GENERAL CHEMISTRY I       QUIZ II
INSTRUCTIONS:

PRINT YOUR NAME ————>     NAME ____________________.

WORK 3 OF #1 THROUGH #4 (3@ 25)

SHOW YOUR WORK FOR PARTIAL CREDIT

USE THE CORRECT NUMBER OF SIGNIFICANT FIGURES
THE LAST PAGE IS A PERIODIC TABLE

\[ R = 0.08206 \text{ lit-atm/mol-K} \] 1 ____
\[ R = 8.3145 \text{ J/mol-K} \] 2 ____
\[ h = 6.626 \times 10^{-34} \text{ J-s} \] 3 ____
\[ c = 2.9979 \times 10^8 \text{ m/s} \] 4 ____

TOTAL(75) ____.
1. Give a short answer to eight (3 pt each) of (a)-(j). You may omit two with no penalty.

(a) What is the percent composition by mass of each element of sodium sulfate, \( \text{Na}_2\text{SO}_4 \)?

Predict the formula of the ionic compound formed from the following pairs of elements or polyatomic ions. For elements, you must determine the charge on the ion by the position in the periodic table.

<table>
<thead>
<tr>
<th>Element or ion</th>
<th>Element or ion</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) calcium</td>
<td>chlorine</td>
<td></td>
</tr>
<tr>
<td>(c) sodium</td>
<td>phosphate (( \text{PO}_4^{3-} ))</td>
<td></td>
</tr>
<tr>
<td>(d) aluminum</td>
<td>nitrate (( \text{NO}_3^- ))</td>
<td></td>
</tr>
<tr>
<td>(e) ammonium (NH(_4^+ ))</td>
<td>sulfur</td>
<td></td>
</tr>
</tbody>
</table>

(f) Identify the noble gas in period 4. _______

For (g)-(h), Consider the element Calcium.

(g) To which group (number) does it belong? _______To which period? _______

(h) Is calcium a metal or a nonmetal? _________________________

List the symbol and name of two transition metal elements.

(i) Symbol _________ Name ________________

(j) Symbol _________ Name ________________
2. THF glycol is an industrial compound that is used in the manufacture of plastics. Elemental analysis of THF glycol finds a composition by mass of 54.50% C, 9.15% H and 36.35% O. A separate experiment determines the molar mass to be 132.16 g/mol. Determine the empirical and molecular formula of THF glycol.

3. Consider a 20.00 g sample of potassium aluminate. It contains 0.2039 mol of potassium. The sample is 27.51% by mass aluminum. The sample has $2.451 \times 10^{23}$ atoms of oxygen. Determine the empirical formula of potassium aluminate.
4. The model below shows a ball and stick model of dihydroxyacetone. It is one of the ingredients in artificial tanning lotions. The code for the atoms: carbon = large filled in balls, oxygen = large balls with white dot in the middle, hydrogen = small white balls.

(a) What is the molecular formula and molar mass of dihydroxyacetone?

(b) How many mol are in 35.6 g of dihydroxyacetone?

(c) How many individual dihydroxyacetone molecules are in 35.6 g? (Do not use units of mol in your final answer)

(d) How many individual oxygen atoms are in 0.567 mol of dihydroxyacetone. (Do not use units of mol in your final answer.)