This exam consists of 4 pages. Make sure you have one of each. Print your name at the top of each page now. A fifth page contains a periodic chart. You may tear it off and use it as a scratch sheet. Show your work on calculations, including unit conversions, and give answers in the correct units and appropriate number of significant figures.

In problems involving molecular and formula weights, you may use values rounded to the nearest 0.1 amu.

If anything confuses you or is not clear, raise your hand and ask!

Page	Points
1	_____
2	_____
3	_____
4	_____

Total _____

(4) 1. Silver has a density of 10.5 g/cm^3. What would be the volume of a silver bar weighing 4.45 kg?

(4) 2. Your tire pressure is 32 pounds per in^2. What would this be in kg per cm^2?
(1 pound = 453.6 g, 1 in = 2.54 cm)

(8) 3. Name the following compounds:

$Fe(OH)_2$ _____ K_2SO_4 _____

$CaCO_3$ _____ $(NH_4)_3PO_3$ _____

(8) 4. Write the formulas for the following:

magnesium nitrite _____ phosphorus trichloride _____

copper (I) sulfide _____ lithium perchlorate _____

(9) 5. Give the number of protons, neutrons, and electrons in the following:

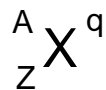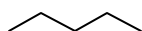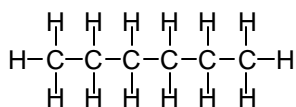| Nuclide	Protons	Neutrons	Electrons
^{59}Ni	_____	_____	_____
$^{80}Br^{-1}$	_____	_____	_____
$^{65}Zn^{+2}$	_____	_____	_____

(8)   6.   Give the atomic symbol, as in the illustration, including **Z**, **A**, and **q** for atoms or ions containing the following numbers of particles:

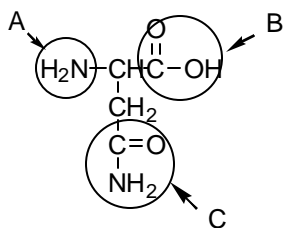   (a) 16 p, 16 n, 18 e   (a) 20 p, 21 n, 18 e

$$_{Z}^{A}X^{q}$$

(8)   7.   Give the molecular formula and name for the following hydrocarbons.

       Structural Formula   **Molecular Formula**   **Name**

```
    H  H  H  H  H  H
    |  |  |  |  |  |
H – C– C– C– C– C– C– H
    |  |  |  |  |  |
    H  H  H  H  H  H
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(6)   8.   Following is the structure of the natural compound called **asparagine**. Give the **name** of the circled organic functional groups.
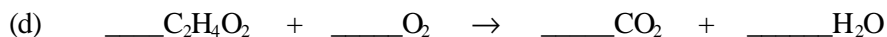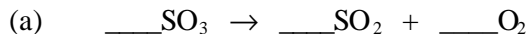
               A. _____

               B. _____

               C. _____

(14)   9.   Balance the following chemical equations (reduce to the smallest whole number coefficients):

(a)   ____SO_3 → ____SO_2 + ____O_2

(b)   ____Mg_3N_2 + ____HCl → ____$MgCl_2$ + ____NH_4Cl

(c)   ____N_2O_5 + ____H_2O → ____HNO_3

(d)   ____$C_2H_4O_2$ + ____O_2 → ____CO_2 + ____H_2O

(4)   10.   Calculate the number of moles in 23.8 g of SO_2.

(4)   11.   Calculate the number of molecules in 33.1 g of CH_4.

(8)   12.   A compound containing only carbon, hydrogen and oxygen was shown by combustion analysis to consist of 54.6% C and 9.1% H. What is its empirical formula?

(15)   13.   Balance the following chemical equation:

_____H_3PO_4 + _____$BaSO_4$ → _____$Ba_3(PO_4)_2$ + _____H_2SO_4
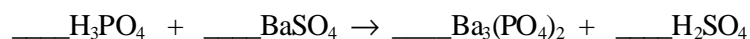
25.1 g of H_3PO_4 are mixed with 52.1 g of $BaSO_4$, and the above reaction proceeds. Answer each of the following questions in the blank provided, **showing your work in the space under the question**.

(a)   How many moles of H_3PO_4 is this? _____

(b)   How many moles of $BaSO_4$ is this? _____

(c)   Which is the limiting reagent? _____

(d)   How many g of $Ba_3(PO_4)_2$ will be produced? _____

(e)   How many g of the excess reagent will be left? _____