

Name: _____

Homework was checked against the key with wrong answers corrected.

Parent Signature: _____

Chapter 5: Atomic Structure and the Periodic Table

Each numbered question is worth 1 point except as noted. Total possible = 39 points

Section 5.1

1. In your own words, state the main ideas of Dalton's atomic theory. (2)

3. Democritus and Dalton both proposed that matter consists of atoms. How did their approaches to reaching that conclusion differ?

Section 5.2

4. What are the charges and relative masses of the three main subatomic particles?

5. Describe the basic structure of an atom. Draw a diagram if that would help.

6. Describe Thomson's, Milikan's, and Rutherford's contributions to atomic theory. Include their experiments, if appropriate. (3)

Section 5.3

7. How many protons and electrons are in each atom?

- a. fluorine
- b. aluminum
- c. calcium

8. Complete the table.

Element	Atomic Number	Protons	Electrons
K	19		19
			5
	16		
		23	

9. How many neutrons are in each atom?

- a. ${}^{16}_8\text{O}$
- b. ${}^{32}_{16}\text{S}$
- c. ${}^{108}_{47}\text{Ag}$
- d. ${}^{80}_{35}\text{Br}$
- e. ${}^{207}_{82}\text{Pb}$

10. Use Table 5.2 and Figure 5.8 in your textbook to express the composition of each atom in shorthand form.

- a. carbon-12
- b. fluorine-19
- c. beryllium-9

11. For each atom in Problem 9, identify the number of electrons.

- a.
- b.
- c.
- d.
- e.

12. Three isotopes of oxygen are oxygen-16, oxygen-17, and oxygen-18. Write the complete symbol for each, including the atomic number and mass number.

13. The three isotopes of chromium are chromium-50, chromium-52, and chromium-53. How many neutrons are in each isotope, given that chromium always has an atomic number of 24?

14. Boron has two isotopes: boron-10 and boron-11. Which is more abundant, given that the atomic mass of boron is 10.81? Explain.

15. There are three isotopes of silicon; they have mass numbers of 28, 29, and 30. The atomic mass of silicon is 28.086 amu. Comment on the relative abundance of these three isotopes.

16. The element copper has naturally occurring isotopes with mass numbers of 63 and 65. The relative abundance and atomic masses are 69.2% for mass = 62.93 amu; and 30.8% for mass = 64.93 amu. Calculate the average atomic mass of copper.

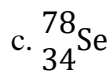
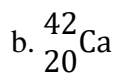
20. An atom is identified as platinum-195.

a. what does the number represent?

b. Symbolize this atom using superscripts and subscripts.

21. How are isotopes of the same element alike? How are they different?

23. List the number of protons, neutrons, and electrons in each pair of isotopes. (2)



24. The atomic masses of elements are generally not whole numbers. Explain why.

Section 5.4

27. Describe how the periodic table was developed.

28. What criteria did Mendeleev use to construct his periodic table of elements?

30. Identify each element as a metal, metalloid, or nonmetal.

a. gold

b. silicon

c. manganese

d. sulfur

e. barium

31. Which of the elements listed in the preceding question are representative elements?

32. Name two elements that have properties similar to those of the element calcium.

Chapter 5 Review

33. With which of these statements would John Dalton have agreed in the early 1800s? 5.1

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.

35. Would you expect two electrons to attract or repel each other? Why? 5.2

36. How did the results of Rutherford's gold foil experiment differ from his expectations? 5.2

37. What is the charge, positive or negative, of the nucleus of every atom? 5.2 (0.5)

38. Why is an atom electrically neutral? 5.3

39. What does the atomic number of each atom represent? 5.3

42. Complete this table. 5.3 (2)

Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Symbol of element
9			10		
		14	15		
	47		25		
	55	25			

48. How did Moseley's arrangement of the elements differ from that of Mendeleev? 5.4

49. Provide the symbol of each element. 5.4 (2.5)

- the nonmetal in Group 4A
- the inner transition metal with the lowest atomic number
- all of the nonmetals for which the atomic number is a multiple of five
- the two elements that are liquid at room temperature
- the metal in Group 5