



Here is a worksheet on chemical bonding:

1. Define chemical bond.
2. Differentiate between covalent, ionic and metallic bonds.
3. Provide an example of a substance that has a covalent bond, ionic bond, and metallic bond.
4. What is an electronegativity? How does it impact bond formation?
5. Define polar covalent bond and nonpolar covalent bond.
6. Differentiate between a molecule and a compound.
7. What is the octet rule?
8. Define Lewis dot structure.
9. Explain the VSEPR theory.
10. What is a dipole moment?

Answers:

1. A chemical bond is the attractive force that holds two or more atoms together in a molecule.
2. Covalent bonds involve the sharing of electrons between atoms. Ionic bonds occur when atoms transfer electrons to each other. Metallic bonds occur between metal atoms by sharing their valence electrons with each other.
3. Covalent bond: H₂O (water); Ionic bond: NaCl (table salt); Metallic bond: Fe (iron)
4. Electronegativity is the measure of an atom's ability to attract a shared pair of electrons towards itself. It impacts bond formation because atoms with a high electronegativity tend to attract electrons in a bond more strongly, forming polar covalent bonds or ionic bonds.
5. A polar covalent bond occurs when there is an unequal sharing of electrons between atoms, resulting in the creation of partial positive and partial negative charges. A nonpolar covalent bond occurs when there is an equal sharing of electrons between atoms and no partial charges are created.
6. A molecule is a group of atoms held together by covalent bonds. A compound is a substance made up of two or more different types of atoms bonded together.
7. The octet rule states that an atom will combine with other atoms to form a stable outer shell of eight electrons.
8. A Lewis dot structure is a representation of a molecule showing the valence electrons of each atom in the molecule as dots.
9. The VSEPR (Valence Shell Electron Pair Repulsion) theory states that the electron pairs surrounding a central atom will arrange themselves to be as far apart from each other as possible, resulting in a specific molecular geometry.
10. The dipole moment is a measure of the separation of charge in a molecule and the resulting polarity. It occurs when there is an electronegativity difference between the atoms in a covalent bond.