CHAPTER 7 REVIEW

Chemical Formulas and Chemical Compounds

SECTION 1

SHORT ANSWER  Answer the following questions in the space provided.

1. _____ In a Stock system name such as iron(III) sulfate, the Roman numeral tells us
   (a) how many atoms of Fe are in one formula unit.
   (b) how many sulfate ions can be attached to the iron atom.
   (c) the charge on each Fe ion.
   (d) the total positive charge of the formula unit.

2. _____ Changing a subscript in a correctly written chemical formula
   (a) changes the number of moles represented by the formula.
   (b) changes the charges on the other ions in the compound.
   (c) changes the formula so that it no longer represents the compound it previously
   represented.
   (d) has no effect on the formula.

3. The explosive TNT has the molecular formula C7H5(NO2)3.
   ________________ a. How many elements make up this compound?
   ________________ b. How many oxygen atoms are present in one molecule of
   C7H5(NO2)3?
   ________________ c. How many atoms in total are present in one molecule of C7H5(NO2)3?
   ________________ d. How many atoms are present in a sample of 2.0 × 1023 molecules
   of C7H5(NO2)3?

4. How many atoms are present in each of these formula units?
   ________________ a. Ca(HCO3)2
   ________________ b. C12H22O11
   ________________ c. Fe(ClO2)3
   ________________ d. Fe(ClO3)2

5. ________________ a. What is the formula for the compound dinitrogen pentoxide?
   ________________ b. What is the Stock system name for the compound FeO?
   ________________ c. What is the formula for sulfurous acid?
   ________________ d. What is the name for the acid H3PO4?
SECTION 1 continued

6. Some binary compounds are ionic, others are covalent. The type of bond favored partially depends on the position of the elements in the periodic table. Label each of these claims as True or False; if False, specify the nature of the error.
   a. Covalently bonded binary molecular compounds are typically composed of nonmetals.
   
   b. Binary ionic compounds are composed of metals and nonmetals, typically from opposite sides of the periodic table.

7. Refer to Table 2 on page 226 of the text and Table 5 on page 230 of the text for examples of names and formulas for polyatomic ions and acids.
   a. Derive a generalization for determining whether an acid name will end in the suffix \(-ic\) or \(-ous\).
   
   b. Derive a generalization for determining whether an acid name will begin with the prefix \(hydro-\) or not.

8. Fill in the blanks in the table below.

<table>
<thead>
<tr>
<th>Compound name</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum sulfide</td>
<td></td>
</tr>
<tr>
<td>Cesium carbonate</td>
<td></td>
</tr>
<tr>
<td>PbCl₂</td>
<td></td>
</tr>
<tr>
<td>((NH₄)₃PO₄)</td>
<td></td>
</tr>
<tr>
<td>Hydroiodic acid</td>
<td></td>
</tr>
</tbody>
</table>
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SECTION 1

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1. c In a Stock system name such as iron(III) sulfate, the Roman numeral tells us
   (a) how many atoms of Fe are in one formula unit.
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2. c Changing a subscript in a correctly written chemical formula
   (a) changes the number of moles represented by the formula.
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   c. How many atoms in total are present in one molecule of C7H5(NO2)3?
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4. How many atoms are present in each of these formula units?
   a. Ca(HCO3)2
   b. C12H22O11
   c. Fe(ClO2)3
   d. Fe(ClO3)2

5. N2O5
   a. What is the formula for the compound dinitrogen pentoxide?
   b. What is the Stock system name for the compound FeO?
   c. What is the formula for sulfurous acid?
   d. What is the name for the acid H3PO4?
SECTION 1 continued

6. Some binary compounds are ionic, others are covalent. The type of bond favored partially depends on the position of the elements in the periodic table. Label each of these claims as True or False; if False, specify the nature of the error.

   a. Covalently bonded binary molecular compounds are typically composed of nonmetals.
      True

   b. Binary ionic compounds are composed of metals and nonmetals, typically from opposite sides of the periodic table.
      True

7. Refer to Table 2 on page 226 of the text and Table 5 on page 230 of the text for examples of names and formulas for polyatomic ions and acids.

   a. Derive a generalization for determining whether an acid name will end in the suffix -ic or -ous.
      In general, if the anion name ends in -ate, the corresponding acid name will end in a suffix of -ic. In general, if the anion name ends in -ite, the corresponding acid name will end in a suffix of -ous.

   b. Derive a generalization for determining whether an acid name will begin with the prefix hydro- or not.
      In general, if the anion name ends in -ide, the corresponding acid name will end in a suffix of -ic and begin with a prefix of hydro-. The prefix hydro- is never used for anions ending in -ate or -ite.

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</tr>
<tr>
<td>Cesium carbonate</td>
<td>Cs₂CO₃</td>
</tr>
<tr>
<td>Lead(II) chloride</td>
<td>PbCl₂</td>
</tr>
<tr>
<td>Ammonium phosphate</td>
<td>(NH₄)₃PO₄</td>
</tr>
<tr>
<td>Hydroiodic acid</td>
<td>HI</td>
</tr>
</tbody>
</table>