

**Exercise 4: Nomenclature and moles**

1. Using the rules given in the text and in class, **name** the following compounds:

a. KBr

b. Na<sub>2</sub>S

c. Na<sub>2</sub>SO<sub>4</sub>

d. BeCl<sub>2</sub>

e. Fe<sub>2</sub>O<sub>3</sub>

2. Give the **chemical formula** of the following compounds (make sure the resulting molecule is electrically neutral!):

a. Calcium fluoride

b. Potassium permanganate

c. Cobalt (II) carbonate (and you thought capitalization wasn't important!)

d. Lithium nitride

e. Tungsten (IV) oxide

3. Manganese can exist as a 2+ and 3+ metal ion. If we add manganese ions to a solution containing nitrate ( $\text{NO}_3^-$ ) and oxalate ( $\text{C}_2\text{O}_4^{2-}$ ) ions, what **possible compounds** may result?

4. **Name** the following compounds according to IUPAC rules. This includes acids and Roman numerals, where needed.

a.  $\text{CaSO}_3$

b.  $\text{H}_2\text{SO}_3$  (aq)

c.  $\text{SnSO}_3$

d.  $(\text{NH}_4)_2\text{SO}_3$

e.  $\text{SO}_3$

5. Write the complete **chemical formula** for the following compounds:

a. Hydrobromic acid

b. Hydrogen bromide

c. Perbromic acid (hint: make an analogy with the chlorine oxyacid series)

d. Bromic acid

e. Oxygen dibromide

6. Fill in the following table:

Substance	Iron	Glucose (C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> )
Is the smallest unit of the substance that retains its chemical properties an <b>atom</b> or a <b>molecule</b> ?		
Number of these units in one <b>mole</b> of the substance		
<b>Mass</b> (in grams) of one mole of the substance		

7. How come one mole of iron does **not** weigh the same as one mole of glucose, even though the two contain equal numbers of units?

8. If one mole of glucose were to completely break down into glucose's component atoms, **how many moles of carbon atoms** would there be?

9. What **percentage** of glucose's mass is due to carbon?

10. If an unknown substance is analyzed and its mass percentage of carbon turns out to be the same as the value you got in the previous question, *must* the unknown substance be glucose? To answer this question, suppose the analysis came back that the mass percent composition of the unknown was 40.00% carbon, 53.29% oxygen and 6.71% hydrogen. What is the **empirical formula** of this unknown substance? Must it be glucose? What else do you need to know in order to identify it as glucose?