Name_____
Please write your name on the back also.

Physiological Chemistry I
Exam II
Dr. Melissa Kelley
October 17, 2007

You have 50 minutes to complete this exam. Provide the one best answer for each, following the instructions given in each section of the exam.

1. (2 points each) **Name the following:**

_____a. $(NH_4)_2O_2$

_____b. K_3PO_4

_____c. SO_3

_____d. CuCl

_____e. Na_2CO_3

2. (2 points each) **Write the formula for each of the following compounds:**

_____a. Iron (III) acetate

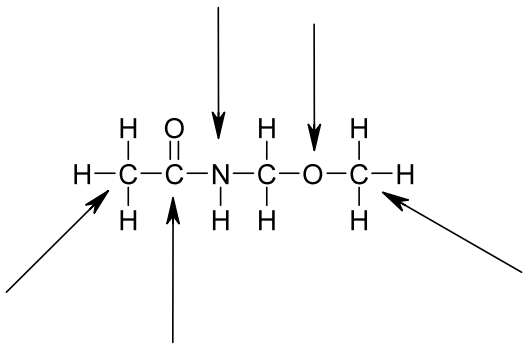
_____b. Sodium sulfate

_____c. Phosphorous trichloride

_____d. Sodium hydroxide

_____e. Magnesium chloride

3. (10 points) **For each atom with an arrow, write the geometry of that atom by the arrow.**



4. (5 points) Draw the Lewis Structures. VSEPR geometry is not required.

$CH_2CHOC(O)C(CH_3)_3$

5. (5 points) Shown below are three compounds. Identify which compound would be a solid, liquid or a gas and briefly explain your answer.

CH_3OH carbon tetrafluoride Magnesium chloride

6. (14 points) Balance the following chemical equations: All coefficients including the number one must be shown in the blank provided to receive maximum credit. **ANY BLANK NOT FILLED IN WILL BE MARKED WRONG**

a. _____Al_2O_3 → _____Al + _____O_2 (g)

b. _____PbS + _____O_2(g) → _____SO_2(g) + _____PbO(g)

7. (8 points) Write a complete and balanced equation for the following statement: Aluminum ions reacts with carbonate ions to form aluminum carbonate.

Perform the following calculations: Credit will only be given if you show your work and units.

8. (10 points) Lithium oxide reacts with water to form lithium hydroxide. Lithium oxide is used in the space shuttle to remove water from the inside of the space shuttle. How many pounds of lithium oxide must be carried on the space shuttle to remove 5.0L of water? The density of water is 0.998 g/mL. Your answer should include a balanced chemical equation and the correct number of significant figures. Useful information: density of water=0.998 g/mL and 1 lb=454g

9. (10 points) Butanethiol ($C_4H_{10}S$) is the chemical responsible for the odor of a skunk. This compound can be deodorized by a reaction with household bleach (NaOCl). My dog Scoutie has been sprayed with 5.0 grams of butanethiol. How many mL of bleach should I add to Scoutie's bath water to deodorize the butanethiol. The concentration of bleach in my cabinet is 0.0985 moles NaOCl per liter of NaOCl. The chemical reaction is shown below:

$C_4H_{10}S + NaOCl \rightarrow C_8H_{18}S_2 + NaCl + H_2O$

Your answer should include the correct number of significant figures.
Useful information:

Molar mass C_4H_{10}=90.19 g/mol
Molar mass of $C_8H_{18}S_2$= 168.28 g/mol
Molar mass of NaCl= 58.44 g/mol
Molar mass of NaOCl = 74.44 g/mol
Molar mass of H_2O= 18.0 g/mol

Multiple Choice: Select the one best answer for each question. Multiple answers will not be accepted. Each question is worth 3 points.

_____10. Assuming reactions between the following pairs of elements, which pair is most likely to form a covalent compound?

A. calcium and oxygen
B. lithium and carbon
C. aluminum and chloride
D. phosphorous and iodine

_____11. Which of the following represents an intramolecular force?

A. Pyramidal shape of NH_3.
B. Solubility of water and table sugar.
C. N_2 having a low boiling point.
D. Water having a high melting point.

_____12. Which of the following statements is **not true**?

A. Polar covalent bonding can exist in a covalent compound with a double bond.
B. An ionic bond between two atoms is the transfer of valence electrons.
C. Non-polar covalent bonding between two atoms is the sharing of valence electrons.
D. Cations involved in an ionic bond have high electron affinity.

_____13. Which of the following statements is **not true**?

A. Double bonds have a shorter bond length and a higher bond energy than single bond.
B. Triple bonds have a shorter bond length and a higher bond energy than single bonds.
C. Double bonds have a shorter bond length and a lower bond energy than triple bond.
D. Triple bonds have a shorter bond length and a lower bond energy than single bonds.

_____14. Which of the following statements is **not true**?

A. A molecule having more than one resonance form is very reactive.
B. When a molecule has more than one resonance form, either structure is chemically correct.
C. Some polyatomic ions have resonance.
D. Two resonance forms have same numbers of valence of electrons.

_____15. How molecules are in 1.0 teaspoon of water? Useful information: 1 mL = 0.202 tsp and density of water=0.998 g/mL

A. 1.7×10^{23} molecules
B. 6.0×10^{23} molecules
C. 3.2×10^{23} molecules
D. 5.7×10^{23} molecules