



CHEMICAL REACTIONS AND EQUATIONS

PART 2 – OTHER TYPES & APPLICATIONS + BALANCING

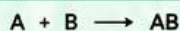
Key Concepts, Equations, Examples & Facts at a Glance



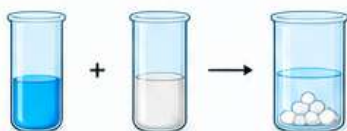
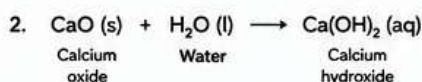
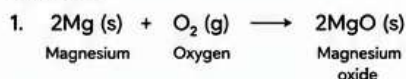
1 COMBINATION REACTION

- Two or more substances combine to form a single product.
- Also called synthesis reaction.

General form:



Examples:



Real-life: Quick lime (CaO) reacts with water to form slaked lime used in whitewashing.

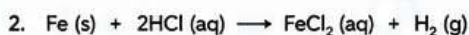
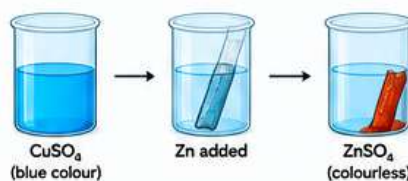
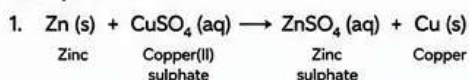
2 DISPLACEMENT REACTION

- A more reactive element displaces a less reactive element from its compound.

General form:



Examples:



Reactivity Series (most to least reactive)



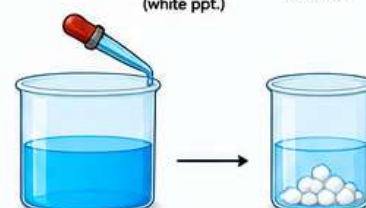
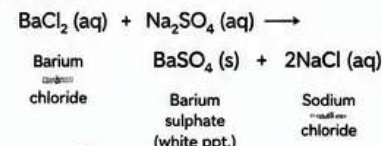
3 DOUBLE DISPLACEMENT REACTION

- Exchange of ions between two compounds in aqueous solution.

General form:



Example:

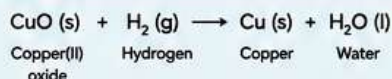


Note: Precipitation, gas or water formation drives the reaction.

4 OXIDATION AND REDUCTION (REDOX REACTION)

- Oxidation and reduction occur simultaneously.
- Oxidation** – Gain of oxygen / Loss of hydrogen / Loss of electrons.
- Reduction** – Loss of oxygen / Gain of hydrogen / Gain of electrons.

Example:



Oxidation

- ✓ Gain of oxygen
- ✓ Loss of hydrogen
- ✓ Loss of electrons

(OIL – Oxygen In, Loss of electrons)

Reduction

- ✓ Loss of oxygen
- ✓ Gain of hydrogen
- ✓ Gain of electrons

(RIG – Reduction Is Gain of electrons)

5 EFFECTS OF CHEMICAL REACTIONS

Change in State



Change in Colour



Change in Temperature



Evolution of Gas



Daily Life Examples:

- ✓ Cooking food
- ✓ Ripening of fruits
- ✓ Gas formation
- ✓ Digestion of food
- ✓ Rusting of iron

6 CORROSION AND RANCIDITY

Corrosion

- Slow conversion of metals into oxides by reaction with air, moisture or chemicals.
- Example:** Rusting of iron.

Prevention:

- ✓ Painting / Oiling
- ✓ Galvanisation
- ✓ Alloying (e.g., Stainless steel)



Rancidity

- Oxidation of oils and fats.
- Causes unpleasant smell and taste.
- Prevented by:
 - ✓ Keeping food in air-tight containers
 - ✓ Using antioxidants

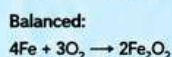
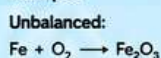


7 BALANCING CHEMICAL EQUATIONS

Steps:

- Write the unbalanced equation.
- Count atoms of each element on both sides.
- Add coefficients to balance atoms (Never change subscripts).
- Recheck to be equal on both sides.

Example:



QUICK FORMULAS / FACTS

- ✓ Law of Conservation of Mass: Mass of reactants = Mass of products
- ✓ Physical change → No new substance formed
- ✓ Chemical change → New substance formed
- ✓ Precipitate → Solid formed in solution
- ✓ Decomposition requires energy (heat / light / electricity)

COMMON MISTAKES

- ✗ Not balancing chemical equations.
- ✗ Changing subscripts while balancing.
- ✗ Confusing displacement and double displacement reactions.
- ✗ Ignoring physical states (s, l, g, aq).
- ✗ Thinking all changes are chemical changes.



KEY TAKEAWAY

Chemical reactions transform substances in different ways. By understanding the types of reactions, their effects and balancing equations, we can predict, control and use these changes in everyday life!



Remember:

Chemical reactions are everywhere — in our body, home and environment. Understanding them helps us use materials wisely and live a healthier, safer life!