

Name: _____ Date: _____ Period: _____

Graded problems are worth 2 points each. This assignment is graded out of points.

Give the number of valence electrons in the following atoms.

Atom (name of the element)	Number of <i>valence</i> electrons in atom
1) Fluorine	
2) Potassium	
3) Graded. Silicon	

4) An atom is found to have 3 valence electrons. It might be ____.

- a) Nitrogen
- b) Aluminum
- c) Magnesium
- d) Lithium

5) **Graded.** An atom is found to have 5 valence electrons. It might be ____.

- a) Nitrogen
- b) Boron
- c) Aluminum
- d) Magnesium

6) What is an ion?

7) The oxidation number tells us ____ when an ion of that element is formed.

- a) how many electrons are gained by an atom
- b) how many protons are gained by an atom
- c) what the charge of the ion is
- d) how many atoms of that element are used

8) **Graded.** Why do atoms gain or lose electrons to form ions?

- 9) Nitrogen gains three electrons to form the N^{3-} ion. Why doesn't it lose five electrons instead to form the N^{5+} ion?
- 10) **Graded.** Why do the noble gases tend NOT to form ions?
- 11) Elements that are in the alkali earth group will ____ electron(s) when forming an ion.
- a) gain 1
 - b) gain 2
 - c) lose 1
 - d) lose 2
- 12) Elements that are in the halogens group will ____ electron(s) when forming an ion.
- a) gain 1
 - b) gain 2
 - c) lose 1
 - d) lose 2
- 13) An ion of an element is formed when it loses three electrons. The element could be ____.
- a) Phosphorus
 - b) Silicon
 - c) Boron
 - d) Beryllium
- 14) **Graded.** An ion of an element is formed when it gains two electrons. The element could be ____.
- a) Sulfur
 - b) Chlorine
 - c) Aluminum
 - d) Potassium

For each element listed below, give the chemical formula for the ion.

	Element	Ion's Chemical Formula
15)	Lithium	
16)	Oxygen	
17) Graded.	Hydrogen	
18) Graded.	Magnesium	
19) Graded.	Chlorine	
20) Graded.	Phosphorus	
21) Graded.	Aluminum	
22) Graded.	Sodium	

Selected Answers

Give the number of valence electrons in the following atoms.

- 1) Fluorine has 7 valence electrons. (9 total, but only 7 in the outermost shell.)
- 2) Potassium has 1 valence electron.
- 4) An atom is found to have 3 valence electrons. It might be *Aluminum*.

5) What is an ion?

An ion is a charged particle formed when an atom gains or loses electrons.

6) The oxidation number tells us c. what the charge of the ion is when an ion of that element is formed.

7) Nitrogen gains three electrons to form the N^{3-} ion. Why doesn't it lose five electrons instead to form the N^{5+} ion?

Because it is easier to gain three electrons than it is to lose 5 electrons (it takes less energy to move three electrons than to move five electrons).

8) Elements that are in the alkali earth group will d. lose 2 electron(s) when forming an ion.

9) Elements that are in the halogens group will a. gain 1 electron(s) when forming an ion.

10) An ion of an element is formed when it loses three electrons. The element could be c. Boron.

For each element listed below, give the chemical formula for the ion.

	Element	Ion's Chemical Formula
11)	Lithium	Li^{+1}
12)	Oxygen	O^{-2}