ST Lab Pretest

A- Metals, Metalloids, Non Metals

1. **Complete the table.**

SUBSTANCE	Appearance	Conductivity test result	Acid test result
METAL			
METALLOID			
NONMETAL			

2. Two different substances both seem shiny:
   Substance A sparkles like ice in bright sunlight.
   Substance B is more reflective and looks almost all white in the sun.

   a) Which one is lustrous?
   b) Is substance B necessarily a metal? Why or why not?

3. a) When testing for conductivity, should you **not** use a powdery version of a solid?
   b) Why or why not?
   c) Is a substance that makes the light blink on necessarily a metal?

4. a) If a few bubbles slowly appear after adding a powder to acid, is there necessarily a reaction?
   b) Why or why not?
   c) What is the advantage of using a powdered substance for the acid test?

B- Reduction of Copper Oxide Lab

5. Why is it important to mix the two powders (carbon and copper oxide)?
6. What color of flame from the Bunsen burner makes the reaction go faster?

7. a) What's the purpose of the limewater?
   b) Think of something that would prevent the limewater from going cloudy.

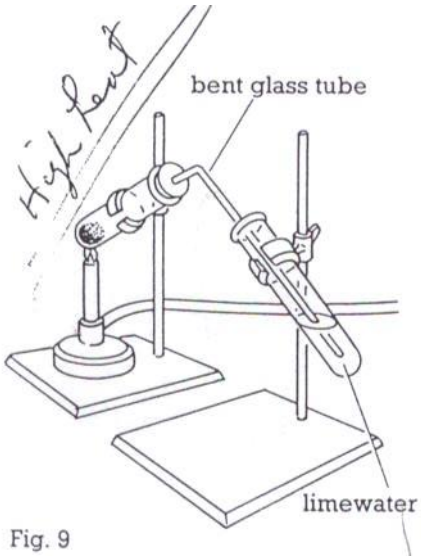


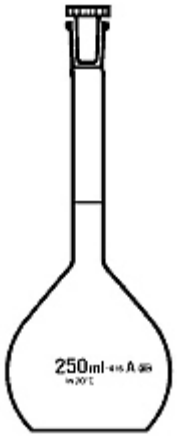
Fig. 9

8. In the reduction of copper oxide lab, why did the mass decrease?

9. a) If you had weighed the limewater before and after and subtracted the two masses, what would the answer represent?
   b) If this difference in mass was still smaller than the difference between the masses of the black powder mixture before and after the reaction, what would it signify?

10. Where did the brown product of this reaction come from?

C- Preparation and Dilution of a Solution

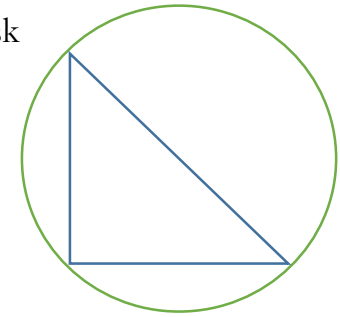



Pipette

11. Before preparing a solution of a known concentration, what calculation has to be performed? (just mention the formula)
12. Why do we go through the trouble of using a volumetric flask? Why not measure the volume in a graduated cylinder? Why is the former more accurate?
13. Why don't we add the solid directly to the volumetric flask?
14. a) To accurately dilute a solution of known concentration we remove a precise volume from the volumetric flask. What piece of glassware do we use?
    b) Why is this piece of glassware even more precise than the volumetric flask?

STE Lab Pretest

A- The Thickness of Copper Lab



1. A student wanted to estimate the thickness of a thin circular disk of 18K gold.

a) What physical property of 18 K gold would (s)he have to look up in a handbook or on Google?

b) A student drew a right triangle inside the disk. What did (s)he then measure with a ruler and why?

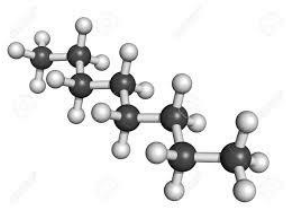
c) What other measurement would (s)he need in order to later calculate the disk's thickness?

d) Which of these formulas will yield the thickness= h ? (d = density; r = radius of disk; m = mass of disk ; π = 3.1415….)

(A) $h = \frac{d\pi r^2}{m}$ (B) $h = \frac{m}{d\pi r^2}$ (C) $h = \frac{d}{m\pi r^2}$ (D) $h = \frac{m\pi r^2}{d}$

e)How many decimal places are recorded with a typical ruler and how many places are estimated ?

B- Molecular Model Building

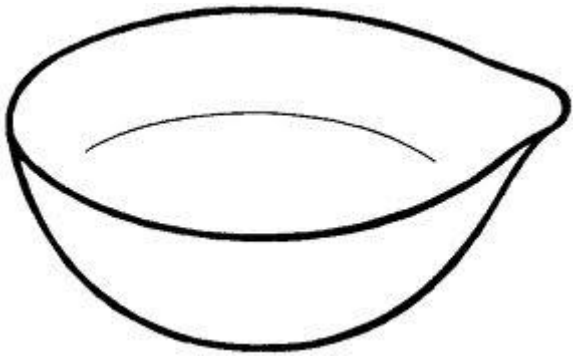


2. Match the sphere from the molecular models with the number of holes that it had.

SPHERE	NUMBER OF HOLES
a)Black (carbon) _____	1
b)White (hydrogen)_____	2
c)Red(oxygen)_____	3
d) Green(fluorine)_____	4

e) How many electrons are represented by each spring connecting any two spheres?

STOICHIOMETRY LAB



3. a) What evidence did we gather for the fact that not all HCl reacted with $NaHCO_3$?
   b) Why was excess HCl used?
   c) Where did the water that we evaporated away come from? Give two sources.
   d) How did we predict the amount of NaCl that should have formed according to stoichiometry theory? Mention what was measured in the lab and then the calculation-step used.

4. Which of the following statements concerning % yield are true. BTW:

$$\%\ \text{yield} = \frac{actual\ mass\ of\ NaCl}{mass\ predicted\ by\ calculation} X100\%$$

   1. If salt spattered while heating too quickly, the yield would have been <100%.
   2. If the sample of salt was still slightly humid then the yield would have been >100%.
   3. If impurities from the acid stained the salt yellow, and if everything else was perfect, then the yield would have been <100%.
   4. If salt spattered while heating too quickly and if the sample of salt was still slightly humid, the two errors could have offset each other.