Take-Home Quiz
Topic 02: Ions and Periodic Properties

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: 2.3, 3.6, 3.7, 2.4, 1.5, Appendix B

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.

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Topic 02: Ions and Periodic Properties

ADD ON 1: Periodic Table Assignment (not in book)

1. Print the periodic table at the end of this document and fill it in with the following information:
    a. atomic number
    b. element symbol
    c. atomic mass to 4 significant figures
    d. number of valence electrons
    e. usual ionic charge
    f. units of atomic mass
    g. new group number (i.e. 1-18)
    h. old group number (i.e.
    i. period number
    j. element full name (on back of the page, numbered using the atomic number)
    k. location of metals/nonmetals/metalloids
    l. Don't do row 7 or the F block
2. Put your name on it somewhere.
3. Color it and/or put as many other annotations as you want.
4. Keep it handy when doing assignments and quizzes and you can also use this for the exams and final.
5. An example of this can be found here (LINK).
6. Submit this with the rest of this quiz.

ADD ON 02: Polyatomic Ion Assignment (not in book)

1. Print the blank polyatomic ion table and fill it in with at least 30 polyatomic ions or variable charged cations. Use your book, lab manual, or other online resources to find the 30 you want. I recommend using the ones you encounter in class or in this quiz.
2. Put your name on it somewhere.
3. Color it and/or put as many other annotations or additional ions as you want.
4. Keep it handy when doing assignments and quizzes and you can also use this for the exams and final.
5. An example of this can be found here (LINK).
6. Submit this with the rest of this quiz.

3.6 The Periodic Table

(From Chapter 3.6 #87) Using the periodic table, classify each of the following elements as a metal or a nonmetal, and then further classify each as a main-group (representative) element, transition metal, or inner transition metal:

1) uranium 2) bromine 3) strontium 4) neon

5) gold 6) americium 7) rhodium

8) sulfur 9) carbon 10) potassium

(From Chapter 3.6 #88) Using the periodic table, classify each of the following elements as a metal or a nonmetal, and then further classify each as a main-group (representative) element, transition metal, or inner transition metal:

11) cobalt 12) europium 13) iodine

14) indium 15) lithium 16) oxygen

17) cadmium 18) terbium 19) rhenium

(From Chapter 3.6 #89) Using the periodic table, identify the lightest member of each of the following groups:

20) noble gases 21) alkaline earth metals

22) alkali metals 23) chalcogens

(From Chapter 3.6 #90) Using the periodic table, identify the heaviest member of each of the following groups (use the whole periodic table, not just your periodic table):

24) alkali metals 25) chalcogens

26) noble gases

27) alkaline earth metals

(From Chapter 3.6 #91) Use the periodic table to give the name and symbol for each of the following elements:

28) the noble gas in the same period as germanium

29) the alkaline earth metal in the same period as selenium

30) the halogen in the same period as lithium

31) the chalcogen in the same period as cadmium

(From Chapter 3.6 #92) Use the periodic table to give the name and symbol for each of the following elements:

32) the halogen in the same period as the alkali metal with 11 protons

33) the alkaline earth metal in the same period with the neutral noble gas with 18 electrons

34) the noble gas in the same row as an isotope with 30 neutrons and 25 protons

35) the noble gas in the same period as gold

(From Chapter 3.6 #93) Write a symbol for each of the following neutral isotopes. Include the atomic number and mass number for each.

36) the alkali metal with 11 protons and a mass number of 23

37) the noble gas element with 75 neutrons in its nucleus and 54 electrons in the neutral atom

38) the isotope with 33 protons and 40 neutrons in its nucleus

39) the alkaline earth metal with 88 electrons and 138 neutrons

(From Chapter 3.6 #94) Write a symbol for each of the following neutral isotopes. Include the atomic number and mass number for each.

40) the chalcogen with a mass number of 125

SKIP THIS ONE) the halogen whose longest-lived isotope is radioactive

41) the noble gas, used in lighting, with 10 electrons and 10 neutrons

42) the lightest alkali metal with three neutrons

2.3 Atomic Structure and Symbolism

(From Chapter 2.3 #11) Write the symbol for each of the following ions:

43) the ion with a 1+ charge, atomic number 55, and mass number 133

44) the ion with 54 electrons, 53 protons, and 74 neutrons

45) the ion with atomic number 15, mass number 31, and a 3− charge

46) the ion with 24 electrons, 30 neutrons, and a 3+ charge

(From Chapter 2.3 #12) Write the symbol for each of the following ions:

47) the ion with a 3+ charge, 28 electrons, and a mass number of 71

48) the ion with 36 electrons, 35 protons, and 45 neutrons

49) the ion with 86 electrons, 142 neutrons, and a 4+ charge

50) the ion with a 2+ charge, atomic number 38, and mass number 87

(From Chapter 2.3 #16) Determine the number of protons, neutrons, and electrons in the following isotopes that are used in medical diagnoses:

51) atomic number 9, mass number 18, charge of 1−

52) atomic number 43, mass number 99, charge of 7+

53) atomic number 53, atomic mass number 131, charge of 1−

54) atomic number 81, atomic mass number 201, charge of 1+

55) Name the elements in parts (a), (b), (c), and (d).

(From Chapter 2.3 #17) The following are properties of isotopes of two elements that are essential in our diet. Determine the number of protons, neutrons and electrons in each and name them.

56) atomic number 26, mass number 58, charge of 2+

57) atomic number 53, mass number 127, charge of 1−

1.5 Measurement Uncertainty, Accuracy, and Precision

(From Chapter 1.5 #44) Express each of the following numbers in scientific notation with correct significant figures:

58) 711.0

59) 0.239

60) 90743

61) 134.2

62) 0.05499

63) 10000.0

64) 0.000000738592

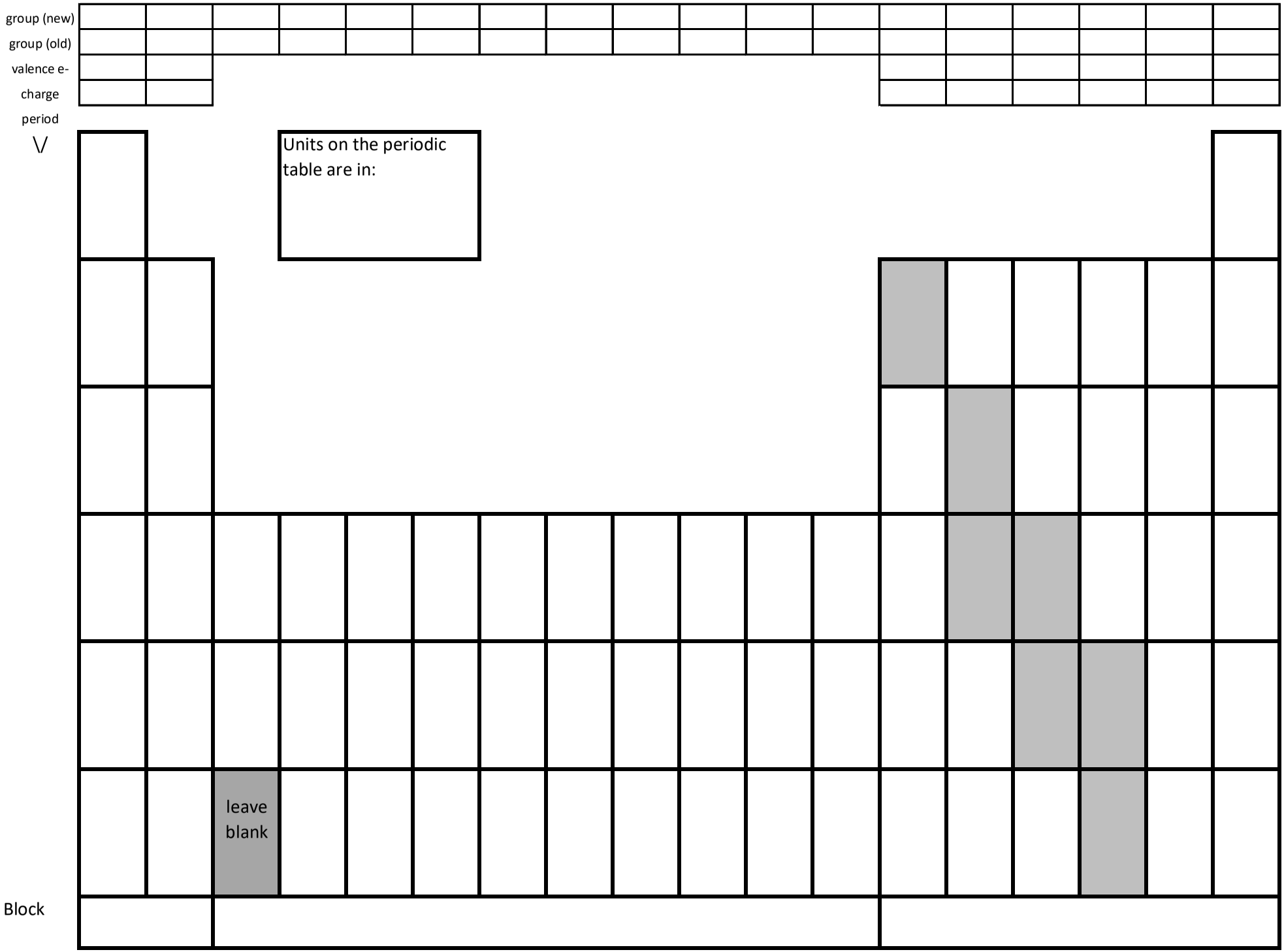
Extra Questions Not In Book (Yes, do these as well!):

65) Define fixed charged ions (or likely ion formation). (section 3.7)

66) Define variable charged ions. (section 3.7)

67) On the periodic table, do groups 1, 2, 13, 14, 15, 16, 17, 18 have mostly fixed or variable charged ions? (section 3.7)

68) On the periodic table, groups 3-12 have mostly fixed or variable charged ions? (section 3.7)


group (new)
group (old)
valence e-
charge
period
\/
Units on the periodic table are in:
leave blank
Block

-1	
Formula	Name

-2	
Formula	Name

-3	
Formula	Name

+1	
Formula	Name

+2	

+3	

+4	