Salt

Introduction to Salt

Riya and Kabir discuss salt, its sources, and how it is formed. Salt can be obtained from sea water through evaporation. It can also be formed by reaction of acids and bases, a process called neutralization. The reaction between an acid and a base produces salt and water.

Definition of Salt

Salt is a compound formed by partial or complete replacement of the hydrogen of an acid by a metal or an electropositive radical.

Chemical Reactions Involving Salt Formation

- i. Hydrochloric Acid and Sodium Hydroxide Reaction:
 - HCl + NaOH \rightarrow NaCl + H₂O
 - Sodium chloride (NaCl) is formed.
- ii. Sulfuric Acid and Sodium Hydroxide Reaction (Partial Replacement):
 - $H_2SO_4 + NaOH \rightarrow NaHSO_4 + H_2O$
 - Sodium hydrogen sulfate (NaHSO₄) is formed.
- iii. Sulfuric Acid and Sodium Hydroxide Reaction (Complete Replacement):
 - $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$
 - Sodium sulfate (Na₂SO₄) is formed.

iv. Nitric Acid and Ammonium Hydroxide Reaction:

- $HNO_3 + NH_4OH \rightarrow NH_4NO_3 + H_2O$
- Ammonium nitrate (NH₄NO₃) is formed.

Analysis of Salt Formulas

Sodium hydrogen sulfate (NaHSO₄): Formed by partial replacement of hydrogen in sulfuric acid by sodium.

Sodium sulfate (Na₂SO₄): Formed by complete replacement of hydrogen in sulfuric acid by two sodium atoms.

Sodium chloride (NaCl): Formed by replacing hydrogen in hydrochloric acid with sodium.

Ammonium nitrate (NH₄NO₃): Formed by replacing hydrogen in nitric acid with an ammonium group.

Properties of Salts

- i. High melting and boiling points: Most salts are solid at room temperature.
- ii. Solubility in water: Many salts dissolve in water.
- iii. Electrical conductivity: Salt solutions conduct electricity.

Common Salts and Their Chemical Formulas

Name of Salt	Chemical Formula	Parent Acid
Sodium chloride (Table salt)	NaCl	Hydrochloric acid (HCl)
Sodium carbonate (Washing soda)	Na ₂ CO ₃	Carbonic acid (H₂CO₃)
Calcium carbonate (Marble, chalk, lime)	CaCO₃	Carbonic acid
Copper sulfate (Blue vitriol)	CuSO₄	Sulfuric acid
Ammonium sulfate	(NH ₄) ₂ SO ₄	Sulfuric acid
Ammonium nitrate	NH₄NO₃	Nitric acid
Calcium phosphate	Ca₃(PO₄)₂	Phosphoric acid

Acid Rain

Rain containing excess acids.

Cause: Air pollutants like carbon dioxide (CO_2) , sulfur dioxide (SO_2) , and nitrogen dioxide (NO_2) dissolve in rainwater, forming:

- Carbonic acid (H₂CO₃)
- Sulfuric acid (H₂SO₄)
- Nitric acid (HNO₃) supply to roots.

Effects of Acid Rain:

Damages buildings and historical monuments (e.g., Taj Mahal deterioration due to acid rain).

Harms plants and animals.

Leads to soil and water pollution.

Conclusion

Salts are essential compounds formed by neutralization reactions.

They have varied properties and uses in daily life.

Acid rain is a harmful consequence of industrial pollution, affecting both the environment and human-made structures.