Name _____

Academic Chemistry Midterm Review

Directions: Answer each question fully. Follow directions for each section.

Scientific Method and Math

1. Write the following in scientific notation:

   a. 0.000 310 _____

   b. 340, 651, 000 _____

   c. 789, 000 _____

   d. 0.3021 _____

2. Convert the following using dimensional analysis:
   a. 4.87 ds to hs

   b. $6.15 * 10^9$ cm to km

   c. 8.27 ng to mg

3. What is the percent error when a student measures the density of ice as 2.2 g/cm^3 when the accepted density of ice is 1.92 g/cm^3?

4. What substance will have a volume of 36.72 cm^3 and a mass of 416.54 g?
   Use your reference packet to help with this question.

Matter and the Atom

1. Write an "X" in the correct box to describe the following substances.

Substance	Element	Compound	Homogeneous	Heterogeneous
Uranium				
Blood				
Sprite				
Alcohol				
Vinegar				
Gallium				
unsweet Tea				
Dirt				

2. Complete the following table

Particle	Relative Mass	Charge	Location
Neutron			
		+1	
	0		

3. Complete the following table

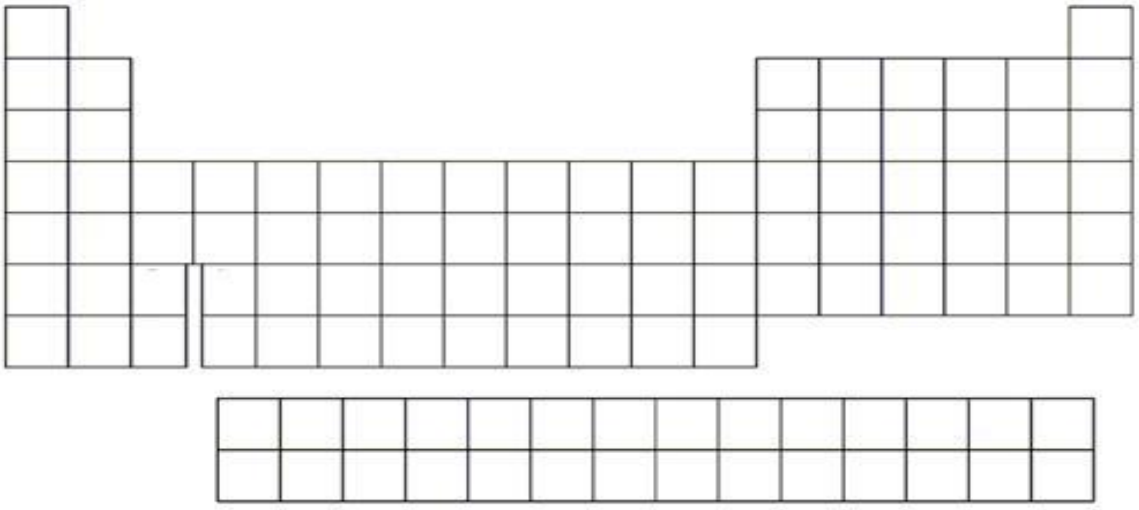
Name	Symbolic Notation	Atomic Number	Atomic Mass	Mass Number	Number Protons	Number Neutrons	Number Electrons
Astatine-210							86
				39	20		
Copper (+2)						27	
		35		82			
	$^{90}_{39}Y$						

4. Complete the following table. Place an "X" in the correct box

Change	Chemical	Physical
Grinding coffee beans		
Breaking and Frying an egg		
Melting butter for popcorn		
Spoiling food		
Mowing the lawn		
Bleaching your hair		
Squeezing oranges for juice		

Periodic Table, Quantum, and Electron Configuration

1. Label the group names on the periodic table below. Color the metals blue, metalloids orange, and nonmetals green. Label the valence electrons on the periodic table below. Outline the d block red, f block yellow, p block purple, and s block green.



2. What is the oxidation number for the following groups?

   a. Group 17
   b. Group 11
   c. Group 1
   d. Group 5

3. Name an example of the following (just use symbols):

element in the d-block: element in period 3:

metalloid: inner transition metal:

very reactive nonmetal: stable metal:

group 14: alkaline earth metal:

4. How many energy levels do the following elements have?

a) Phosphorous b) Calcium C) Xenon

5. Put the following elements in order of increasing atomic radius.

a. Ga , As, Cu, , K, Ti

6. Put the following elements in order of decreasing ionization energy

a. Rb , Cs, Li, Na,

7. Put the following substances in order of decreasing ionic radius

a. P^{+5}, P^{-3}, P^{+1}, P

8. Put the following in order of increasing reactivity

a. Ba, Hf, Ir, Re

b. Br, Cl, F, I

9. Using the Bohr model, give the wavelength of the wave released when the following occurs:

n = 4 to n = 1 → _____ n = 6 to n = 2 → _____

what color is released?

10. List the following in increasing frequency: blue light, infrared, microwaves, orange light, and x-rays

11. Write the full, orbital, noble gas electron configurations and Lewis dot diagram for the following substances:

Element	Full e config	Orbital notation	Noble gas	Lewis Dot
P				
Xe				

Chemical Bonding

1. In which type of bond are electrons transferred from one atom to another?

2. Name the representative unit for an ionic compound.

3. Name the intermolecular force that occurs between the following substances.
   a. CO_2 and HCl
   b. NH_3 and NH_3
   c. CH_4 and F_2

4. Which type of bond is only a good conductor when it is in aqueous state?

5. What type of covalent bonding gives diamonds, graphite and quartz unique characteristics? (be specific)

6. Complete the table below. (**8 pts**)

	CO_2	NH_3
Structural Formula		
Shape		
Molecular Polarity		

6. How many shared and lone pairs does a trigonal pyramidal shaped molecule have around its central atom?

7. Show the neutral compound that forms between the following elements. What type of bonding do these elements have? Also name them!

a) Calcium and Nitrogen b) Cobalt and Nitrate c) Silver and Phosphate

8. Identify the type of bonding that occurs when these elements bond. (you will need to use electronegativity tables to do this)
   a) Ca and F b) C and O c) N and F d) H and Br

9. What are the 7 Diatomic molecules?

10. What are some characteristics of ionic, covalent and metallic bonds?

Chemical Reactions:

1. Write an example of a synthesis reaction.

2. Balance the equation $H_2 + O_2 \rightarrow H_2O$

3. What type of reaction is shown in the following unbalanced equation?

   $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$

4. What are the four indicators of a chemical change?