

Atomic Structure, Isotopes and Average Atomic Mass

Practice Sheet # 5

1. Which scientist(s) is described in the following statements below:

- a. _____ Proposed that all matter is composed of indivisible atoms
Who discovered that the atom is mostly empty space with a small, dense positively charged center?
- b. _____
- c. _____ Discovered why electrons do not spiral down into the nucleus.
Showed that electrons can be found only in "allowed" states called orbitals
- d. _____ With a cathode ray, showed that atoms contain negatively charged particles.
- e. _____ Shot positively charged alpha particles at gold foil, discovering the nucleus.
- f. _____
- g. _____ Proposed the Raisin Bun model of the atom.
- h. _____ Discovered neutrons

2. Use the periodic table to fill out the following table for NEUTRAL (uncharged) atoms

Atomic Number	Elemental Name	Symbol	Atomic Mass (amu)	# of Protons	# of Neutrons	# of Electrons
27			59			
	Ruthenium		101			
		Hs				
			272			
				86		
			131			54
			108		61	
			262			
			1			1
	Sodium		23			

Name: _____ Per _____

3. In your OWN WORDS state the definition on an isotope.

4. If an atom with a mass number of 27 has 14 neutrons, it is an isotope of which element? Explain why.

5. A fictitious element is composed of isotopes A and B with masses of 61.9887 and 64.9846, respectively. The atomic mass of the element is 64.52. What can you conclude about the natural abundances of the two isotopes?
 - a. The natural abundance of isotope A must be greater than the natural abundance of isotope B.
 - b. The natural abundance of isotope B must be greater than the natural abundance of isotope A.
 - c. The natural abundances of both isotopes must be about equal.
 - d. Nothing can be concluded about the natural abundances of the two isotopes from the given information.

6. Explain why you chose your answer in number 5.

7. Gallium has two naturally occurring isotopes: Ga-69 with mass 68.9256 amu and a natural abundance of 60.11 %, and Ga-71 with mass 70.9247 amu and a natural abundance of 39.89 %. Calculate the average atomic mass of gallium.

8. Magnesium has three naturally occurring isotopes with masses of 23.99, 24.99, 25.98 amu and natural abundances of 78.99 %, 10.00 %, and 11.01 %, respectively. Calculate the average atomic mass of magnesium.