Name: _____

Unit 2 Practice Sheet (Chapter 4, 5, and 6)

***Chapter 4:**

1. Who was the first person to suggest the existence of atoms?
2. Through what instrument can we observe atoms?
3. Can atoms of one element ever turn in to atoms of another element through physical or chemical processes?
4. Who discovered the following:
   a. protons
   b. neutrons
   c. electrons
   d. nucleus
5. Draw the plum pudding model of the atom.
6. What did Rutherford shoot at the gold foil?
7. What 2 conclusions did Rutherford make after his experiment?
8. Draw the Rutherford model of the atom.
9. Fill in the following chart.

Subatomic Particle	Symbol	Charge	Relative Mass	Location

10. How many neutrons are in $^{19}_{9}F$?

11. Fill in the following chart.

Element	**# of Protons**	**# of Electrons**	**# of Neutrons**	**Atomic Number**	**Mass Number**
	25		**30**		
		11	**12**		
	35		**45**		
				39	**89**
		33			**75**
Actinium (Ac)					**227**

12. What is an isotope?

13. The two most abundant isotopes of carbon are carbon-12 (mass = 12.00 amu) and carbon-13 (mass = 13.00amu). Their relative abundances are 98.9% and 1.10% respectively. Calculate the atomic mass of carbon.
14. What is a vertical column on the periodic table called?
15. What is a horizontal row on the periodic table called?

***Chapter 5:**

16. Why was Rutherford's model of the atom inadequate?
17. Draw the Bohr's model of the atom.
18. What is a quantum of energy?
19. Draw the quantum mechanical model of the atom.
20. Fill in the following chart.

sublevel	# of orbitals	# of electrons
d		
	1	
		6
	9	
f		

21. Define the following:
    a. Aufbau's Principle
    b. Pauli Exclusion Principle
    c. Hund's Rule
22. Which elements are described by the following electron configurations?
    a. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^4$
    b. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^5 5s^2$
23. Write the arrow electron configuration for the following elements.
    a. V
    b. Cl
    c. Cu

24. Write the standard electron configuration for the following elements.
    a. Ti

    b. Cr

    c. S

25. What sublevel do the electron configurations end in for elements in group 2?
26. What sublevel do the electron configurations end in for elements in group 18?
27. How many electrons are in the last p sublevel of the elements in group 16?
28. What is the difference between an electron in its ground state and in an excited state?
29. What are 3 ways that an electron can gain energy to become excited?
30. How does an atom emit light? (BE SPECIFIC!)

***Chapter 6:**

31. Elements in the same _____ have similar properties.
32. How did Mendeleev arrange the elements in his periodic table?
33. How is the modern periodic table arranged?
34. What is the periodic law?
35. List 4 properties of metals and 4 properties of nonmetals.
36. What are metalloids?
37. Label each element as a metal, metalloid, or nonmetal.
    a. chlorine

    b. silver

    c. silicon

38. Name 2 elements that have properties similar to chlorine.
39. What is similar about the electron configurations of two elements in the same group?
40. List the title of the elements in the following group(s):

    a. group 3-12

    b. first bottom row

c. group 1

d. group 17

e. group 2

f. second bottom row

g. group 18

h. stair-step line

41. Which group of elements would be characterized by an s^2p^3 configuration?
42. What characterizes the electron configuration of transition metals?
43. Label the following periodic trends:
    a. Atomic Radius
    b. Electronegativity
    c. Ionization Energy
44. Why does atomic radius decrease across a period?
45. Why does electronegativity decrease down a group?
46. Which has the larger ionization energy: Na or P?
47. Which has the smaller atomic radius: O or S?
48. Which has the larger radius Cl or Cl^-?
49. Cations are _____ than the parent atoms.
50. Arrange oxygen, fluorine, and sulfur in order of increasing electronegativity.