Alchemy Mid-Unit Test Study Guide

Definition and Properties of Matter

- Be able to define what matter is and provide examples of things that are/are not matter.
- Know the names and uses of lab equipment we have used in class.
- Know the density formula (Density = mass/volume) and how to solve for any of its variables.

Sample Questions:

1. Name two things that are matter and two things that are not matter.
2. Describe the appearance and use of each of the following pieces of lab equipment:
    a. Beaker
    b. Erlenmeyer flask
    c. Graduated Cylinder
    d. Hot plate
3. Solve the following:
    a. What is the density of a metal rod with the mass of 45.1g and volume of 12.3mL?
    b. What is the mass of a block with the density of 3.5g/mL and volume of 2.2mL?
    c. What is the volume of a gold coin with the mass of 58.5g? (Density of gold is 19.3g/mL)

Solutions and the Copper Cycle

- Know the definition of a solution and the difference between a solvent and solute.
- Know how to write the formula for a solution.
- Study the equations from the copper cycle lab and how the compounds changed with each step.

Sample Questions:

1. What is the difference between NaCl(s) and NaCl(aq)?
2. Sodium hydroxide, NaOH(aq), is added to potassium sulfate, K_2SO_4(aq), will result in KOH(aq) and a solid. What is the solid?
    a. NaOH(s)
    b. Na_2SO_4(aq)
    c. Na_2SO_4(s)
    d. NaK(s)
    e. K_2SO_4(s)

Period Table

- Be able to identify the trends on the periodic table as you move vertically and horizontally including atomic mass, atomic number, reactivity, atomic radius (size), and softness.
- Know where the families (halogens, noble gases, transition metals, etc) are located on the table.
- Know what a group (column) and period (row) on the table are.
- Know where the metals, nonmetals and metalloids are located.

Sample Questions:

1. In general, which elements on the periodic table will have similar properties?
2. What element is in group 5 and period 4?
3. Which has a smaller atomic radius (size), Cu or Ge?
4. Which is more reactive, Sr or I?
5. What metal is softer, Be or Ba?

Atomic Structure & Isotopes

- Know the parts of the atom (subatomic particles) and their relative masses, charge, and locations within the atom.
- Be able to use the Periodic Table to determine the number of protons, neutrons, and electrons in an atom of an element.
- Know what an isotope is, how to read and write an isoptope symbol, and to solve for the number of neutrons in different isotopes of an element.
- Know what accounts for the instability/radioactivity of some isotopes and types of nuclear changes that can take place in an atom.
- Know the characteristics of the types of nuclear decay (alpha, beta, & gamma) and be able to determine the products of a nuclear decay reaction.

Sample Questions:

1. How many electrons, protons, and neutrons are contained in each of the following atoms:
    a. Fluorine-23
    b. Molybdenum-96
    c. $^{59}_{27}Co$
    d. $^{70}_{30}Zn$
2. Describe the structure of a typical atom. Be sure to identify where each subatomic particle is located.
3. For each of the following elements, give the name, atomic number, # of protons, # of electrons, group number, and family/group name (if applicable):
    a. S
    b. Mg
    c. N
    d. Na
4. Create a table comparing the mass and charge of alpha, beta, and gamma radiation.
5. Write the nuclear equation for the alpha decay of astatine-213.
6. Write the nuclear equation for the beta decay of promethium-142.
7. Complete and balance the following nuclear equations. Indicate which type of nuclear process is taking place:
    a. $^{66}_{29}Cu \rightarrow {}^{66}_{30}Zn + ?$
    b. $? \rightarrow {}^{181}_{77}Ir + {}^{4}_{2}He$

****Final Note: This is a *guide* and is meant to help you focus your studying. Be sure to go over your making sense notes and homework, remember your sig fig rules and bring a calculator on test day.**

****AS ALWAYS, COME IN AND GET HELP IF YOU NEED IT!**