

pH

pH is a measure of the acidity or basicity of a solution. Sorenson introduced pH scale.

It is defined as the negative logarithm of the hydrogen ion concentration.

$$\text{pH} = -\log[\text{H}^+]$$

The pH scale ranges from **0 to 14**, where

pH < 7 → Acidic solution (higher H^+ concentration)

pH = 7 → Neutral solution (e.g., pure water)

pH > 7 → Basic solution (higher OH^- concentration)

pOH and pH Relationship

pOH measures hydroxide ion concentration and is given by

$$\text{pOH} = -\log[\text{OH}^-]$$

The relationship between pH and pOH is

$$\text{pH} + \text{pOH} = 14.$$

pH is temperature-dependent. Typically, pH decreases as temperature increases.

Importance of pH

1. Biological Systems: Enzyme activity and metabolic processes depend on pH balance.
2. Water Quality: Drinking water should have a neutral pH (~7).
3. Agriculture: Soil pH affects plant growth and nutrient absorption.
4. Chemical Reactions: Many reactions occur at specific pH levels.
5. Medicine: Blood pH (~7.4) is critical for human health.