



Miscible and Immiscible Liquids

1. Miscible and Immiscible Liquids

Miscible Liquids:

- Two liquids that mix completely and form a uniform solution.
- Cannot be separated by simple physical means.

Examples:

- Milk and water.
- Alcohol and water.
- Vinegar and water.

Immiscible Liquids:

- Two liquids that do not mix and form separate layers.
- The lighter liquid floats on the heavier liquid.

Examples:

- Oil and water.
- Kerosene and water.
- Mercury and water (mercury sinks due to its higher density).

2. Separation of Substances in Liquids

A. Separation of Insoluble Substances

Insoluble substances can be separated by:

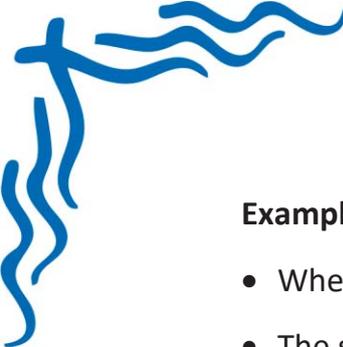
- Sedimentation
- Decantation
- Filtration

Sedimentation and Decantation

Sedimentation:

The process by which insoluble solid particles settle at the bottom of a solid-liquid mixture.





Example:

- When muddy water is left undisturbed, the soil and sand settle at the bottom.
- The settled solid particles are called sediments.

Decantation:

The process of pouring the clear liquid from the top of the container without disturbing the sediments.

Example:

After sedimentation of muddy water, the clear water on top is carefully poured into another container.

Filtration

- Used to separate fine insoluble solid particles from a mixture of solid and liquid.
- The mixture is passed through a filtering device (filter paper, sieve, etc.).
- The solid particles are left behind as residue.
- The clear liquid that passes through is called the filtrate.

Examples:

- Tea preparation: Tea leaves are separated using a strainer.
- Water purification: Water is passed through sand and gravel filters.

B. Separation of Soluble Substances

Soluble substances can be separated by:

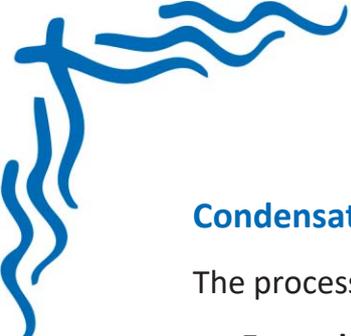
- Evaporation and Condensation
- Distillation

Evaporation and Condensation

Evaporation: The process of heating a solution until the solvent (water) evaporates, leaving the solute behind.

Example:

- Salt or sugar is separated from its solution by evaporation.
- Water evaporates, and the remaining residue is salt or sugar.



Condensation:

The process of cooling the evaporated vapour back into liquid form.

Example: In water cycles, water vapour condenses into rain.

Combination of Evaporation and Condensation:

- Water is heated → evaporates → leaves behind salt.
- The evaporated water is cooled → condenses into liquid water again.
- This helps recover both the solute and solvent.

Distillation:

A process to separate soluble impurities from a solution by heating and cooling.

Steps involved:

- i. The mixture is heated in a round-bottomed flask.
- ii. Water boils and turns into vapour.
- iii. The vapour is passed through a condenser, where it cools and turns into liquid.
- iv. The pure liquid (filtrate) is collected in another flask.
- v. The soluble impurity is left behind in the flask.

Example:

Distillation of saltwater:

- Water evaporates → leaves salt behind.
- The evaporated water is cooled → forms pure water.

Distilled Water:

The purest form of water, free from impurities and minerals.

Uses:

- In car and inverter batteries.
- In laboratories.
- For medical purposes.

Note: Distilled water is not suitable for drinking as it lacks essential minerals.



Key Takeaways

i. Miscible and Immiscible Liquids:

- **Miscible liquids:** Mix completely (milk + water).
- **Immiscible liquids:** Do not mix (oil + water).

ii. Separation of Insoluble Substances:

- **Sedimentation:** Particles settle at the bottom.
- **Decantation:** Pouring the clear liquid from the top.
- **Filtration:** Separates fine solid particles from the liquid.

iii. Separation of Soluble Substances:

- **Evaporation:** Removes the solvent, leaving the solute behind.
- **Condensation:** Vapour cools into a liquid.
- **Distillation:**
 - Separates impurities through heating and cooling.
 - Produces distilled water.

iv. Important Applications:

- **Water purification:** Filtration and distillation.
- **Recovery of salt:** Evaporation.
- **Distilled water:** Used in batteries and medical purposes.

Fun Facts

i. Oil and Water Separation:

- In oil spills, oil floats on water due to its lower density.
- Special materials (like sponges) are used to remove the oil.

ii. Water Cycle:

- **The natural water cycle involves:** Evaporation, condensation, and precipitation.
- This is how nature purifies water.



iii. Everyday Examples of Filtration:

- **Coffee filter:** Separates coffee grounds from the liquid.
- **Water filters:** Remove impurities from tap water.

iv. Perfume Diffusion:

- Perfume diffuses in the air → Gas in gas solution.