1. Which of the following is an example of a physical property? (1 pt.)
   A. corrosiveness of sulfuric acid
   B. lead becomes a liquid when heated to 601ºC
   C. flammability of gasoline
   D. neutralization of stomach acid with an antacid
   E. toxicity of cyanide

2. Which one of the following represents a chemical change? (1 pt.)
   A. boiling water to form steam
   B. bleach turns hair yellow
   C. melting butter
   D. mixing powdered zinc and sulfur at room temperature
   E. cutting a bar of sodium metal into pieces with a knife

3. Given the following densities at 25ºC: magnesium: 1.7 g/cm³; graphite: 1.8 g/cm³
   iron: 7.9 g/cm³
   A block of iron has a mass of 826 g. What is the mass of a block of magnesium that has the
   same volume as the block of iron? (4 pt.)
4. The elements in a column of the periodic table are known as: ____________________ (2 pt.)

5. Atoms of the same element with different mass numbers are called: _______________. (2 pt.)

6. Give the formulas for the following. (6 pt.)

   Calcium phosphate  _______________  Aluminum Iodide  _______________

7. Give the name of the following compounds: (12 pt.)

   Ba(OH)₂  ________________________  KHCO₃  ________________________

   CrSO₃  ________________________  HClO₂  ________________________

8. Name the following: (12 pt.)

   P₄S₁₀  ________________________  CO  ________________________

   N₂O₄  ________________________  SF₆  ________________________

9. List the seven elements that naturally occur as diatomic molecules. (7 pt.)
10. Complete the table (11 pt.)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>(^{14}\text{C})</th>
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</thead>
<tbody>
<tr>
<td>Protons</td>
<td>15</td>
</tr>
<tr>
<td>Neutrons</td>
<td>14</td>
</tr>
<tr>
<td>Electrons</td>
<td>15</td>
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<tr>
<td>Atomic No.</td>
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<tr>
<td>Mass No.</td>
<td>123</td>
</tr>
</tbody>
</table>

11. The percent composition by mass of a compound is 76.0% C, 12.8% H, and 11.2% O. The molar mass of this compound is 284.5 g/mol. What are the empirical and molecular formula of the compound? (12 pt.)

12. When a chemical equation is balanced, it will have a set of whole number coefficients that cannot be reduced to smaller whole numbers. Balance the following equations: (8 pt.)

\[
\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow \text{Al(OH)}_3 + \text{CH}_4
\]

\[
\text{C}_7\text{H}_{14} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}
\]
13. Ammonia reacts with diatomic oxygen to form nitric oxide and water vapor:

\[ 4 \text{NH}_3 + 5 \text{O}_2 \rightarrow 4 \text{NO} + 6 \text{H}_2\text{O} \]

a. When 40.0 g NH\(_3\) and 50.0 g O\(_2\) are allowed to react, how many grams of water are produced? (12 pt.)
b. Which is the limiting reagent? (2 pt.)

14. Calculate the mass of sodium chlorate that must be decomposed to form 6.5 g of oxygen. (8 pt.)

\[ 2\text{NaClO}_3(\text{s}) \rightarrow 2\text{NaCl}(\text{s}) + 3\text{O}_2(\text{g}) \]