Take-Home Quiz
Topic 05: Polyatomic Ions and Nomenclature

Objective:

This is to assess your comprehension of the material we have covered so far and to help prepare you for the exam.

Instructions and Notes:

- Most of the quiz problems are from or adapted from "Exercises" at the end of the chapters in the Chemistry: Atoms First 2e Online Textbook (OpenStax)
- You must *CLEARLY LABEL* all problems and *SHOW ALL WORK* neatly and legibly to receive credit. If the problems do not require calculations/work then you must explain how you got the answer. (can be a few words up to a few sentences or even a few arrows)
- If the problem requires calculations, the answers should be highlighted or boxed.
- Book sections covered: 3.7, 4.3

Submission:

The quiz is usually due ~1 week after we start this section (see our due date schedule). Summer session is due sooner. This should be scanned as a single PDF and submitted online through Canvas. The file cannot be larger than 20 Mb (20,000 kB).

Helpful Tips:

- Start as soon as we're done with the lecture.
- Refer to the lecture and/or videos (if available).
- Use the corresponding chapter in the book to help you through difficult problems/concepts.
- There are answers and solutions available to the odd numbered problems (book number not quiz number) on the OpenStax website under "Student Resources". It is not advised to rely on the solutions because you will not have access to the solutions during the exam. Only use the solutions as a last resort. Struggling is good and that is when you are learning the most!
- Work together with your classmates.
- Go to tutoring in the ASTC or MESA, ask your classmates in our Discord room, watch YouTube Videos, come to office hours, etc.
- To ensure your mastery of the material, do the quiz multiple times.

Questions Not In Book

1) What are fixed charged ions? What groups in the periodic table are mostly fixed charged ions?

2) What are variably charged ions? What groups in the periodic table are mostly variably charged ions?

3) Give an example of an element with two different charges.

4) What are the symbols and charges of the two elements that are fixed charge but located in groups 11 and 12?

5) List the name, formula, and charge of a polyatomic ion with a 1+ charge.

6) List the name, formula, and charge of a polyatomic ion with a 1- charge.

7) List the name, formula, and charge of a polyatomic ion with a 2- charge.

8) List the name, formula, and charge of a polyatomic ion with a 3- charge.

9) What is the difference between naming an ionic compound with a fixed charge cation and a variably charged cation?

10) What makes something an acid?

3.7 Ionic and Molecular Compounds

(From Chapter 3.7 #97) For each of the following compounds, state whether it is ionic or covalent. If it is ionic, write the symbols for the ions involved:

11) NF_3 12) BaO 13) $(NH_4)_2CO_3$

14) $Sr(H_2PO_4)_2$ 15) IBr 16) Na_2O

(From Chapter 3.7 #99) For each of the following pairs of ions, write the symbol for the formula of the compound they will form.

17) Ca^{2+}, S^{2-} 18) NH_4^+, SO_4^{2-} 19) Al^{3+}, Br^-

20) Na^+, HPO_4^{2-} 21) Mg^{2+}, PO_4^{3-}

(From Chapter 3.7 #100) For each of the following pairs of ions, write the symbol for the formula of the compound they will form.

22) K^+, O^{2-} 23) NH_4^+, PO_4^{3-} 24) Al^{3+}, O^{2-}

25) Na^+, CO_3^{2-} 26) Ba^{2+}, PO_4^{3-}

4.3 Chemical Nomenclature

(From Chapter 4.3 #23) Name the following compounds:

27) CsCl 28) BaO 29) K_2S

30) $BeCl_2$ 31) HBr (g) 32) AlF_3

(From Chapter 4.3 #25) Write the formulas of the following compounds:

33) rubidium bromide 34) magnesium selenide 35) sodium oxide

36) calcium chloride 37) hydrogen fluoride 38) gallium phosphide

39) aluminum bromide 40) ammonium sulfate

(From Chapter 4.3 #27) Write the formulas of the following compounds:

41) chlorine dioxide 42) dinitrogen tetraoxide 43) potassium phosphide

44) silver sulfide 45) aluminum fluoride trihydrate 46) silicon dioxide

(From Chapter 4.3 #29) Each of the following compounds contains a metal that can exhibit more than one ionic charge. Name these compounds:

47) Cr_2O_3 48) $FeCl_2$ 49) CrO_3

50) $TiCl_4$ 51) $CoCl_2 \cdot 6H_2O$ 52) MoS_2

(From Chapter 4.3 #31) The following ionic compounds are found in common household products. Write the formulas for each compound:

53) potassium phosphate 54) copper(II) sulfate 55) calcium chloride

56) titanium(IV) oxide 57) ammonium nitrate

58) sodium bisulfate (the common name for sodium hydrogen sulfate)

(From Chapter 4.3 #33) What are the IUPAC names of the following compounds? (This means use the roman numerals where needed)

59) manganese dioxide

60) mercurous chloride (Hg_2Cl_2) [Hg_2^{2+} is a polyatomic ion, Mercury (I)]

61) ferric nitrate [$Fe(NO_3)_3$] 62) titanium tetrachloride 63) cupric bromide ($CuBr_2$)

More Questions Not In Book

Write the formulas of the following compounds:

64) hydrochloric acid 65) hydrocyanic acid 66) hydrofluoric acid

67) nitric acid 68) nitrous acid 69) phosphorous acid

70) sulfuric acid

Name the following compounds:

71) H_3PO_4 72) HBr 73) HI 74) $HC_2H_3O_2$

75) HClO 76) $HClO_4$ 77) H_2SO_3