

**Matching**

Match each description in Column B to the correct term in Column A.

**Column A**

- \_\_\_\_\_ 1. chemical formula
- \_\_\_\_\_ 2. valence electrons
- \_\_\_\_\_ 3. electron dot structure
- \_\_\_\_\_ 4. octet rule
- \_\_\_\_\_ 5. formula unit
- \_\_\_\_\_ 6. ionic bonds
- \_\_\_\_\_ 7. ionic compounds
- \_\_\_\_\_ 8. anions
- \_\_\_\_\_ 9. cations

**Column B**

- A. compounds composed of cations and anions
- B. the attraction of free-floating valence electrons for positively charged metal ions
- C. the lowest whole-number ratio of ions in an ionic compound
- D. the electrostatic attraction that binds oppositely charged ions together
- E. the number of ions of opposite charge that surround the ion in a crystal
- F. negatively charged ions
- G. shows the kinds and numbers of atoms in the smallest representative unit of a substance
- H. a diagram that shows valence electrons as dots
- I. a negative ion formed when a halogen atom gains an electron
- J. In forming compounds, atoms tend to react so as to acquire the stable electron configuration of a noble gas.
- K. electrons in the highest occupied energy level of an element's atoms.
- L. a mixture of two or more elements, at least one of which is a metal
- M. positively charged ions

Answer the following in the space provided.

10. What is the relationship between the group number of the representative elements and the number of valence electrons?

11. How many electrons will each element gain or lose in forming an ion? State whether the resulting ion is a cation or an anion.

- |              |              |               |
|--------------|--------------|---------------|
| a. strontium | c. tellurium | e. bromine    |
| b. aluminum  | d. rubidium  | f. phosphorus |

12. Give the name and symbol of the ion formed when

- |  |   |
|--|---|
| a. a chlorine atom gains one electron. | b. a potassium atom loses one electron. |
| c. an oxygen atom gains two electrons. | d. a barium atom loses two electrons.   |

13. How many electrons are lost or gained in forming each of the following ions?

- |                     |                  |                     |                     |
|---------------------|------------------|---------------------|---------------------|
| a. $\text{Mg}^{2+}$ | b. $\text{Br}^-$ | c. $\text{Sr}^{2+}$ | d. $\text{Fe}^{3+}$ |
|---------------------|------------------|---------------------|---------------------|

14. Classify each of the following as a cation or an anion.

- |                     |                    |                     |
|---------------------|--------------------|---------------------|
| a. $\text{Na}^+$    | c. $\text{I}^-$    | e. $\text{Ca}^{2+}$ |
| b. $\text{Cu}^{2+}$ | d. $\text{O}^{2-}$ | f. $\text{Cs}^+$    |

16. Write the electron configuration for each of the following atoms and ions.

- |       |                  |                  |
|-------|------------------|------------------|
| a. Ca | b. $\text{Na}^+$ | d. phosphide ion |
|-------|------------------|------------------|

15. For each element below, state (i) the number of valence electrons in the atom, (ii) the electron dot formula, and (iii) the chemical symbol for the ion.

	Na	O	N	Ca
Valence electrons				
Electron dot diagram				
Symbol for the ion				

17. Use electron dot structures to show how the following form ionic compounds, and write the formula for the compound .

a. sodium and bromine

d. calcium and iodine

b. magnesium and oxygen

e. aluminum and sulfur

c. Potassium and sulfur

f. gallium and phosphorus

18. Which of these combinations of elements is likely to react to form ionic compounds?

a. sodium and magnesium

c. potassium and iodine

b. barium and sulfur

d. oxygen and argon

19. Write an electron configuration for the following transition metals, then write one that describes the ion it forms.

a. Sc

Sc<sup>3+</sup>

b. Cd

Cd<sup>2+</sup>

c. Ni

Ni<sup>3+</sup>