Study Guide: SPS1, 2, 4- Atomic Structure and Periodic Table

Apalachee High School, Physical Science

Complete the following questions.

1. What is the charge of the following:
   a. Proton
   b. Neutron
   c. Electron
   d. Nucleus

2. Which subatomic particle determines the identity of the element?

3. Why is the electron cloud attracted to the nucleus?

4. What are Protons and Neutrons made of?

5. What is the Atomic Mass Unit (AMU) for the following?
   a. Proton
   b. Neutron
   c. Electron

6. Why is most of the mass located in the nucleus of an atom

1. The atomic # is equal to the number of _____ and in a neutral atom the number of _____.

2. The atomic mass of elements equals the number of _____ plus _____.

3. What is an isotope?

4. Here are three isotopes of an element: ${}^{12}_{6}C$ ${}^{13}_{6}C$ ${}^{14}_{6}C$
   a. The element is:

   b. The number 6 refers to the

   c. The numbers 12, 13, and 14 refer to the

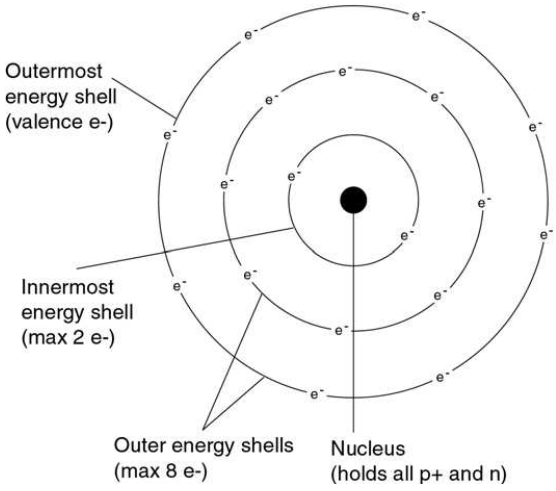
   d. How many protons and neutrons are in the first isotope?

   e. How many protons and neutrons are in the second isotope?

   f. How many protons and neutrons are in the third isotope?

5. Complete the following chart:

Isotope name	atomic #	mass #	# of protons	# of neutrons	# of electrons
92 uranium-235					
92 uranium-238					
5 boron-10					
5 boron-11					



p+ = #e- = 18

n = 22

atomic # = 18

element = Argon

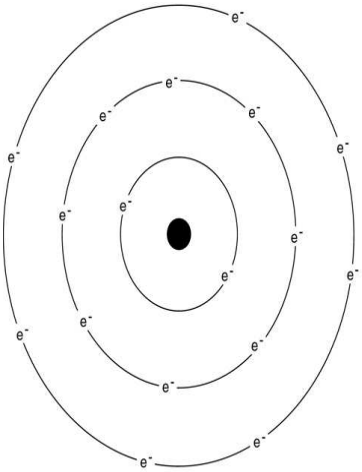
atomic mass = 40

Argon $^{18}_{40}Ar$

valence e- = 0

Change in e- desired? None

Complete these diagrams with all the missing information, Example given above.



p+ =

n =

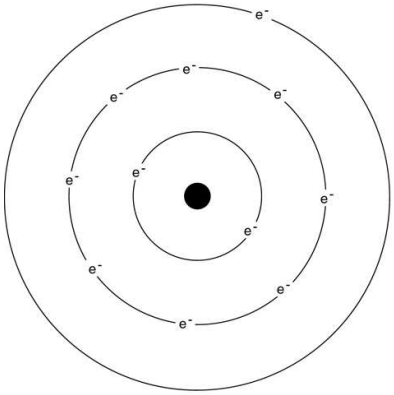
atomic # =

element =

atomic mass = 36

valence e- =

Change in e- desired?



p+ =

n =

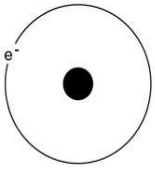
atomic # =

element =

atomic mass = 23

valence e- =

Change in e- desired?



p+ =

n =

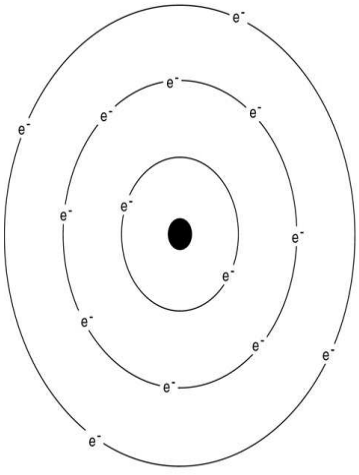
atomic # =

element =

atomic mass = 1

valence e- =

Change in e- desired?



p+ =

n =

atomic # =

element =

atomic mass = 28

valence e- =

Change in e- desired?

12. Classify each of the following elements as an alkali metal, an alkaline-earth metal, transition metal, metalloid, halogen, or noble gas based on its position in the periodic table:

    a. boron
    b. gold
    c. krypton
    d. calcium

13. How many Valence electrons to the following atoms have?

    a. carbon
    b. selenium
    c. xenon
    d. potassium

14. What would be the oxidation number (ion) charge of the following?

    a. N
    b. He
    c. F
    d. Al
    e. P
    f. Mg

15. Explain why oxygen is a fairly reactive element while neon is not.

16. Explain why beryllium loses electrons when forming ionic bonds, while sulfur gains electrons.

17. Explain why fluorine and chlorine have similar reactivities (the word "valence" should be somewhere in your answer!)

18. The periodic table is organized by increasing atomic (mass/number).

19. Elements having more than 92 protons, the atomic number of uranium, are called _____ elements.

20. **Directions:** Complete the following table that compares the properties of metals and nonmetals by supplying the information requested.

Characteristic	Metal	Nonmetal
Appearance of solid		
Is it malleable?		
Is it ductile?		
Does it conduct?		
***Most common* state at room temperature?**		
Where is it located on the periodic table?		

Bonding

1. Ionic Bonds (share/transfer) electrons.

2. Covalent Bonds (share/transfer) electrons.

3. Ionic Bonds are between a _____ and a _____. While covalent bonds are between a

_____ and a _____ and Metallic Bonds are between a _____ and _____.

4. Identify the following as Metallic, Covalent, or Ionic Bonds.

a. Lithium and Fluorine

b. Iron and Nickel

c. Sodium and Chlorine

d. Cobalt and Copper

e. Oxygen and Chlorine

f. Sulfur and Oxygen

5. Draw the electron dot structure of the following elements:

a. Sodium
b. Magnesium
c. Aluminium
d. Silicon
e. Phosphorus
f. Sulfur
g. Chlorine
h. Argon

6. Show the how the following elements bond (Identify type of bond first, ionic or covalent). Give the correct formula for each.

a. Potassium and Sulfur

Type:

Formula:

b. Calcium and Nitrogen

Type:

Formula:

c. Aluminum and Chlorine

Type:

Formula:

d. Phosphorus and Sulfur

Type:

Formula:

e. Oxygen and Fluorine

Type:

Formula:

f. Carbon and Oxygen

Type:

Formula