

JANUARY 2015 STUDY GUIDE FOR LAB EXAM SECTION (20% of 2nd term lab grade)

The STE Lab Exam Covers 3 Labs:

- 1) Thickness of Copper
- 2) Stoichiometry: Salt from NaHCO_3 plus acid
- 3) Urine Lab

1) Thickness of Copper

Purpose: To use a characteristic property (density), mass and the measurement of other dimensions in order to find the thickness of a thin copper strip.

How To Do It

1. Measure the length and width of the rectangular strip to 2 decimal places with a ruler.
2. Find the mass of the strip with a two-decimal balance.

How To Do the Analysis.

1. Calculate the area, using length and width.
2. Calculate the volume using mass and density of copper.
3. Divide volume by area to get the height, which in this case is the thickness of the copper.

Sample questions:

- 1) Why couldn't we measure the thickness directly?
- 2) What would have happened if the strip was not a perfect rectangle?
- 3) How could the density of the actual sample have been different from the textbook density?



2) Stoichiometry: Salt from NaHCO₃ plus acid

Purpose: To isolate and weigh the salt from reacting a known amount of NaHCO₃ and checking to see if it matches the predicted amount from stoichiometry.

Key Results and Observations From Experiment:

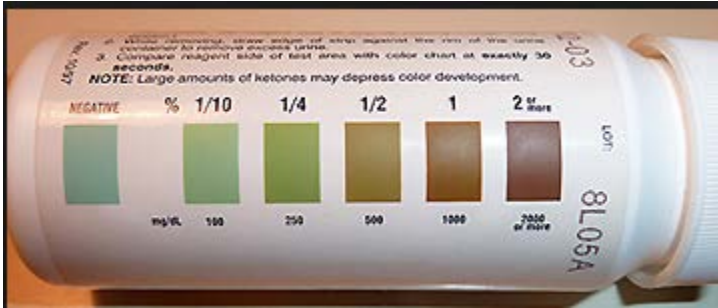
- The reaction was $\text{NaHCO}_3 + \text{HCl} \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{NaCl}$
- HCl used was in excess to make sure that all the NaHCO₃ was consumed. Otherwise it could easily have contaminated the salt.
- All of the CO₂ was driven out (bubbling seen at the beginning)
- Heating was necessary to drive out the HCl (turned wet, blue litmus red) Impurities, especially chloride, can increase that ratio.
- Heating also dried the salt by driving out all the water produced by the reaction and any water that was dissolving the acid.
- The mass of salt was compared to the stoichiometric expectation: measured mass of NaHCO₃ converted to moles, converted to moles of NaCl (same due to 1:1 ratio) and finally converted to mass.



Sample questions:

- 1) How was the percent yield calculated?
- 2) How would the yield have been affected if the salt was still wet?
- 3) If the salt was dry and someone had a low % yield, what was the most probable lab error?

3) Urine Lab



Purpose: to use urine strips and a color chart to find the concentration of glucose in 5 unknowns and to prepare a solution of the same concentration as one of the given samples.

Key Results and Observations From Experiment:

- When the concentration of glucose in a solution is low the urine strip gives a blue-green color and when the concentration is higher, it 's more brown in color
- Exact timing is important. All solutions go dark brown if we wait too long before matching the color on the chart
- If the strips are old, their compounds are no longer reliable.
- The solution can be prepared by :
- Using $n = CV$ and conversion to mass to get mass of glucose
- We dissolved that amount in a beaker in less than the desired volume
- We then transferred to a volumetric flask of the desired volume, added what we rinsed from the beaker to the flask, and we
- Added water to the white line on the flask and mixed.



Sample questions:

- 1) What is the approximate concentration of glucose if its urine-strip color is in between the colors corresponding to 5 and 15 mmol/dL?
- 2) How did we check if the glucose solution was well-prepared?