

Chemistry – Chapter 4 Book assignment #3: Chapter review problems

1. With which of these statements would John Dalton have agreed in the early 1800s? For each, explain why or why not.
 - a. Atoms are the smallest particles of matter.
 - b. The mass of an iron atom is different from the mass of a copper atom.
 - c. Every atom of silver is identical to every other atom of silver.
 - d. A compound is composed of atoms of two or more different elements.
2. Which experimental evidence did Thomson have for each statement:
 - a. Electrons have a negative charge
 - b. Atoms of all elements contain electrons.
3. In the Rutherford atomic model, which subatomic particles are located in the nucleus?
4. Why is an atom electrically neutral?
5. What does the atomic number of each atom represent?
6. How many protons are in each of the following atoms?
 - a. phosphorus (P)
 - b. molybdenum (Mo)
 - c. aluminum (Al)
 - d. cadmium (Cd)
 - e. chromium (Cr)
 - f. lead (Pb)
7. What is the difference between the mass number and the atomic number of an atom?
8. Complete the following table:

Atomic #	Mass #	# protons	# neutrons
9	a. _____	b. _____	10
c. _____	d. _____	14	15
e. _____	47	f. _____	25
g. _____	55	25	h. _____

9. Lithium has two isotopes, lithium-6 (atomic mass = 6.015, relative abundance = 7.5%) and lithium-7 (atomic mass = 7.016, relative abundance = 92.5%). Calculate the atomic mass of lithium.

10. What parts of Dalton's atomic theory no longer agree with the current picture of the atom?
11. The four isotopes of lead are shown below, each with its percent by mass abundance and the composition of its nucleus. Using these data, calculate the approximate atomic mass of lead.

Particle 1: 82 p⁺, 122 n⁰; 1.4%

Particle 2: 82 p⁺, 125 n⁰; 22.1%

Particle 3: 82 p⁺, 124 n⁰; 24.1%

Particle 4: 82 p⁺, 126 n⁰; 52.4%

12. Using the data for nitrogen below, calculate the weighted average atomic mass. Show your work.

¹⁴N : 99.63% abundance, 14.003 amu

¹⁵N : 0.37% abundance, 15.000 amu

13. Why did Mendeleev leave spaces in his periodic table?
14. What pattern is revealed when the elements are arranged in a periodic table in order of increasing atomic number?
15. Based on their locations in the periodic table, would you expect carbon and silicon to have similar properties? Explain your answer.
16. Where are the alkali metals, the alkaline earth metals, the halogens, & the noble gases located on the periodic table?
17. Which of these metals isn't a transition metal?
- a. aluminum
 - b. silver
 - c. iron
 - d. zirconium
18. Write the symbol of the element or elements that fit each description
- a. a nonmetal in column 14
 - b. the inner transition metal with the lowest atomic number
 - c. all of the nonmetals for which the atomic number is a multiple of 5
 - d. a metal in column 15