

AP Chemistry – Atomic Structure – 3

Name _____ Per ____

1. Complete the information on each of the following elements.

Name	Symbol	Atomic Number	Mass Number	Protons	Neutrons	Electrons
Sodium 23						
Calcium 40						
Arsenic 75						
Oxygen 16						
Boron 11						
Aluminum 27						
Bromine 80						
Iron 56						
Titanium 48						
Silver 108						
Antimony 122						

2. On the reverse side, write the electron configuration for each of the elements listed above.

Symbol	Electron Configuration (Use the Noble Gas kernel like [Ne] or [Ar], etc.)
Na	
Ca	
As	
O	
B	
Al	
Br	
Fe	
Ti	
Ag	
Sb	

3. Summarize Rutherford's gold-foil experiment and its conclusion.

4. Millikan determined the charge on the electron by studying the static charges on oil drops falling in an electric field. A student carried out this experiment using several oil drops for her measurements and calculated the charges on the drops. She obtained the following data:

Droplet	Calculated Charge
A	$1.60 \times 10^{-19} \text{ C}$
B	$3.15 \times 10^{-19} \text{ C}$
C	$4.81 \times 10^{-19} \text{ C}$
D	$6.31 \times 10^{-19} \text{ C}$

- a) What is the significance of the fact that the droplets carried different charges?
- b) What conclusion can the student draw from these data regarding the charge of the electron?
- c) What value, and how many significant digits, should she report for the charge of the electron?

5. Determine whether each of the following statements is true or false; if false, correct the statement to make it true.

- a) The nucleus has most of the mass and comprises most of the volume of an atom.
- b) Every atom of a given element has the same number of protons.
- c) The number of electrons in an atom equals the number of neutrons in that atom.
- d) The protons in the nucleus of the helium atom are held together by a force called the strong nuclear force.

6. Label each of the following elements as a metal, metalloid or non-metal.

Li _____ N _____
 Ge _____ Te _____
 Br _____ Sc _____

7. What is the name of group IV? List the six symbols for the group and whether it is a metal, metalloid or non-metal. group name _____

_____ _____
 _____ _____
 _____ _____

8. Write the molecular and empirical formulas of the following compounds:

a) the reactive substance *diborane*, which has two boron atoms and six hydrogen atoms;

b) the sugar called *glucose*, which has six carbon atoms, twelve hydrogen atoms and six oxygen atoms.