I. Fill in the blanks

__________ arranged the periodic table in order of increasing atomic mass. He was able to use his periodic table to predict ____________ of the missing elements.

__________ discovered that each element has a unique atomic number and arranged the elements in order of increasing atomic number.

The ____________ ____________ ____________ states that the properties of the elements repeat when arranged by increasing atomic number.

A column on the periodic table is called a _____________. Elements in the same column of the periodic table have ____________ electron distributions. Elements in the same column of the periodic table have the same number of ____________ ____________.

A row on the periodic table is called a _____________. Elements in the same row of the periodic table have the same number of ____________ ____________.

Elements in the Noble Gas family are considered stable because they have ____________ outer energy levels.

Elements that have characteristics of both metals and nonmetals are called ____________.

__________ ____________ is defined as one half the distance between nuclei of two like atoms.

The amount of energy released when an atom gains an electron is called ____________ ____________.

The amount of energy required to remove an electron from a neutral atom is called ____________ ____________.
II. For each of the following, circle the appropriate element.

<table>
<thead>
<tr>
<th>Li</th>
<th>P</th>
<th>Kr</th>
<th>member of the Alkali Metal family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al</td>
<td>Cl</td>
<td>Br</td>
<td>gas at room temperature</td>
</tr>
<tr>
<td>O</td>
<td>S</td>
<td>Se</td>
<td>3 energy levels</td>
</tr>
<tr>
<td>O</td>
<td>F</td>
<td>Ne</td>
<td>8 valence electrons</td>
</tr>
<tr>
<td>Xe</td>
<td>I</td>
<td>Be</td>
<td>member of the Halogen family</td>
</tr>
<tr>
<td>Be</td>
<td>Mg</td>
<td>Ca</td>
<td>largest atomic radius</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
<td>F</td>
<td>highest ionization energy</td>
</tr>
<tr>
<td>Na</td>
<td>Mg</td>
<td>Al</td>
<td>forms 3+ ions when bonding</td>
</tr>
<tr>
<td>Sn</td>
<td>Sb</td>
<td>Te</td>
<td>smallest atomic radius</td>
</tr>
<tr>
<td>K</td>
<td>N</td>
<td>B</td>
<td>metal</td>
</tr>
<tr>
<td>He</td>
<td>H</td>
<td>Li</td>
<td>member of the Noble Gas family</td>
</tr>
<tr>
<td>Br</td>
<td>Cl</td>
<td>F</td>
<td>higher electron affinity</td>
</tr>
<tr>
<td>Hg</td>
<td>H</td>
<td>S</td>
<td>liquid at room temperature</td>
</tr>
<tr>
<td>Zn</td>
<td>Bi</td>
<td>At</td>
<td>member of the Transition Metal family</td>
</tr>
<tr>
<td>K</td>
<td>Ca</td>
<td>Sc</td>
<td>electron distribution ending in s^1</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
<td>F</td>
<td>forms 2- ions when bonding</td>
</tr>
<tr>
<td>N</td>
<td>P</td>
<td>As</td>
<td>highest ionization energy</td>
</tr>
<tr>
<td>C</td>
<td>P</td>
<td>Se</td>
<td>4 valence electrons</td>
</tr>
</tbody>
</table>
III. An element has the electron distribution 1s\(^2\)2s\(^2\)2p\(^6\)3s\(^2\)3p\(^6\)4s\(^2\)3d\(^{10}\)4p\(^4\). Use this information to answer the following questions.

____________What is the symbol of the element?
____________What is the name of the element?
____________What is the atomic number of the element?
____________How many valence electrons are in an atom of this element?
____________How many energy levels are in an atom of this element?
____________What charge will an ion of this element have in bonding?
____________What family does this element belong to?
____________Is this element a metal, nonmetal, or metalloid?
____________Is this element a solid, liquid, or gas at room temperature?

IV. Write the Noble Gas Distribution for each of the following elements.

Pd   Ar
Li   Ra
N    Ge

V. How many valence electrons do these atoms have?

_____ Al  _____ Ne  _____ Si
_____ K  _____ I  _____ Po

VI. Predict the charge on the ion for these elements when they are involved in bonding.

_____ Ca  _____ B  _____ Cl
_____ S  _____ Cs  _____ P
VII. Fictitious symbols are used for the first 18 elements in the periodic table. Use the clues below to write the fictitious symbol in the appropriate spot on the periodic table provided.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
</table>

**Clue 1**  
*Hi, Yi, and ! are noble gases. Hi has the smallest and ! has the largest atomic radius.*

**Clue 2**  
*It is the lightest element on the table.*

**Clue 3**  
*Sj has the lowest ionization energy of any element on this chart.*

**Clue 4**  
*R is a halogen on the in the second period.*

**Clue 5**  
*M and On both have electron distributions ending in s²p². On has the lower ionization energy of the two.*

**Clue 6**  
*E has an ending electron distribution of 2p¹. De has an ending electron distribution of 3p³.*

**Clue 7**  
*Nk forms ions with a charge of +1. Ch atoms lose 2 electrons to become stable. Ch atoms are smaller than Nk atoms.*

**Clue 8**  
*Us is an alkaline earth metal, and Ul is a halogen.*

**Clue 9**  
*Rf atoms have 6 valence electrons.*

**Clue 10**  
*T is an alkaline earth metal, and Ul is a halogen.*

**Clue 11**  
*T and Is belong in the 2nd period. Is atoms are larger than T.*