TALENT & OLYMPIAD

Separation of Substances

Most of the substances available in the nature are in the mixture form. Mixtures are separated into their constituents as per our requirement. In this chapter we will study about mixtures and some methods of their separation.

Pure Substances: The substances which are made up of only one kind of atoms or molecules are called pure substances. For example gold, silver, copper etc.

Mixture: When two or more than two different substances are mixed up together a mixture is formed. For example air is a mixture of many gasses like nitrogen, oxygen, carbon dioxide and some other gasses.

Constituents of a Mixture: The different substances which are present in a mixture are called constituents of the mixture. For example nitrogen, oxygen, carbon dioxide and many other gasses which are present in the air are constituents of air.

- Homogeneous mixture: A mixture that is uniform in composition is called Homogeneous mixture. Example air, milk, salt water solution etc.
- Heterogeneous mixture: A mixture that is not uniform in composition is called Heterogeneous mixture. Example mixture of air and water, sandy water, orange juice with pulp in it etc.

Why do we separate mixtures?

We separate mixtures for the following purposes:

(a) For removing undesirable constituents

(b) For obtaining useful constituents

(c) For obtaining the pure substances

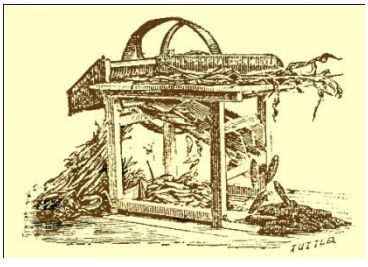
Now let us study some method of separation of mixtures.

Methods of Separation

Some methods of separation has been discussed below:

Threshing: This method is used to separate grains from their stalks. In this method stalks of grains are beaten to separate grains.

Threshing is done by hands, by machines or by cattle.



Winnowing: This method is used to separate husk from grains with the help of wind.

Husk is very light whereas grains are comparatively heavy. So when mixture of husk and grains are slowly fallen down from a height, wind carry away the husk.
Thus husk is separated from the grains.

Hand-picking: By this method, undesirable substances like small pieces of stones are picked out and separated from the grains by hands.

Sieving: This method is used to separate the constituents of a mixture whose particles are of different sizes.

Sedimentation and decantation: By this method insoluble solid particles present in a liquid is separated out. Insoluble solid particles, which are heavier than the liquid, are allowed to settling down at the bottom of the container by keeping the solution undisturbed for sometime. This process is called sedimentation. The liquid is then poured out from the container without disturbing the sediments. This process is known as decantation.

Loading: Fine solid particles have very small weight therefore they do not easily settle down in a liquid. Loading is the process of adding weight to the fine solid particles so that solid particles easily settled down in the liquid.

Filtration: By this method insoluble solid particles present in a liquid are separated using a filter paper.

Evaporation: By this method dissolved solid particles in a liquid are separated out. In this method liquid is evaporated by heating. When all the liquid is evaporated, dissolved particles are left behind as a solid residue.

Distillation: This is the method of separating a liquid from a mixture of liquids having different boiling points. The liquid to be separated is evaporated and its vapor is then collected after it condenses.

Saturated Solution:
A solution in which no more substance can be dissolved at that temperature, is called saturated solution.

Note : Water can dissolves large number of substances, therefore, water is called universal solvent.

Commonly Asked QUESTIONS

Which one of the following is a pure substance?

(a) Iron
(b) Silver
(c) Copper
(d) All of these
(e) None of these

Answer: (d)

Which one of the following methods is used to separate the constituents of a mixture whose particles are of different sizes?

(a) Loading
(b) Evaporation
(c) Sieving
(d) Distillation
(e) None of these

Answer: (c)

SUMMARY

- Pure substance are made up of only one kind atoms or molecules.
- In a mixture different substances are mixed together.
- A mixture having uniform composition is known as homogeneous mixture.
- A mixture having non-uniform composition is known as heterogeneous mixture.
- Threshing, winnowing, hand-picking etc. are the methods of separation.

Self Evaluation TEST

Duration
10 Minutes

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1. The substance which contains only one kind of molecules is called:

(a) Pure substance (b) Mixture
(c) Solution (d) Saturated solution
(e) None of these

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2. Which one of the following statements is correct?

Statement 1: The mixture having uniform composition is an example of homogeneous mixture.
Statement 2: Salt- water solution is an example of homogeneous mixture.

(a) Statement 1 (b) Statement 2
(c) Both statements are correct (d) Both statements are incorrect

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3. Which one of the following methods is used for separating wheat from their husk?

(a) Winnowing (b) Hand - picking
(c) Loading (d) Sieving
(e) None of these

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4. Which one of the following methods is used to add weight to the fine solid particles so that they can easily settle down?

(a) Threshing (b) Distillation
(c) Sieving (d) Loading
(e) None of these

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5. Tea leaves are separated from tea using a tea-strainer. This method of separation is known as:

(a) Distillation (b) Decantation
(c) Filtration (d) Loading
(e) None of these

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6. To obtain salt from sea-water which one of the following methods is used?

(a) Sedimentation (b) Decantation
(c) Filtration (d) Evaporation
(e) None of these

7. **What name has been given to the solution in which no more substance can be dissolved at the given temperature?**

(a) Saturated solution (b) Unsaturated solution
(c) Diluted solution (d) All of these
(e) None of these

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8. **Which one of the following is an example of heterogeneous mixture?**

(a) Milk (b) Blood
(c) Air (d) Muddy water
(e) None of these

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9. **Small particles of stone are separated from grains by the method of :**

(a) Sieving (b) Hand-picking
(c) Sedimentation (d) Decantation
(e) None of these

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10. **Which method is used to separate the mixtures whose component are of different sizes?**

(a) Sieving (b) Winnowing
(c) Threshing (d) Filtration
(e) None of these

Answers – Self Evaluation Test																			
1.	A	**2.**	C	**3.**	A	**4.**	D	**5.**	C	**6.**	D	**7.**	A	**8.**	D	**9.**	B	**10.**	A