

Chemistry CP

Name: _____

Review Sheet

Formulas and Compounds (Ch. 7)

After studying Chapter 7, you should be able to:

- Infer the charge on a monatomic ion using the periodic table.
- Determine the formula of an ionic compound formed between two given ions.
- Name an ionic compound given its formula.
- Define a polyatomic ion and memorize the names and formulas of common polyatomic ions.
- Using prefixes, name a binary molecular compound from its formula.
- Write the formula of a binary molecular compound given its name.
- Classify compounds as either ionic or molecular.
- Calculate the gram formula mass of any given compound.
- Use gram formula mass to convert between mass in grams and amount in moles of a chemical compound.
- Define how Avogadro's number is related to a mole of any substance.
- Calculate the number of molecules, formula units, or ions in a given molar amount of a chemical compound.
- Calculate the percentage composition of a given chemical compound or experimental data.
- Derive the empirical formula of a compound from experimental data (either a percentage or a mass composition).
- Derive the molecular (true) formula of a compound from experimental data.

Problems for you to try:

Let's warm up with formula writing.

1. Write the chemical formulas for the following compounds.

- | | |
|---------------------------|-------------------------|
| a) Aluminum fluoride | e) Strontium bromide |
| b) Magnesium oxide | f) Sulfur trioxide |
| c) Vanadium (V) phosphate | g) Dinitrogen pentoxide |
| d) Cobalt (II) sulfate | h) Iron (III) carbonate |

2. Name each of the following compounds.

- | | |
|----------------|-------------|
| a) MgI_2 | e) SO_2 |
| b) NaH_2PO_4 | f) PBr_3 |
| c) CS_2 | g) $CuCl_2$ |
| d) N_2O_4 | h) AuI |

3. Find the gram formula mass of p-dichlorobenzene, $C_6H_4Cl_2$, an ingredient used in mothballs.

9. Determine the empirical formula of the compound with the percent composition of: 29.1% Na, 40.5% S, and 30.4% O.
10. Analysis of a compound shows that it contains 10.88 g of calcium and 19.07 g of chlorine. Determine the empirical formula of this compound. Name the compound.
11. The gram formula mass of a compound is 166.3 g. The compound contains 47.1% potassium, 14.5% carbon, and 38.4% oxygen. What is the molecular (true) formula for the compound?
12. How many kilograms of iron can be recovered from 639 kg of the ore Fe_2O_3 ?

Moles → ? Grams:

13. If you have 0.37 mole of Cu, how many grams do you have? _____

Grams → ? Moles:

14. If you have 34.6 grams of Ba, how many moles do you have? _____

atoms (molecules) → ? moles

15. If you have 8.4×10^{23} atoms of Ca, how many moles do you have? _____

moles → ? atoms (molecules)

16. If you have 0.006522 moles of Li, how many atoms do you have? _____

grams → ? atoms (moles)

17. If you have 21 g of N_2 , how many molecules of N_2 do you have _____

Refer to your answers for #3 and #4

18. How many moles are present in a 26.7 g sample of p-dichlorobenzene?

19. What is the mass of a .77 mol sample of calcium hydrogen sulfate?

Answers to selected problems

3. 147 g/mol
4. 234.3 g/mol
5. 55.76% K, 14.59% P, 30.15% O
6. 30.4% C, so 19.8 g C
7. 8.62% H_2O
8. NO_2 , nitrogen dioxide
9. $Na_2S_2O_3$
10. $CaCl_2$, calcium chloride
11. Empirical formula KCO_2 ; true formula $K_2C_2O_4$
12. 69.96% Fe, so 447 kg Fe can be recovered