3. Chemical bonding

Starter Quiz ·

A-Level Chemistry Name: _____ Score: _____

1. Which element is the most electronegative?

   ☐ Fluorine

   ☐ Caesium

   ☐ Oxygen

   ☐ Chlorine

2. Ionic bonding is the electrostatic attraction between oppositely charged ions.

   ☐ True ☐ False

3. Metallic bonding is the attraction between:

   ☐ two oppositely charged ions in a lattice

   ☐ two molecules with permanent dipoles

   ☐ two atoms sharing a pair of electrons

   ☐ positive metal ions and a sea of delocalised electrons

4. A covalent bond is:

   ☐ a shared pair of electrons attracted to both nuclei

   ☐ a transfer of electrons

   ☐ a sea of delocalised electrons

   ☐ a force between molecules

5. A pi (π) bond forms by:

   ☐ electron transfer

   ☐ a sea of delocalised electrons

   ☐ the sideways overlap of two p orbitals, above and below the axis

   ☐ head-on overlap between the atoms

6. VSEPR theory says the shape of a molecule is set by:

   ☐ the mass of the atoms around the central atom

   ☐ electron pairs around the central atom repelling and spreading as far apart as possible

   ☐ the colour of the molecule in visible light

   ☐ the number of neutrons in the central atom

7. The weakest intermolecular forces, present between all molecules, are van der Waals (London) _____ forces.

   _____

8. Water boils at a much higher temperature than hydrogen sulfide although H_2S is heavier.

   ☐ True ☐ False

9. A dot-and-cross diagram shows the outer electrons of each atom in a bond.

   ☐ True ☐ False

10. In an O–H bond, the hydrogen carries $\delta+$.

    ☐ True ☐ False

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Answers ·

A-Level Chemistry

1. **Fluorine**

   About 4.0 on Pauling's scale.

2. **True**

   It forms by transferring electrons from a metal to a non-metal.

3. **positive metal ions and a sea of delocalised electrons**

   In a metal, positive ions sit in a sea of delocalised electrons that hold the structure together.

4. **a shared pair of electrons attracted to both nuclei**

   In a covalent bond two atoms share a pair of electrons, attracted to both nuclei.

5. **the sideways overlap of two p orbitals, above and below the axis**

   A σ bond is head-on overlap; a π bond is the sideways overlap of p orbitals.

6. **electron pairs around the central atom repelling and spreading as far apart as possible**

   Like charges repel, so the electron pairs push apart to minimise repulsion, fixing the shape.

7. **dispersion**

   Caused by temporary induced dipoles.

8. **True**

   Hydrogen bonds must be broken.

9. **True**

   Dots and crosses distinguish the atoms' electrons.

10. **True**

    Oxygen is more electronegative.