1. Which element has two (2) electrons in its valence shell?

a. Ar b. P c. Ba d. Si

2. The Modern Periodic Law is now based on \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_. This revision was done by a scientist named Moseley.

3. The name of the Group II A family of elements is called \_\_\_\_\_\_\_\_\_\_.

4. How many “s” electrons in an electron configuration of the element Sulfur are in the ground state?

5. An atom with \_\_\_\_\_\_\_ electrons in the outside or valance shell is very stable. \_\_\_\_ \_\_\_\_ in Group VIIIA all have this. *This is a statement known as the Octet rule.*

6. Look at Period Two on the Periodic Table. As the atomic number increases, what happens to the corresponding atomic radius?

a. Increases b. Decreases c. Remains the same

7. The atomic number of the Group V A element that is also in the 4th period is \_\_\_\_\_\_\_\_\_\_.

8. Elements with similar properties have a similar arrangement of \_\_\_\_\_\_\_\_\_\_ electrons.

9. In general as non-metals form ions, they tend to \_\_\_\_\_\_\_\_\_\_ electrons.

10. Which of the following elements has an incomplete “d” sublevel?

a. He b. Na c. Cu d. Ne

11. What is the Group number for the Alkali metals?

12. What is the Aufbau Principle?

13. As one goes from the left of the Periodic Table to the right, the metallic character of the elements \_\_\_\_\_\_\_\_\_\_.

14. The Actinide Series of elements all have something in common, and that is the filling of an \_\_\_\_\_\_\_\_\_\_ sublevel of electrons.

15. How many transition elements are there in a given period that has them. (*Not all periods have them*).

16. Name the scientist who arranged the first 63 in order of atomic masses.

17. Name the Noble Gas with the lowest atomic number.

18. How many valance electrons does a halogen have?

19. An element that has the properties of both metals and non-metals is called a (an) \_\_\_\_\_\_\_\_\_\_.

20. Metals can react to form ions. Which is larger: the metal atom or the corresponding metal ion?

21. Which of the following is correctly paired with its group?

a. Ca – halogen c. Na – noble gas

b. Ba – alkaline earth d. Cl – chalogen

22. Which of the following is the best metal?

a. K b. B c. O d. Kr

23. Why does Atomic Radius decrease and Electronegativity and Ionization energy increase from left to right across the Periodic Table (explain each one)?

Directions: For questions 24-30, match the item on the left with the correct electron dot structure on the right.

24. An inert gas a. s2p3

25. Would form a +2 cation b. alkaline earth metal

26. A halogen c. s2p5

27. valence for Nitrogen d. s1  alkali metal

28. forms +1 cation e. [ Q ]+ alkali metal ion

29. Symbol for a metallic ion f. s2p6 … full valence

30. Can make a + (*cation*) or – ion (*anion*) g. s2p2 Carbon group

ANSWER KEY

1. Which element has two (2) electrons in its valence shell?

**c. Ba**

2. The Modern Periodic Law is now based on **atomic numbers**. This revision was done by a scientist named Moseley.

3. The name of the Group II A family of elements is called **Alkaline Earth Metals**

4. How many “s” electrons in an electron configuration of the element Sulfur are in the ground state? **6**  … 16S32 🡪 1s2 2s2 2p6 3s2 2p4

5. An atom with ­­­­­­­­\_\_\_**8**\_\_ electrons in the outside or valance shell is very stable. **Noble Gases** in Group VIIIA all have this. *This is a statement known as the Octet rule.*

6. Look at Period Two on the Periodic Table. As the atomic number increases, what happens to the corresponding atomic radius?

**b. Decreases**

7. The atomic number of the Group V A element that is also in the 4th period is **33** (As)

8. Elements with similar properties have a similar arrangement of **valence** electrons.

9. In general as non-metals form ions, they tend to **gain** electrons.

10. Which of the following elements has an incomplete “d” sublevel?

**c. Cu** … transition element … Copper can be Cu+1 (valence: 4s13d10) or Cu+2 (valence: 4s23d9) depending on the electrons in the 3d sublevel.

11. What is the Group number for the Alkali metals? **1**

12. What is the Aufbau Principle?

* *Electrons occupy orbitals of the lowest energy available*

13. As one goes from the left of the Periodic Table to the right, the metallic character of the elements **decreases.**

14. The Actinide Series of elements all have something in common, and that is the filling of an **5f, then 6d** sublevels of electrons.

15. How many transition elements are there in a given period that has them. (*Not all periods have them*). **10** in periods 4-5 (d sublevel) / **24** in periods 6-7 (f, d sublevels)

16. Name the scientist who arranged the first 63 in order of atomic masses. **Mendeleev**

17. Name the Noble Gas with the lowest atomic number. **Helium**

18. How many valance electrons does a halogen have? i.e fluorine (**7** valence)

19. An element that has the properties of both metals and non-metals is called a (an) **metalloid**

20. Metals can react to form ions. Which is larger: the metal atom or the corresponding metal ion? **The metal atom is larger because it loses electrons to become an ion**

21. Which of the following is correctly paired with its group?

**b. Ba** – alkaline earth

22. Which of the following is the best metal?

**a. K** … B – metalloid O = non-metal Kr = inert gas

23. Why does Atomic Radius decrease and Electronegativity and Ionization energy increase from left to right across the Periodic Table (explain each one)?

**Atomic size decreases from left to right across a period. Electrons are being added to the same energy level. The increasing charge on the nucleus is all in one energy level. It tends to pull the electrons closer, so the atomic radius decreases.**

**Electronegativity increases because Metals (group 1A – 3A) tend to lose an electron to attain the ideal electron configuration, so there is little attraction to gain additional electrons. Non-metals (group 5A – 7A) have a much stronger attraction for electrons (gain electrons), in order to gain the ideal electron configuration.**

**Ionization energy increases because Metals (group 1A – 3A) tend to lose an electron to attain the ideal electron configuration, so there is little energy needed to release electrons. Non-metals (group 5A – 7A) have a much stronger attraction for electrons (gain electrons), in order to gain the ideal electron configuration, so there require a higher ionization energy to release electrons.**

Directions: For questions 23-27, match the item on the left with the correct electron dot structure on the right.

24. An inert gas **f** a. s2p3

25. Would form a +2 cation **b** b. alkaline earth metal

26. A halogen **c** c. s2p5

27. valence for Nitrogen **a** d. s1  alkali metal

28. forms +1 cation **d** e. [ Q ]+ alkali metal ion

29. Symbol for a metallic ion **e** f. s2p6 … full valence

30. Can make a + (*cation*) or – ion (*anion*) **g** g. s2p2 Carbon group

Because it can gain or lose electrons