

Name _____

Period _____ Date _____

Chapter 4
Atomic Structure
Extra Practice Problems

What the numbers mean

Numbers, numbers, everywhere! The numbers associated with atoms and atomic structure are: atomic number, mass number and atomic mass. This worksheet gives practice in using these numbers.

Example A

What is the atomic number of an element which contains 19 protons, 19 electrons, and 20 neutrons?

Solution Since the atomic number is the number of protons in the nucleus of the atom of that element, the atomic number of the element must be 19 (the number of protons)

You try it

1. What is the atomic number of an element which contains 12 protons, 12 electrons, and 13 neutrons?

Example B

Calculate the mass number of the potassium atom discussed in Example A.

Solution The mass number is the total number of protons and neutrons in the nucleus. These two types of particles contribute to the bulk of the mass in any atom. Thus this atom has a mass number of 39 (19 protons and 20 neutrons)

You try it

2. Calculate the mass number of the carbon atom containing 6 protons and 6 neutrons.

Example C

Use the following information to determine the atomic mass of chlorine. Two isotopes are known: chlorine-35 (mass=35.0 amu) and chlorine-37(mass=37.0 amu). The relative abundances are 75.4% and 24.6%, respectively.

Solution Recall that the text defines atomic mass as the weighted average of the masses of the isotopes of that element. To solve the problem:

$$\begin{aligned} 35.0 \text{ amu} \times 0.754 \text{ (expressed in decimal form)} &= 26.4 \text{ amu} \\ 37.0 \text{ amu} \times 0.246 &= 9.10 \text{ amu} \\ 26.4 \text{ amu} + 9.10 \text{ amu} &= 35.5 \text{ amu} \end{aligned}$$

You try it

3. Use the following information to determine the atomic mass of carbon. Two isotopes are known: carbon-12 (mass=12.00 amu) and carbon-13 (mass = 13.00 amu). Their relative abundances are 98.9% and 1.10% respectively.

Problems for you to try

4. How many protons are found in an atom of each of the following?

a. boron _____ b. sulfur _____ c. strontium _____ d. gold _____

5. Name the element which has

a. 1 proton (p^+) _____ c. 4 n^0 , 3 p^+ , 3 e^- _____

b. 30 n^0 , 26 e^- , 26 p^+ _____ d. 18 e^- , 22 n^0 , 18 p^+ _____

Element name	Symbol	Number of protons	Number of electrons	Number of neutrons	Atomic number	Mass number
		25		30		
			11			23
		35		45		
					39	89
			33			75
	Ac					227

7. Determine the atomic mass of an element which has 2 isotopes with mass numbers of 6 (mass = 6.02) and 7 (mass = 7.02). The relative abundances are 7.42% and 92.6% respectively.