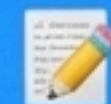


Unit 6: Ionic Equilibrium

The First Definition of Acids and Bases

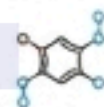
The Arrhenius Concept



Exam Snapshot: Svante Arrhenius



Awarded the **1903 Nobel Prize in Chemistry**.

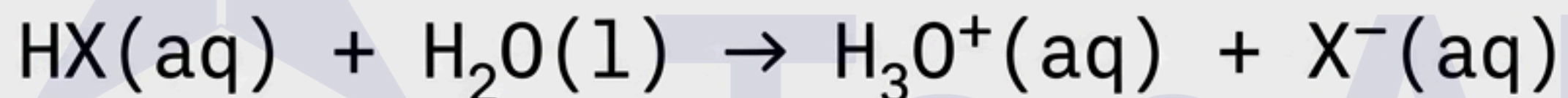
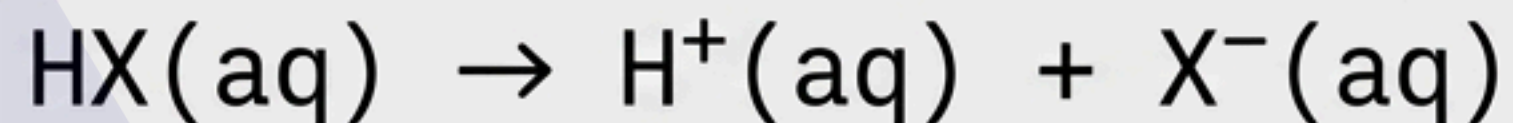


Recognized for his **groundbreaking theory of electrolytic dissociation**.

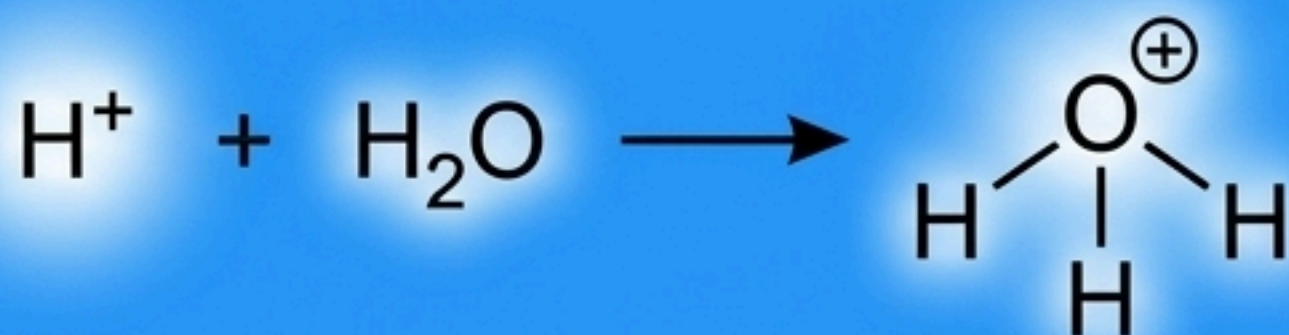
Key Takeaway: Arrhenius realized that certain molecules split into charged ions when dissolved in water. This single insight became the first scientific definition of acids and bases.

Arrhenius Acid Definition

Formula Bank



Explanation Card



A bare proton (H^+) is too reactive to exist freely in aqueous solutions. It instantly bonds to the oxygen atom of a water molecule to form a trigonal pyramidal Hydronium ion (H_3O^+).



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$$E=mc^2$$



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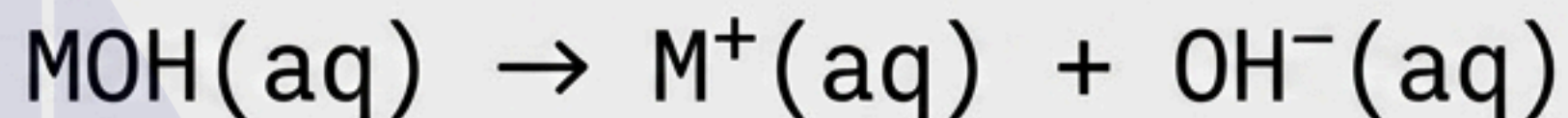
Key Highlights

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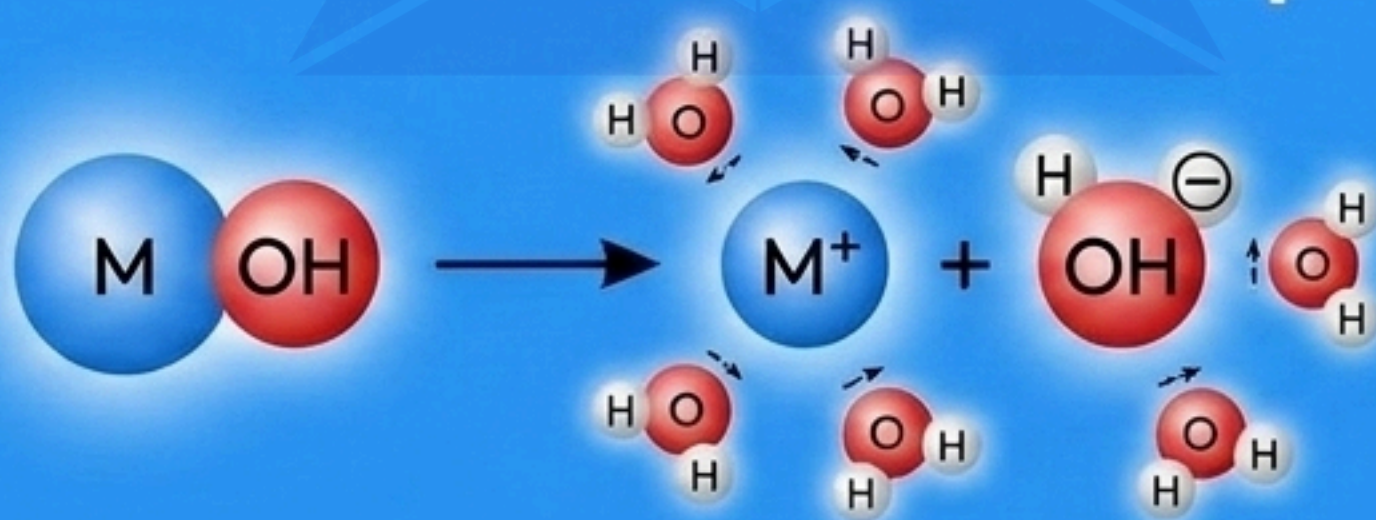


Arrhenius Base Definition

Formula Bank



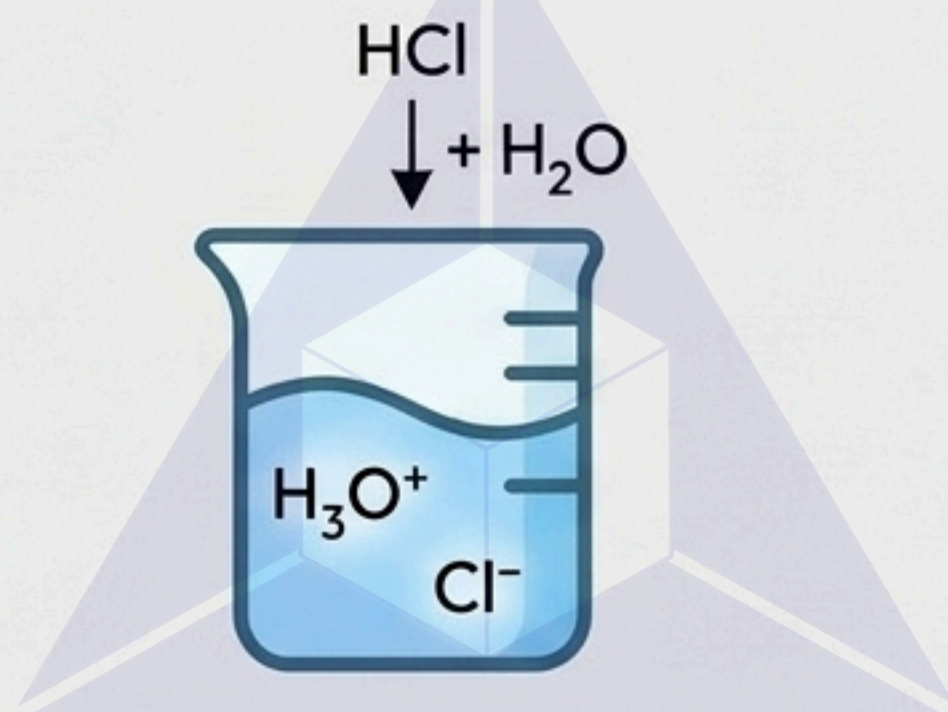
Explanation Card



A base is a substance that produces hydroxyl ions (OH^-) when dissolved in an aqueous medium. Like the proton, the hydroxyl ion also exists in a hydrated form in solution.

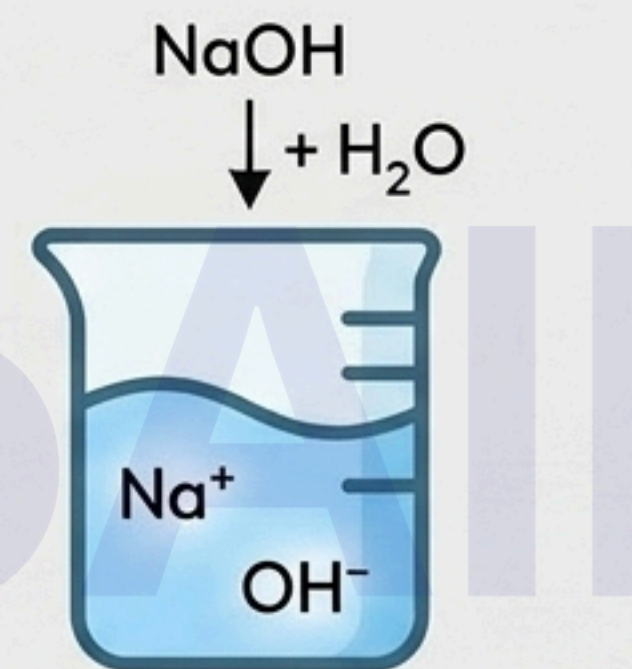
The Theory in Action: Strong Electrolytes

Hydrochloric Acid (HCl)



Dissociates almost completely to donate protons.

Sodium Hydroxide (NaOH)



Dissociates almost completely to yield hydroxyl ions.

Key Takeaway

Water is Non-Negotiable: Both reactions strictly require an aqueous (aq) medium to break the bonds and release their respective ions.

Limitations of the Arrhenius Theory



- Fails entirely in non-aqueous solvents (e.g., benzene, gas phase).
- Cannot explain the basicity of substances like Ammonia (NH_3), which act as bases but do not possess a hydroxyl (OH) group.

⚠ JEE TRAP ALERT

Identify ions produced, not formula appearance.



Just because a molecule has hydrogen (CH_4) doesn't make it an Arrhenius acid. Just because it has an OH group (CH_3OH) doesn't make it a base. It MUST produce H^+ or OH^- ions in an aqueous solution.



You've Learned the Theory.

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