Chapter 3

1. A Helium-Neon (HeNe) laser emits light at 633 nm. What color light is this?

2. 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>15</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>42</td>
<td>42</td>
<td></td>
<td>38</td>
<td>50</td>
<td></td>
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<tr>
<td></td>
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<td>14</td>
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<tr>
<td></td>
<td></td>
<td>56</td>
<td>138</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. 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

4. Sort the following forms of electromagnetic radiation in order of increasing energy.
   a. Infrared light  b. AM radio waves  c. FM radio waves  d. Blue light

5. What happens when an electron collapses back to its ground state from an excited state?

6. Draw a diagram similar to Figure 1.17 with the electronic configuration of the following elements.
   a. Sodium  b. Magnesium  
   c. Aluminum  d. Silicon  
   e. Phosphorus  f. Argon

7. How many valence electrons does each element have in Question 6?

8. Classify each of the following as a solid, liquid, or gas at room temperature.

9. Classify each of the following elements as a metal, a nonmetal, or a semimetal.
   a. Helium  b. Sodium  c. Iodine  d. Calcium  e. Boron