

CLASS 12 CHEMISTRY • CHAPTER 1

1.1 Types of Solutions

Understanding homogeneous mixtures, solvents, solutes, and physical states.

1.1 TYPES OF SOLUTIONS

The Anatomy of a Solution

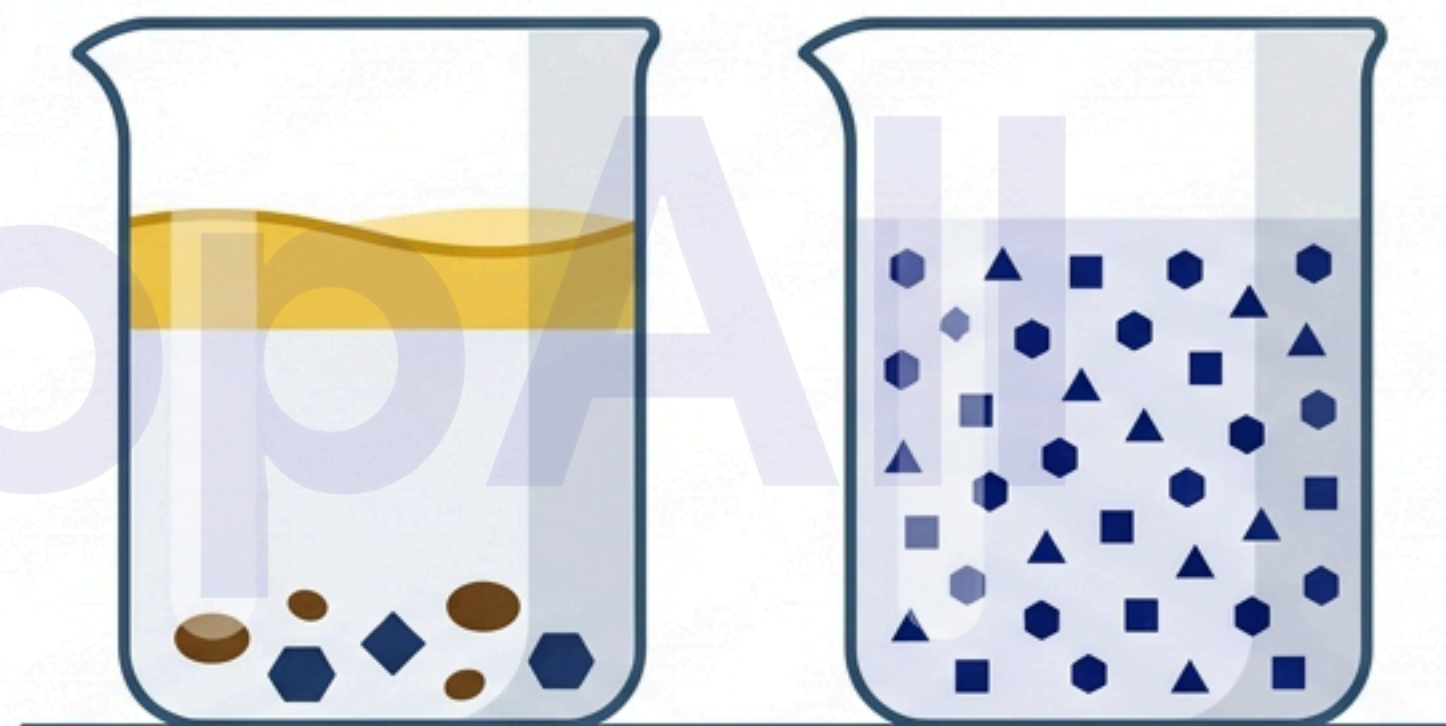


Solutions are homogeneous mixtures of two or more than two components. “Homogeneous” means that its composition and properties are uniform throughout the entire mixture.

Binary Solutions: In this unit, we exclusively study solutions consisting of exactly two components.



If you can see distinct layers or varying properties within the mixture, it is not a true solution.



Heterogeneous

Homogeneous

Solvent vs. Solute

The Solvent

- Quantity: Present in the largest quantity.
- Role: The “Boss” — it dictates the final physical state of the solution.
- Limit: There is always only one solvent in a solution.

The Solute(s)

- Quantity: Present in lesser quantities.
- Role: The substance(s) being dissolved into the solvent.
- Limit: There can be one or multiple solutes in a single solution.

Solute (Minority) + Solvent (Majority) $\rightleftharpoons$ Homogeneous Solution



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



At prep.topall.app

Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Solvent Dictates the State



Solutions are classified into three overarching types based entirely on the physical state of the solvent. The solute can be in any state (solid, liquid, or gas).

[GAS]

Solvent: Gas

Outcome: The final mixture exists purely as a gas.

[LIQUID]

Solvent: Liquid

Outcome: The final mixture exists purely as a liquid. (Most common in biology and chemistry).

[SOLID]

Solvent: Solid

Outcome: The final mixture exists purely as a solid.

THE 9 COMBINATIONS (TABLE 1.1)

Matrix of Binary Solutions



Gaseous Solutions <i>(Solvent is always Gas)</i>	Liquid Solutions <i>(Solvent is always Liquid)</i>	Solid Solutions <i>(Solvent is always Solid)</i>
Gas in Gas: Mixture of O_2 and N_2 gases	Gas in Liquid: O_2 dissolved in water	Gas in Solid: Solution of H_2 in palladium (Pd)
Liquid in Gas: Chloroform mixed with N_2 gas	Liquid in Liquid: Ethanol dissolved in water	Liquid in Solid: Amalgam of mercury (Hg) with sodium (Na)
Solid in Gas: Camphor in N_2 gas	Solid in Liquid: Glucose dissolved in water	Solid in Solid: Copper (Cu) dissolved in gold (Au)

1.1 TYPES OF SOLUTIONS

Chapter Foundation Recap



The Rule of Homogeneity

A true solution is always a homogeneous mixture. Its properties and composition remain perfectly uniform at the macroscopic level, regardless of its physical state.



The Role of the Solvent

The solvent is always the component in the majority. It is the defining matrix of the solution and strictly dictates whether the final solution is a gas, liquid, or solid.



The 9 Combinations

Because a solvent can be a solid, liquid, or gas—and can dissolve a solid, liquid, or gas—there are exactly 9 types of binary solutions, ranging from metal alloys (solid in solid) to breathable air (gas in gas).



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis