



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

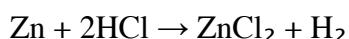
Indicators

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

Natural indicators: turmeric, onion, clove, vanilla

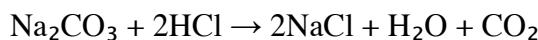
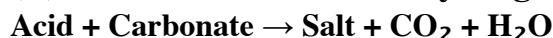
CHEMICAL PROPERTIES (MUST-WRITE REACTIONS)

(A) Acids + Metals



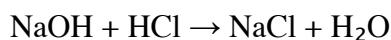
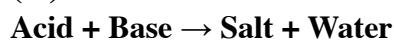
✓ H_2 gas burns with pop sound

(B) Acids + Carbonates / Hydrogencarbonates (Bicarbonates)



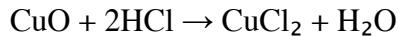
✓ CO_2 turns limewater milky

(C) Neutralisation



(D) Acids + Metal Oxides

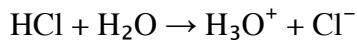




WHAT MAKES ACIDS & BASES WORK?

✓ 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)

- pH < 7 → Acidic
- pH = 7 → Neutral
- pH > 7 → Basic

Lower pH → stronger acid

Higher pH → stronger base

Examples:

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

IMPORTANCE OF pH IN DAILY LIFE

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

✓ **Tooth decay:** Starts below pH 5.5 → 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:

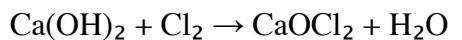
Acid + Base	Nature
Strong + Strong	Neutral
Strong + Weak	Acidic
Weak + Strong	Basic

CHEMICALS FROM COMMON SALT (NaCl)

Sodium Hydroxide (Chlor-alkali process)

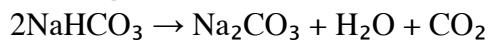
$2\text{NaCl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$; Uses: soap, paper, degreasing metals

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?

7

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 ≠ 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 ≠ wet salt



INSTANT-RECALL FACTS

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