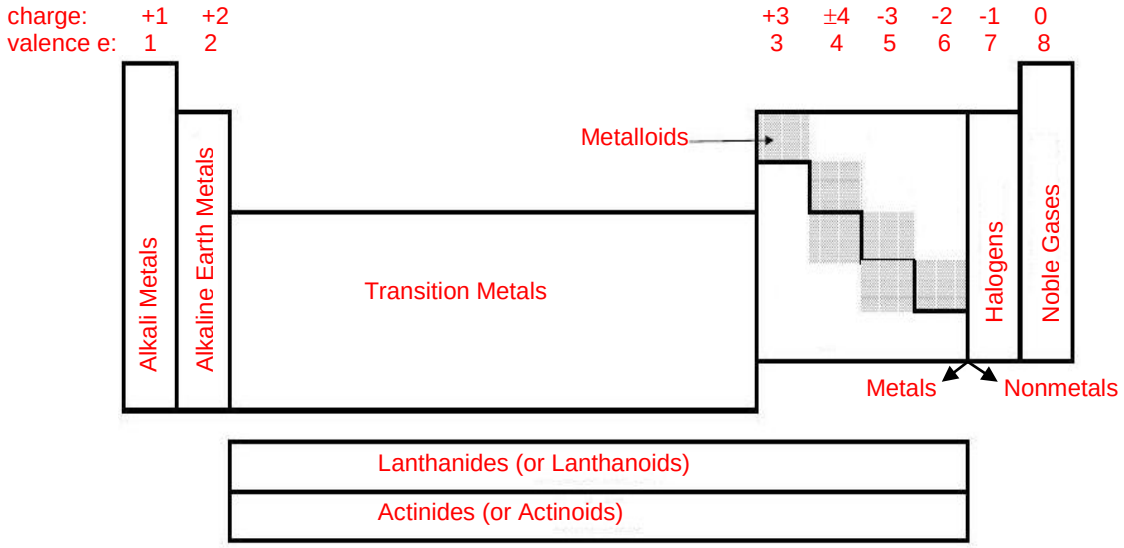
Chapter 5 & 6 Test Review (PreIB) Name: _____

Historical Development and Periodic Table Basics

1) How did Mendeleev arrange the periodic table? Increasing atomic mass
2) How did Moseley arrange the periodic table? Increasing atomic number
3) How is the modern periodic table arranged? Increasing atomic number
4) Define **periodic law**. When elements are arranged by atomic number, their physical and chemical properties show a periodic (repeating) pattern.

5) Label the families of the periodic table. Write the number of valence electrons and charges at the top of each family in the s and p blocks.



6) What is another name for a column on the periodic table? Group, family row? period
7) What are some properties of metals? high luster (shiny), malleable, ductile, good conductor of heat & electricity
8) What are some properties of nonmetals? dull, brittle, not malleable or ductile, poor conductor
9) A semiconductor is a material that needs to be a good conductor but not heat up very much, or be a good insulator. Would metals, nonmetals, or metalloids make a better semiconductor? Why? Metals are good conductors but they would get too hot (not a good insulator). Nonmetals are poor conductors, although they would not heat up very much (good insulator). A metalloid, like silicon, is a good conductor of electricity but does not get too hot.

Applications of the Periodic Table

10) What are valence electrons? Electrons in the highest energy level.
11) Define the *octet rule*. Atoms are stable when they have 8 valence electrons (full s & p sublevels)
12) Write the electron configuration for S^{-2} $1s^2 2s^2 2p^6 3s^2 3p^6$
13) Write the electron configuration for Li^{+1} $1s^2$
14) Write the electron configuration for Mg^{+2} $1s^2 2s^2 2p^6$
15) Write the electron configuration for N^{-3} $1s^2 2s^2 2p^6$
16) An element has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^5$.
    a. What charge would it be likely to form? -1
17) An element has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.
    a. What charge would it be likely to form? +2

18) How many valence electrons do the following elements have?

a. Oxygen 6	d. Sodium 1	g. Carbon 4
b. Bromine 7	e. Neon 8	h. Helium 2
c. Magnesium 2	f. Aluminum 3	i. Phosphorus 5

19) Why do elements in a group have similar properties? same number of valence electrons
20) Which elements have the same properties as fluorine? O, C, **Cl**, **Br**, Ne, He, **I**
21) Which elements have the same properties as potassium? Mg, **Cs**, Ar, Ca, **Li**, **Fr**
22) Which elements have the same properties as neon? F, **He**, N, **Ar**, H, **Kr**, Nb
23) What family contains the least reactive elements? Noble gases

Periodic Trends

24) WORD BANK: negative, decreases, positive, cation, increases, anion

When an atom…	*Its charge becomes…*	*It is called a(n)…*	*Its size…*
Gains electrons	Negative	Anion	Increases
Loses electrons	Positive	Cation	Decreases

For the following problems, circle the atom with the largest atomic radius:

25) F **F^{-1}** 26) Sr^{+2} **Sr** 27) **Ni^{+1}** Ni^{+2}

28) Put in order from smallest to largest ionic size: X^{+2}, X^{-3}, X^{-1}, X, X^{+1}

X^{+2} < X^{+1} < X < X^{-1} < X^{-3}

29) Which list consists of elements that have the most similar chemical properties?

a) Mg, Al, and Si b) K, Ca, and Ga **c) Mg, Ca, and Ba** d) K, Al, and Ni

For the following problems, circle the atom with the largest atomic radius:

30) **Al** Cl 31) Al **In** 32) **Rb** Sr

For the following problems, circle the atom with the largest ionization energy:

33) B **N** 34) **S** Se 35) Sn **I**

For the following problems, circle the atom with the largest electronegativity:

36) **Na** Rb 37) K **Ca** 38) **S** Ar

PreIB only:

39) Elements with atomic numbers 112 and 114 have been produced and their names are pending approval. However, an element that would be put between these two elements on the Periodic Table has not yet been produced. If produced, this element will be identified by the symbol Uut until a name is approved. **Identify one element that would be chemically similar to Uut.**

a) At **b) In** c) Pb d) Mt

40) As the elements in Group IA (or Group 1) are considered in order of increasing atomic number, the atomic radius of each successive element increases. This is primarily due to an increase in the number of

a) neutrons in the nucleus **c) principal energy levels**
b) electrons in the outermost shell d) unpaired electron

41) Compared to the atomic radius of a sodium atom, the atomic radius of a magnesium atom is smaller. The smaller radius is primarily a result of the magnesium atom having

a) a larger nuclear charge c) more principal energy levels
b) a smaller nuclear charge d) fewer principal energy levels

42) Which element within any given period of the Periodic Table would always have the *lowest* first ionization energy?

a) a noble gas **b) an alkali metal** c) an alkaline earth metal d) a halogen

43) Which statement about the shielding effect in elements is correct?

a) Boron and aluminum have the same shielding effect. c) Helium has more shielding effect than neon.
b) Lithium has more shielding effect than beryllium. **d) Copper and titanium have the same shielding effect.**

44) Which element in Group 17 is *least* likely to lose an electron?

a) Fluorine b) Iodine c) Bromine d) Chlorine

45) Which element in Period 2 has the greatest tendency to form a negative ion?

a) Lithium b) Neon c) Carbon **d) Fluorine**

46) Which particle has the largest radius?

a) Ar **b) Cl^{-1}** c) F^{-1} d) Ne

47) What element is the most reactive: F, Cl, Br, I ? Why? F = largest electron affinity, least shielding