</p>	<p>The table is not filled or there are more than three errors in significant figures (0 points).</p>
<p>Q2a). Calculations. Determining the volume of the system (V) (4 points)</p> <p>Calculate the volume of your system for each trial using the equation provided in the Lab Manual. Show your calculations and <i>include units</i>.</p> <p>Look at the Table 1 in your Data Sheet and ask yourself if the</p>	<p>1. Three sets of calculations are present and are correct.</p> <p>2. The units are included in all the calculations.</p> <p>3. The answers to whether the calculated volume values make sense based on the original estimate from the Data Sheet are</p>	<p>There is one or two errors or omissions in the items from Level 4 (3 points)</p> <p><i>For example:</i> The explanations are present but somewhat unclear</p> <p>One or two units are missing from the calculations</p>	<p>There are two to three errors or omissions in the items from Level 4 (2 points)</p>	<p>There are up to four errors in the items from Level 4 (1 point)</p>	<p>There are multiple errors or omissions in the items from Level 4 (0 points)</p>

<p>volumes you have calculated make sense.</p> <p><i>Explain your choice.</i></p> <p><i>*Partial points may be given withing each Level</i></p>	<p>given and are correct.</p> <p>4. The required explanations are given and are clear and correct. (4 points)</p>				
<p>Q2 b) Report the calculated volume for each trial and the average volume in the table below with the correct number of the significant figures.</p>	<p>The table is complete, and the data is reported with the correct number of significant figures (1 points).</p>	<p>All the data is included and there is one error in the significant figures (0.75 points).</p>	<p>All the data is included, there are two errors in the significant figures (0.5 points).</p>	<p>All the data is included, there are three errors in the significant figures (0.25 points).</p>	<p>The table is not filled or there are more than three errors in significant figures (0 points).</p>

<p>Q.3 a) Determination of the n_{CO_2} produced from the antacid samples</p> <p>Using the average volume from the table in Q2 b), calculate the n_{CO_2} produced from a portion of antacid table in each trial and show your calculations below. Please include units. (3 points)</p> <p><i>*Partial points may be given withing each Level</i></p>	<p>1. Three sets of calculations are present and are correct.</p> <p>2. The units are included in all the calculations. (3 points)</p>	<p>There is one or two errors or omissions in the items from Level 4 (2 points)</p> <p><i>For example:</i> Two units are missing from the calculations</p> <p>OR</p> <p>One calculation is missing</p>	<p>There are two to three errors or omissions in the items from Level 4 (1 point)</p>		<p>There are more than 3 errors or omissions in the items from Level 4 (0 points)</p>
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<p>Q3 b) Report the n_{CO_2} for each trial with the correct number of significant figures. (1 point)</p>	<p>The table is complete, and the data is reported with the correct number of significant figures (1 points).</p>	<p>All the data is included and there is 1 error in the significant figures (0.75 points).</p>	<p>All the data is included, there are 2 errors in the significant figures (0.5 points).</p>	<p>All the data is included, there are 3 errors in the significant figures (0.25 points).</p>	<p>The table is not filled or there are more than 3 errors in significant figures (0 points).</p>
<p>Q.4a) Number of moles and mass of $CaCO_3$ in each portion of the antacid tablet</p> <p>Using the n_{CO_2} values from Q3, calculate the n_{CaCO_3} in each portion of the antacid tablet used as well as the corresponding mass of $CaCO_3$, m_{CaCO_3}, and report it in the table below. Look at the Table 9 in your Data Sheet and ask yourself if the amounts of $CaCO_3$ you have calculated make sense. (3 points) <i>*Partial points may be given withing each Level</i></p>	<p>1. The table is complete, and the values correspond to the units (<i>for example</i>, 0.400 g and not 400 g).</p> <p>2. The data is reported with the correct number of significant figures</p> <p>3. The answers to whether the calculated volume values make sense based on the original estimate from the Data Sheet are given and are correct.</p>	<p>There is one or two errors or omissions in the items from Level 4 (2 points)</p> <p><i>For example: one error in significant figures and one value missing</i></p> <p>OR</p> <p>The explanation is not provided</p>	<p>There are two to three errors or omissions in the items from Level 4 (1 point)</p>		<p>There are more than 3 errors or omissions in the items from Level 4 (0 points)</p>

	4. The required explanations are given and are clear and correct. (3 points)				
Q4b) w/w% of CaCO₃ in the tablet Calculate the w/w % concentration of CaCO ₃ in for each antacid portion. (2 points)	The table is complete, and the data is reported with the correct number of significant figures. The reported values are correct. (2 points).	All the data is included but there is one error in the significant figures, or one value is reported incorrectly (1.5 points). OR One value is missing (1.5 points)	All the data is included, but there are two errors in significant figures, or two values reported incorrectly (1 point). OR There are two values missing (1 point).	All the data is included, but there are three errors on significant figures, or three values reported incorrectly (0.5 points).	The table is not filled or there are more than three errors in significant figures, or more than 3 values reported incorrectly or missing (0 points).
Q5. The amount of CaCO₃ in ONE antacid tablet (2 points)	The table is complete, and the data is reported with the correct number of significant figures.	All the data is included but there is one error in the significant figures, or one value is reported incorrectly (1.5 points).	All the data is included, but there are two errors in significant figures, or two values reported	All the data is included, but there are three errors on significant figures, or three values reported	The table is not filled or there are more than three errors in significant figures, or more than 3 values

	The reported values are correct. (2 points) .	OR One value is missing (1.5 points)	incorrectly (1 point) . OR There are two values missing (1 point) .	incorrectly (0.5 points) .	reported incorrectly or missing (0 points) .
Q6a) Presence of an outlier Do you have an outlier value, - the value that differs greatly from the other two calculated values? Please explain. (1 point)	The answer is given and explained properly and clearly (1 point)		The answer is given but not properly explained (0.5 points)		The answer is given but it is completely incorrect (0 points)
Q6b) Possible sources of poor reproducibility What would be a possible source of poor reproducibility in this experiment. Provide TWO possible reasons. Errors such as spilling half of the amount on the way to the flask are not acceptable reasons. (2 points)	Two valid reasons are provided (2 points)	Two valid reasons are provided but are not completely applicable (1.5 points) .	Only one valid reason is provided OR Two reasons are provided, but one reason is invalid or not applicable (1 point) .	One valid reason is provided but it is not completely applicable (0.5 points)	No answer is given OR Two reasons are provided, but both are invalid or not applicable (0 points) .

Data Sheet (3 points)	Data sheet is complete, no information is missing. The TA signature is present. The data sheet is submitted on time (3 points) .	Data sheet is mostly complete, but some data is missing (up to 10-20%). The TA signature is present. The data sheet is submitted on time (2 points) .	Data sheet is partially complete, up to 30% of data is missing. The TA signature is present. The data sheet is submitted on time (1 point) .	Data sheet is partially complete, up to 50% of data is missing. The TA signature is present. The data sheet is submitted on time (0.5 points) .	Data sheet is incomplete (more than 50% of data is missing), or it is not submitted or submitted after the last deadline, or it is not signed by the TA (0 points) .
Personalized procedure (2 points)	The procedure is complete or mostly complete and personalized. The TA signature is present. (2 points)		The procedure is missing up to 50% of the steps. The TA signature is present. (1 point)		The procedure is copied directly from the manual, or the procedure is not submitted, or submitted past the last deadline, or it is not signed by the TA (0 points) .
Total # points:	25 points				