

Chapter 5

Study Guide – Answers

Name: _____

Date: _____ Per: _____

6. What are 5 properties of metals?

<i>Good conductors of heat</i>	<i>High luster</i>	<i>Highly malleable</i>	<i>Highly ductile</i>	<i>Good conductors of electricity</i>
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7. The electrons in the outermost energy level are responsible for the atom's chemical properties. These electrons are called the valence electrons. There can never be more than 8 of these electrons.

8. In order for an element to be stable it must have 2 (if it is a small atom) or 8 electrons in its outer energy level.

9. The law of octaves says that when the elements are placed in order by atomic number (originally atomic mass) that their chemical and physical properties repeat every 8 elements.

10. A periodic trend is a certain property of the elements that changes in a predictable way within a group or period.

11. All of the periodic trends relate to the fact that attraction of the nucleus to the electron cloud increases from the bottom left corner to the upper right corner.

12. Define effective nuclear charge: the magnitude of the actual attractive force exerted on electrons by the nucleus

a. The effective nuclear charge is always less than the actual nuclear charge due to the distance between the nucleus and electrons being attracted, and shielding by electrons that exist in inner levels.

b. The effective nuclear charge decreases as period number increases in a group due to greater distance (more energy levels) between the nucleus and valence shell, and increases as group number increases within a period due to the addition of protons to the nucleus and constant (unchanging) shielding effect.

13. Fill in the definitions below and the element name with the greatest and least value.

Trend	Definition	Highest	Lowest
Atomic radius	<i>size of an atom as measured by dividing the distance between the nuclei of two neighboring atoms by 2</i>	<i>Fr</i>	<i>He</i>
Ionization Energy	<i>energy required to strip an electron from an atom</i>	<i>He</i>	<i>Fr</i>
Electronegativity	<i>attraction of a nucleus to electrons in a bond</i>	<i>F</i> <i>(He doesn't bond)</i>	<i>Fr</i>

14. Fill in the following chart:

Trend	Change Moving Left to Right Across a Period	Change Moving Down a Group
<i>Atomic radius</i>	<i>decreases</i>	<i>increases</i>
<i>Ionization Energy</i>	<i>increases (overall for first ionization energies)</i>	<i>decreases</i>
<i>Electronegativity</i>	<i>increases</i>	<i>decreases</i>

15. When an atom gains electrons it takes on a negative charge and its radius increases.

16. When an atom loses electrons it takes on a positive charge and its radius decreases.

17. Define 'successive ionization energies' Energies required to strip off successive electrons from an atom. Successive ionization energies always increase as the nucleus exerts a greater attractive force on remaining electrons as they are removed.

18. Elements on the left side of the periodic table tend to lose electrons to become stable, making them positively charged.

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19. Elements on the right side of the periodic table tend to gain electrons to become stable, making them negatively charged.
20. The family of elements with the highest ionization energies are the noble gases.
21. The family of elements with the lowest ionization energies are the alkali metals.