Name STURMAN key Date _____ Class _____

8.2 THE NATURE OF COVALENT BONDING

24 poss ≥ 17

Section Review

Objectives

- State a rule that usually tells how many electrons are shared to form a covalent bond
- Describe how electron dot formulas are used
- Predict when two atoms are likely to be joined by a double or a triple covalent bond
- Distinguish between a single covalent bond and other covalent bonds
- Describe how the strength of a covalent bond is related to its bond dissociation energy
- Describe how resonance structures explain bonding
- Identify some exceptions to the octet rule

Vocabulary

- single covalent bond
- structural formulas
- unshared pairs
- double covalent bonds
- triple covalent bonds
- coordinate covalent bond
- polyatomic ion
- bond dissociation energy
- resonance structures

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

When atoms share electrons to gain the __1__ configuration of a noble gas, the bonds formed are __2__. A __3__ pair of valence electrons constitutes a __4__ covalent bond. Pairs of valence electrons that are not shared between atoms are called __5__. Sometimes two or three pairs of electrons may be shared to give __6__ covalent bonds. In some cases, only one of the atoms in a bond provides the pair of bonding electrons; this is a __7__. __8__ is required to break covalent bonds between atoms. The total energy required to break the bond between two covalently bonded atoms is known as the __9__.

When it is possible to write two or more valid electron dot formulas for a molecule or ion, each formula is referred to as a __10__.

1. ~~noble gas config~~ electrons
2. covalent
3. shared
4. single
5. unshared pairs
6. double/triple
7. coordinate bond
8. energy
9. bond dissociation energy
10. resonance structure.

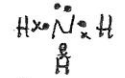
Part B True-False

NT look up.

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

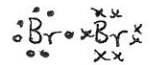
ST 11. The modern interpretation of resonance is that electron pairs rapidly flip back and forth between the various electron dot structures.

NT 12. The compound NH_3 contains two double covalent bonds.



AT 13. The chemical formulas of molecular compounds show the number and type of atoms in each molecule.

AT 14. A molecule of bromine has six unshared pairs of electrons.



ST 15. Carbon forms four single covalent bonds with other atoms.

NT 16. A bond in which one atom contributes both bonding electrons is called a ~~polyatomic~~ covalent bond.
coordinate

Part C Matching

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

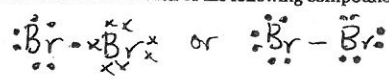
	Column A	Column B
E 17.	single covalent bond	a. a chemical formula that shows the arrangement of atoms in a molecule or a polyatomic ion
A 18.	structural formula	b. the amount of energy required to break a covalent bond between atoms
B 19.	bond dissociation energy	c. a tightly bound group of atoms that has a positive or negative charge and behaves as a unit
C 20.	polyatomic ion	d. a covalent bond in which one atom contributes both bonding electrons
D 21.	coordinate covalent bond	e. a chemical bond in which only one pair of electrons is shared by two bonded atoms

Part D Questions and Problems

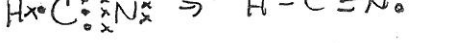
Answer the following in the space provided.

22. Draw electron dot structures for each of the following compounds

a. Br_2



b. HCN



c. NH_4^+