

Atoms and Bonding ▪ Chapter Test A

- _____ 9. _____ ions are composed of more than one atom.
- | | |
|-------------|---------------|
| a. Covalent | b. Molecular |
| c. Polar | d. Polyatomic |
- _____ 10. In a double bond, _____ electrons are shared.
- | | |
|--------|----------|
| a. two | b. four |
| c. six | d. eight |

Completion

Fill in the line to complete each statement.

11. A(n) _____ is a mixture made of two or more elements that has the properties of a metal.
12. Most atoms become less reactive after a change to a total number of _____ valence electrons.
13. A neutral group of atoms joined by covalent bonds is called a(n) _____.
14. A(n) _____ ion is formed when an atom loses an electron.
15. In a reaction, atoms with _____ valence electrons will probably gain two electrons or share two covalent bonds.

True or False

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

- _____ 16. Freely moving valence electrons account for electrical conductivity in metals.
- _____ 17. The most stable elements in the periodic table are found in the family of alkali metals.
- _____ 18. Ions form electrically negative compounds.
- _____ 19. Atoms in a nonpolar covalent bond carry slight electrical charges.
- _____ 20. A group of elements shares the same number of valence electrons.

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Using Science Skills: Interpreting Diagrams

Use the electron dot diagrams to answer the following.



21. Applying Concepts Predict the formula for the compound, if any, that would form from the elements listed below. If a compound is unlikely, explain the reason why.

a. magnesium and chlorine

b. aluminum and sulfur

c. sodium and argon

22. Drawing Conclusions Based on the electron dot diagrams of the elements shown above, which elements are likely to be classified as metals? Explain your answer.

Essay

Write an answer for each of the following in the spaces provided.

23. How does the “sea of electrons” model of metallic bonding explain the shared characteristics of metals?

24. Explain why a water molecule (H₂O) is described as polar, and a molecule of hydrogen (H₂) is described as nonpolar.

25. Compare and contrast ionic bonds and covalent bonds.

Atoms and Bonding ▪ Chapter Test A**Using Science Skills**

Use the portion of the periodic table below to answer the following questions.

	1	2	13	14	15	16	17	18
2	3 Li Lithium 6.941	4 Be Beryllium 9.012	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
8								

- 26. Classifying** A new period of very heavy elements from outer space has been discovered by scientists. In which group does each element belong? Write the element in the appropriate square of period eight.

Element A: bonds with lithium to form the compound Li_3A

Element D: has the lowest atomic number of the elements in period eight

Element E: exists as a nonpolar molecule of two identical atoms with a double bond

Element G: forms an ion with a 3+ charge when reacting with nitrogen

Element J: nonreactive, discovered as a pure element

Element L: explosively reactive when combined with lithium

Element M: bonds with fluorine to form the compound MF_2

Element Q: QO_2 is a covalent molecule with two double bonds

- 27. Inferring** How many covalent bonds can element A form? Explain your answer.

Essay

Answer the following on a separate piece of paper.

- 28.** Explain why the alkali metals in Group 1 are always found in nature combined with other elements.
- 29.** An unknown solid does not conduct electric current. What could you do to determine whether the solid is an ionic compound or a molecular solid?
- 30.** Explain why the polar structure of water molecules causes water to have a higher boiling point than carbon dioxide.