What is Covalent Bonding?

Worksheet

In covalent bonding, atoms share electrons rather than transfer them. A single bond shares 1 electron pair (1 line), double bonds share 2 pairs (2 lines), and triple bonds share 3 pairs (3 lines).

Questions

1. In covalent bonding, electrons are ___.

A) transferred
B) shared
C) removed
D) isolated

2. How many electron pairs does a single bond contain?

A) 2 pairs
B) 1 pair
C) 3 pairs
D) 4 pairs

3. In O=C=O (carbon dioxide), how many double bonds are there?

A) 1
B) 2
C) 3
D) 4

4. Which molecule has only single bonds: HO, O, or N?

A) O
B) N
C) HO
D) All have single bonds

5. Hydrogen (H) forms H by sharing electrons. How many electron pairs are shared?

6. In water (HO), oxygen bonds with two hydrogens. How many single bonds?

7. In carbon dioxide (CO), carbon shares electrons with two oxygens. What type of bonds?

8. Define: What is covalent bonding?

9. Define: What is a single bond?

10. Define: What is a double bond?

Answer Key

1. B) shared - Covalent bonding involves sharing of electrons, not transfer.

2. B) 1 pair - A single bond (-) is 1 shared electron pair.

3. B) 2 - CO has 2 double bonds: one between C and each O.

4. C) HO - HO has two O-H single bonds. O and N have double and triple bonds respectively.

5. Hydrogen: 1 proton, 1 electron (needs 2 electrons for stability) Two H atoms approach each other Each contributes 1 electron to a shared pair Shared pair: 1 electron pair (single bond H-H)

6. Oxygen: 8 protons, 6 valence electrons (needs 2 more) Hydrogen: 1 proton, 1 valence electron (needs 1 more each) O shares 1 electron pair with each H Total: 2 single bonds (H-O-H)

7. Carbon: 6 protons, 4 valence electrons (needs 4 more) Oxygen: 8 protons, 6 valence electrons (needs 2 more each) Each C=O shares 2 electron pairs Total: 2 double bonds (O=C=O)

8. The sharing of electron pairs between two atoms to achieve stable electron configurations.

9. A single bond is the sharing of 1 electron pair between two atoms (drawn as a single line: -).

10. A double bond is the sharing of 2 electron pairs between two atoms (drawn as two lines: =).