Chemistry 120
2nd Examination

October 17, 2004

• Do not open this examination until you are instructed to do so.
• Before starting, be sure to check that no pages are missing.
• Calculators may not be used on this particular examination.
• You will be given 75 minutes to complete the exam.
• Do your best.

<table>
<thead>
<tr>
<th>Page</th>
<th>Points Possible</th>
<th>Points Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>47</td>
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<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>
1. Write the correct formula for each name. (2 points each)

- potassium chloride
- sodium hydroxide
- dinitrogen monoxide
- ferrous phosphate
- sulfurous acid
- silver nitrite

2. Provide a name for each formula. If your compound contains a cation which uses the “old” naming system, provide both names. (2 points each)

- Na₂O
- CuCl₂
- BaCl₂
- H₂S\textsubscript{(aq)}
- MgCO₃
- HF\textsubscript{(g)}
- NaHSO₃
- P₂O₅
- H₃PO₄
- HClO₄
3. Provide the electron configuration for each atom or ion below. You may abbreviate if you wish. (3 points each)
   a. B
   b. P
   c. Ag
   d. Br

4. Draw an atomic orbital diagram for a phosphorus atom (3 points).

5. Briefly explain how each of the following rules guide us in drawing atomic orbital diagrams. (2 points each).
   a. The Aufbau Principle:
   b. Hund’s Rule
   c. The Pauli Exclusion Principle
6. a. In the 4th energy level, how many f orbitals are there? _____ (2 points)

b. Does red light have a longer or shorter wavelength than blue light? _________ (2 points)

c. What is the symbol for the most electronegative element?______ (2 points)

d. What is the maximum number of electrons that can occupy the 3rd energy level?_______ (3 points)

7. Draw the Lewis Structure for each molecule below, then provide the name of the shape, and the approximate bond angle about the central atom. (5 points each)

<table>
<thead>
<tr>
<th>Molecule</th>
<th>Shape</th>
<th>Bond Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH,Br</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCN</td>
<td></td>
<td></td>
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<tr>
<td>CO,^2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO,</td>
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</tbody>
</table>

8. Consider each molecule you drew in question 7. If the molecule has a dipole moment, draw in the dipole moment arrow pointing in the appropriate direction. If the molecule does not have a dipole, write “no dipole” in the upper right corner of the box. (8 points)

9. Consider the following four atoms:

| C | Li | Cs | N |

a. List these four atoms in order from smallest to largest (they should get larger going from right to left.). (4 points)

b. List these four atoms in order from highest first ionization energy to lowest first ionization energy. (4 points)

c. Which is larger, a sodium atom or a sodium ion? (2 points)