Name _____ Class _____ Date _____

Atoms, Elements, Periodic Table, and Bonding Study Guide

1. In a neutral atom, the number of protons equals the number of ____electrons_____.

2. In general, which of the following statements about metals is true?
   a. Metals need to be stored in sealed containers for safety.
   b. Metals are malleable, ductile, and are good conductors.
   c. Metals are highly reactive substances.
   d. Metals do not react with oxygen.

3. Which of these statements about a column of the periodic table is true?
   a. The elements have similar characteristics.
   b. The elements have a wide range of characteristics.
   c. The elements have the same atomic number.
   d. The elements have the same atomic mass.

4. Which particles in an atom have a negative charge? electrons

5. The elements that do not ordinarily form compounds are _noble gases_____.

6. Which elements have some properties of metals and some properties of nonmetals? metalloids

7. Elements that easily transmit electricity and heat are said to be ____good conductors_____.
8. The property of an element that indicates the number of protons in its atoms is the _____atomic number_____.

9. Each element is given a specific _____chemical symbol_____ that usually consists of one or two letters.

Protons, Neutrons, and Electrons

Particle	*Relative Mass*	*Charge*	*Location*
Proton	1	+1	Nucleus
Neutron	1	0	Nucleus
Electron	1/ 1836	-1	Electron Cloud

10. What are two ways that a proton and neutron are similar?

_____proton and neutron are in the nucleus

Protons and neutrons both have a relative mass of about 1

_____
_____
_____

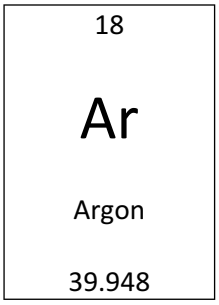
11. What is the overall charge on the nucleus of an atom? _____positively charged
    _____

12. What element is located in the first row of Group 1? Why is this element different from the other elements on Group 1?

_____Hydrogen is a nonmetal

_____
_____

13. Which group of the periodic table contains the most reactive nonmetals? Group 17: halogens



14. What is the average atomic mass of Argon? _____39.948_____

15. Lithium has three protons. During a chemical reaction, one electron is removed. What is the atomic number of Lithium now? ____three!!! (protons never change) _____

16. Each group in the Periodic Table has its own characteristic properties based on the number of valence electrons

17. Which of the following is a compound?
    a. Oxygen
    b. Water
    c. Nitrogen
    d. Air

18. Two atoms of an element both have five protons, but one is charged and the other is neutral. Why is it possible for two atoms of an element to have different charges?
    All atoms of the same element will have the same number of protons, but they can have different number of electrons making them ions

19. Which of these has the same number of protons as a sodium atom (Na), but has a different charge?
    a. Lithium ion (Li^+)
    b. Sodium ion (Na^+)
    c. Potassium ion (K^+)
    d. Potassium atom (K)

Ions	Number of Protons	Number of Electrons	Charge
Magnesium	12	10	2-
Sodium	11	10	1+
Oxygen	8	6	2-
Chlorine	17	18	1+

20. Which ion's charge is shown **correctly** on the chart above? Sodium

21. Which sentence correctly describes atoms and their subatomic particles?
    a. Atoms of different elements may have the same number of positive charges.
    b. Atoms of the same element always have the same number of positive charges.
    c. Atoms of different elements always have different numbers of neutral charges.

d. Atoms of the same element always have an equal number of positive and neutral charges.

22. Annie is reading about the formation of ions. How does a potassium (K) atom become a K^+ ion?
Potassium (K) atom loses 1 electron and becomes a positive ion.

23. Magnesium bromide is an ionic compound with the chemical formula $MgBr_2$. What does the "2" tell you? There are 2 bromide ions for every 1 magnesium ion.

24. Electrons involved in bonding between atoms are valence electrons

25. Molecular compounds will not conduct electricity because no
___metals_____ are present.

The chemical equation for the formation of water is shown below.

$$2H_2 + O_2 \longrightarrow 2H_2O$$

26. How many oxygen atoms are represented in the reactants? _____2_____

27. How many atoms of an element in Group 17 would be needed to react with one atom of an element from Group 2? Explain or give an example.
_____you would need 2 atoms from group 17 to bond with 1 atom from group 2
Ex: $MgBr_2$ Mg has 2 valence electrons to give away. Br only needs 1 valence electron. 2 bromide ions are needed to take both of magnesium's val electrons.
_____
_____
_____

28 -30. Draw Lewis structures (dot diagrams) for the elements below.