3. Chemical bonding

Starter Quiz ·

A-Level Chemistry Name: _____ Score: _____

1. The power of an atom to attract the electrons in a covalent bond is its _____.

   _____

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

   ☐ True ☐ False

3. Metallic bonding is the attraction between:

   ☐ two oppositely charged ions

   ☐ two molecules

   ☐ a shared 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

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

   ☐ the colour of the molecule

   ☐ the number of neutrons

7. Compared with the bonds inside substances, intermolecular forces are:

   ☐ much stronger

   ☐ exactly the same

☐ never present

☐ much weaker

8. Van der Waals forces are the strongest of the intermolecular forces covered here.

   ☐ True ☐ False

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

   ☐ True ☐ False

10. Electronegativity falls across a period and rises down a group, so caesium is the most electronegative element.

    ☐ True ☐ False

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Answers ·

A-Level Chemistry

1. **electronegativity**

   It increases across a period and up a group (fluorine is the highest).

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. **much weaker**

   Intermolecular forces (between molecules) are far weaker than ionic, covalent or metallic bonds within substances.

8. **False**

   False. Hydrogen bonding is the strongest intermolecular force covered here; it is a particularly strong type of permanent dipole attraction.

9. **True**

   Dots and crosses distinguish the atoms' electrons.

10. **False**

    False. Electronegativity rises across a period (smaller radius, more nuclear charge) and falls down a group (more shells), so fluorine is the most electronegative element.