Homework #2

You must show your entire work \textbf{on a separate sheet(s) of paper} to get full credit.

1. Complete the following table for neutral atoms

<table>
<thead>
<tr>
<th>Name of Elements</th>
<th>Symbol</th>
<th>Atomic Number</th>
<th>Mass Number</th>
<th>Number of Protons</th>
<th>Number of Neutrons</th>
<th>Number of Electrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>Ca</td>
<td>20</td>
<td></td>
<td>20</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42</td>
<td></td>
<td>38</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td>138</td>
</tr>
</tbody>
</table>

2. What are the elements that contain each of the following numbers of protons? Give their names and chemical symbols.
   a. 1   b. 76   c. 29   d. 21   e. 95   f. 42

3. What is Dalton’s Atomic Theory?

4. Hydrazine, ammonia, and hydrogen azide all contain only nitrogen and hydrogen. The mass of hydrogen that combines with 1.00 g of nitrogen for each compound is $1.44 \times 10^{-1}$ g, $2.16 \times 10^{-1}$ g, and $2.40 \times 10^{-2}$ g, respectively. Show how these data illustrate the law of multiple proportions.

5. Naturally occurring sodium has a single isotope. Determine the following for the naturally occurring atoms in sodium:
   a. The number of neutrons in the nucleus.
   b. The mass (in amu or u) of the nucleus (to three significant figures).

6. Determine the number of protons, number of neutrons, number of electrons and element symbol in atoms of the following isotopes:
   a. $^{25}\text{X}_{12}$
   b. $^{13}\text{X}_{6}$
   c. $^{41}\text{X}_{19}$
   d. $^{57}\text{X}_{26}$

7. For each of the following atomic numbers, use the periodic table to write the formula (including the charge) for the simple ion that the element is most likely to form in ionic compounds.
   a. 13   b. 34   c. 56   d. 7   e. 87   f. 35
8. Write the formula for each of the following compounds:
   a. iron(III) sulfide
   b. calcium hydride
   c. magnesium nitride
   d. aluminum fluoride
   e. chromium(III) carbonate
   f. tin(II) fluoride
   g. potassium chlorate
   h. cobalt(III) nitrate

9. Name each of the following compounds:
   a. CuI   b. CoI₂   c. CuI₂   d. Na₂CO₃   e. NaHCO₃   f. S₄N₄   g. BaCrO₄   h. NH₄NO₃

10. In the periodic table, how many elements are found in