Chemistry Fall 2013 Review

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Unit 1: Chemistry Math (Chapters 1 and 3)**

KEY VOCAB TO KNOW:

* Meter
* Liter
* Gram
* Mass
* Weight
* Volume
* Density
* Kelvin
* Celsius
* Conversion Factor

1. Metric conversions: Be able to convert between kilo, centi, milli, micro and nano.
   1. How many meters are in 5 km?
   2. How many ng are in 15 cg?
2. How many significant figures are in the following? Which value has the most significant figures?
   1. 3.25 mL vs. 3.250 mL
   2. 0.056 g vs. 5.6 x 10-2g
3. Round each measurement to the number of significant figures indicated in the parentheses.
   1. 56.55 g (3)
   2. 4.007 x 103 m

**Unit 2: Matter and Change (Chapters 2)**

KEY VOCAB TO KNOW:

* Substance
* Mixture
* Homogeneous Mixture
* Heterogeneous Mixture
* Distillation
* Filtration
* Physical Property
* Chemical Property
* Physical change
* Chemical Change
* Element
* Compound
* Precipitate
* Reactant
* Product
* Law of Conservation of Mass

1. Of the states of matter (solid, liquid or gas) which is compressible and takes the shape and volume of its container? Describe the other two states as far as their compressibility and definite (or indefinite), shape and definite (or indefinite) volume.
2. What is the difference between a heterogeneous and a homogeneous mixture? Give an example of each.
3. What is the difference between a substance and a mixture?

**Unit 3: Atomic Structure ( Chapters 4 and 5)**

KEY VOCAB TO KNOW:

* Nucleus
* Proton
* Neutron
* Electron
* Atomic number
* Mass number
* Isotope
* Atomic Mass
* Weighted average
* Quantum mechanical model
* Atomic orbital
* Electron configuration
* Principle energy level
* Aufbau principle
* Hund’s rule
* Pauli exclusion principle
* Wavelength
* Photon
* Electromagnetic radiation
* Frequency
* Hertz
* Ground state
* Excited state
* Atomic emission spectrum

1. Describe the model of the atom that Rutherford proposed after his gold foil experiment. In particular, what was the atom mostly made of? Where was most of the mass and positive charge? What subatomic particle is outside the nucleus?
2. For nuclear symbols, where is the mass number located? The atomic number?
3. What is the number of electrons ,protons and neutrons for the following:
4. How are isotopes of the same elements similar? How are they different?
5. Why are atomic masses calculated with a weighted average?
6. Element X has two natural isotopes. The isotope with a mass of 10 amu has a relative abundance of 19.91%. The isotope with a mass of 11 amu has a relative abundance of 80.09%. Calculate the atomic mass of this isotope and identify the element.
7. Explain the difference between Rutherford’s atomic model and the Bohr model. What is the difference between the Bohr model and the quantum mechanical model?
8. How can you tell what the highest principle energy level of an atom is by looking at the periodic table?
9. Write the electron configuration for the following:
   1. Germanium
   2. Nitrogen
   3. Potassium
10. What happens to the wavelength of light as the frequency increases?
11. A beam of electromagnetic radiation has a wavelength of 500 nm.
    1. What is this wavelength in m?
    2. What is the frequency and the energy of the light?
    3. In what region of the spectrum is this?

**Unit 3: Periodicity and Bonding (Chapters 6-9)**

KEY VOCAB TO KNOW:

* Period
* Group
* Metal
* Metalloid
* Nonmetals
* Alkali Metals
* Alkaline Earth Metals
* Halogens
* Noble Gases
* Transition Metals
* Representative elements
* Atomic Size and PT trend
* Ionization energy and PT trend
* Electronegativity and PT trend
* Ion
* Cation
* Anion
* Ionic Compound
* Monatomic Ion
* Polyatomic ion
* Valence Electron
* Covalent Compound
* Polar covalent bond
* Nonpolar covalent bond
* Diatomic molecules

1. What do elements in the same group have in common?
2. What two ways are metals different from nonmetals ( as far as there general properties)?
3. Why do cations and anions attract one another?
4. List the following in order of increasing ionization energy: Be, Mg, Sr
5. Which element has the higher electronegativity: Cl or F?
6. List the following in order of increasing atomic radius: S, Cl, Na
7. Name the following groups:
8. Group 1A
9. Group 2A
10. Group 3A
11. Group 8A
12. Elements in the B groups.
13. Write the symbol and charge for the following ions:
14. Nitride ion
15. Barium ion
16. Copper (III) ion
17. Chloride ion
18. Aluminum ion
19. Complete this table with the formulas and names of the compounds.

|  |  |  |  |
| --- | --- | --- | --- |
|  | K+ | Mg2+ | Al3+ |
| Br- | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| CO32- | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ | Formula\_\_\_\_\_\_\_\_\_  Name\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. How are the physical properties of ionic compounds different from those of covalent compounds?
2. If a compound name has numerical prefixes, it is not \_\_\_\_\_\_\_\_\_\_\_\_. If the compound name has a metal or ammonium in the name, it is \_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Name these compounds:
4. N2O5
5. Al2SO3
6. SO3
7. Dinitrogen tetroxide
8. Boron tribromide
9. Draw the Lewis dot structures of the following substances and give their shape:
10. CO2
11. CO32-
12. OF2
13. PCl5
14. SO42-
15. NO21-