



ACIDS, BASES AND SALTS

CORE CONCEPT NOTES (ONE-PAGE REVISION)

Acids

- Substances that produce H^+ / H_3O^+ ions in aqueous solution
- **Sour** in taste
- Turn **blue litmus** → **red**

Examples: HCl , H_2SO_4 , HNO_3 , CH_3COOH

Bases

- Substances that produce OH^- ions in aqueous solution
- **Bitter, soapy**
- Turn **red litmus** → **blue**

Examples: NaOH , KOH , $\text{Ca}(\text{OH})_2$

✓ Bases soluble in water are called **alkalis**

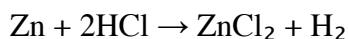
Indicators

Indicator	Acid	Base
Litmus	Red	Blue
Phenolphthalein	Colourless	Pink
Methyl orange	Red	Yellow

Natural indicators: turmeric, onion, clove, vanilla

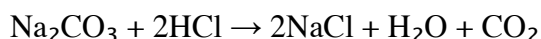
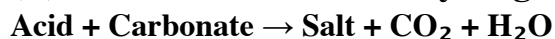
CHEMICAL PROPERTIES (MUST-WRITE REACTIONS)

(A) Acids + Metals



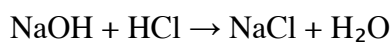
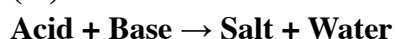
✓ H_2 gas burns with **pop sound**

(B) Acids + Carbonates / Hydrogencarbonates (Bicarbonates)



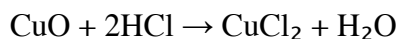
✓ CO_2 turns **limewater milky**

(C) Neutralisation



(D) Acids + Metal Oxides

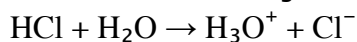




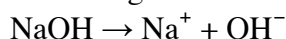
WHAT MAKES ACIDS & BASES WORK?

✓ Acids show acidic nature **only in water**

✓ H^+ ions exist as H_3O^+



✓ Bases give OH^- ions



△ **Dry HCl gas does NOT change dry litmus**

pH SCALE (0–14)

- $\text{pH} < 7 \rightarrow$ Acidic
- $\text{pH} = 7 \rightarrow$ Neutral
- $\text{pH} > 7 \rightarrow$ Basic

Lower pH \rightarrow stronger acid

Higher pH \rightarrow stronger base

Examples:

- Lemon juice ≈ 2
- Curd ≈ 4
- Water = 7
- Milk of magnesia ≈ 10

IMPORTANCE OF pH IN DAILY LIFE

✓ **Stomach:** Excess acid \rightarrow indigestion \rightarrow antacids ($\text{Mg}(\text{OH})_2$)

✓ **Tooth decay:** Starts below pH 5.5 \rightarrow toothpaste is basic

✓ **Soil pH:** Acidic soil treated with lime

✓ **Acid rain:** pH < 5.6 harms aquatic life

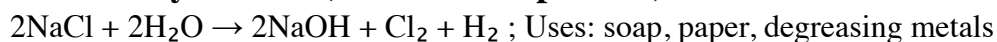
SALTS

- Formed by **neutralisation**
- Nature depends on parent acid & base:

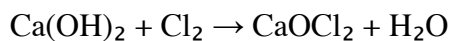
Acid + Base	Nature
Strong + Strong	Neutral
Strong + Weak	Acidic
Weak + Strong	Basic

CHEMICALS FROM COMMON SALT (NaCl)

Sodium Hydroxide (Chlor-alkali process)

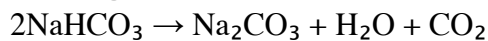


Bleaching Powder – CaOCl_2



Uses: disinfecting water, bleaching

Baking Soda – NaHCO_3



Uses: baking powder, antacid, fire extinguisher

Washing Soda – $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Uses: cleaning agent, glass industry, removes hardness

WATER OF CRYSTALLISATION

- Fixed number of water molecules in salt
- Salts **appear dry**, water is chemically bound

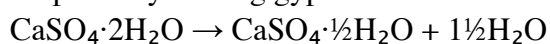
Examples:

- $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
- $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (Gypsum)

PLASTER OF PARIS (POP)

Formula: $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$

Prepared by heating gypsum:



Uses: fracture casts, toys, decoration

△ Store in **moisture-proof container**

BOARD-STYLE QUESTIONS WITH ANSWERS

Q1. Why acids do not show acidic behaviour in dry state?

Because H^+ ions are produced only in aqueous solution.

Q2. What gas is evolved when an acid reacts with a metal?

Hydrogen gas.

Q3. Why does distilled water not conduct electricity?

Because it does not contain ions.

Q4. What is the pH of a neutral solution?

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Q5. Name an antacid and state why it is used.

Magnesium hydroxide; it neutralises excess stomach acid.

Q6. Write one use each of baking soda and washing soda.

Baking soda: antacid

Washing soda: cleaning agent

Q7. Why should POP be stored in moisture-proof container?

It absorbs moisture and changes to gypsum.

Q8. Name the gas that turns limewater milky.

Carbon dioxide.

EXTRA CONCEPTUAL TRAPS

✓ **Strong vs Weak Acids:**

HCl (strong) reacts faster than CH_3COOH (weak) even at same concentration

✓ **Dry HCl \neq Acidic**

Water is compulsory for acidity

✓ **Add acid to water, never water to acid**

(Highly exothermic)

✓ **Baking powder contains tartaric acid**

Prevents bitter taste of Na_2CO_3

✓ **Antacids are weak bases**

Strong bases damage stomach lining

✓ **Water of crystallisation \neq wet salt**



INSTANT-RECALL FACTS

- Acid in vinegar \rightarrow **Acetic acid**
- Acid in ant sting \rightarrow **Methanoic acid**
- Base in toothpaste \rightarrow **Weak base**
- Bleaching powder \rightarrow **CaOCl_2**
- Baking soda \rightarrow **NaHCO_3**
- Washing soda \rightarrow **$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$**