

PARAGON CONVENT SCHOOL

SECTOR: 24B, CHANDIGARH

LESSON - 5

SEPARATION OF SUBSTANCES

SUMMARY

- Pure substances are made up of the same type of particles, e.g., gold and copper.
- Mixtures are made of different types of particles, e.g., air and milk.
- Hand picking is used to separate solid mixtures when one of the components is large in size and less in amount.
- Threshing is used to separate grains from dried stalks by hitting them on a hard surface.
- Winnowing is dropping the mixture slowly from a height so that the heavy particles fall down straight but the lighter particles float in air and fall in a separate heap.
- Sieving involves passing a mixture through sieve so that only one component can pass through its pores. The other remains on the sieve.
- Sedimentation is the settling down of big particles in a mixture of a solid and a liquid.
- Decantation is removing the liquid above the sediment in a mixture of a solid and liquid.
- Filtration is passing the mixture of an insoluble solid and a liquid through a filter. The liquid passes through the filter and the solid remains on the filter.
- Evaporation means changing of a liquid to its vapour form when kept in an open container. It is used to separate a soluble solid from its mixture in a liquid.
- Saturated solution is a solution in which no more solid can be dissolved at a given temperature.

Multiple Choice Questions (Page No. 58)

1. (d) 2. (c) 3. (b) 4. (c) 5. (c)

Multiple Choice Questions (Page No. 62)

1. (b) 2. (c) 3. (a) 4. (b) 5. (a&b)

SECTION A

Oral questions

Q1.- Why do we need to separate different components of the mixture?

Ans.- We need to separate different components from a mixture to remove undesirable and harmful substances and obtain useful components.

Q2.- What are immiscible liquids? Give two examples.

Ans.- Liquids which do not mix or dissolve in one another and form separate layers are called immiscible liquids.

Examples - (a) Water and kerosene (b) Water and mustard oil

Q3.- What is meant by filtrate?

Ans.- The clear liquid obtained after filtration is called filtrate.

Q4.- What is meant by residue?

Ans.- The insoluble solids that cannot pass through the filter paper and remain on the filter paper during filtration is called residue.

Science quiz

Q1.- Name the method which is used to obtain a solid substance that is dissolved in a liquid.

Ans.- Evaporation

Q2.- How do we get water from a salt solution?

Ans.- We get water from salt solution through evaporation followed by condensation or through distillation.

Q3.- Give the name of the chemical substance which is used for quick settling down of fine particles of impurities.

Ans.- Alum

Q4.- Name two heterogeneous mixtures.

Ans.- Mixture of water and oil and mixture of chalk in water are examples of heterogeneous mixture.

WORKSHEET

Tick (✓) the correct options

1. (c) 2. (c) 3. (b) 4. (c) 5. (a) 6. (a)

Circle the odd ones. Give reasons for your choice.

1. Hand-picking Evaporation Winnowing Threshing

Ans.- Evaporation → It is used to separate soluble solids dissolved in a liquid. Whereas others are methods of separation of insoluble solids.

2. Sedimentation Decantation Winnowing Condensation

Ans.- Winnowing → It is used to separate the desired substance (food grains) from a mixture of food grains and husk. Whereas others are the methods of separation of insoluble solids.

2. Sand Sugar Chalk powder Water

Ans.- Water → It is a solvent. Others are solid substances.

4. Solute Solvent Solution Sand

Ans.- Sand → It is not a part of solution. Others are used together to form a mixture or solution.

Fill in the blanks

1. different 2. winnowing 3. Sedimentation, decantation
4. Sieving 5. solubility

SECTION B

Multiple Choice Questions

1. (b) 2. (c) 3. (c) 4. (a)

Very Short Answer Questions

Q1.- Which method is used to separate grains from stalk?

Ans.- Threshing.

Q2.- Give an example from our daily life where the processes of sedimentation and decantation are used .

Ans.- Cleaning of muddy water

Q3.- Name any two processes used to separate soluble components from a mixture.

Ans.- Evaporation and condensation

Q4.- Name the methods by which we can separate seeds and pulp from the fruit juice.

Ans.- Filtration

Q5.- What is meant by condensation?

Ans.- The process of changing vapour into its liquid state on cooling is called condensation. E.g., it is used to get water from salt solution.

Q6.- What are the two types of mixtures?

Ans.- Homogeneous and heterogeneous mixtures

Short Answer Questions

Q1.- a) Why is water called the universal solvent?

b) Define solubility. How can it be increased in water?

Ans.- (a) Water is called universal solvent because it can dissolve many substances like sugar and salt.

(b) The extent to which a substance gets dissolved in a liquid is called its solubility. The solubility of a solid solute in water can be increased with the rise in temperature. The solubility of gases get affected by changes in temperature and pressure.

Q2.- Define the terms : a) sedimentation b) decantation.

Ans.- (a) The process of settling down of heavier insoluble particles at the bottom of a liquid is called sedimentation. The heavier insoluble particles at the bottom of the liquid are called sediments.

(b) The process of pouring out a clear liquid from a vessel (after sedimentation) without disturbing the sediment (heavy, insoluble settled particles) is called decantation.

Q3.- Can water dissolve any amount of a substance? Explain.

Ans.- No, water cannot dissolve any amount of a substance. Different substances dissolve to different extent in water at a given temperature. Water can dissolve any substance only upto a limited amount.

Q4.- What is loading?

Ans.- The process of increasing the rate of sedimentation in a suspension by adding some chemicals to it is called loading. E.g., a piece of alum is used to increase the rate of sedimentation in muddy water.

Q5.- What is the difference between filtrate and residue?

Ans.- After filtration, the clear liquid that passes through the filter paper and collects in the beaker kept below the funnel is called a filtrate. The particles that

cannot pass through the filter paper and remain behind on the filter paper is called residue.

Q6.- Soni is helping her mother and accidentally she mixes the arhar dal with gram seeds and rice flour. Her brother helps her in separating the things from each other.

- a) Which method would they have used to separate things?
- b) What value do you learn from Soni's brother?

Ans.- (a) Sieving and hand picking. Sieving to separate dal and gram seeds from rice flour and then hand picking to separate gram seeds.

(b) From Soni's brother we learn to be helpful and caring.

Long Answer Questions

Q1.- a) How will you separate the following: mustard seeds and common salt, chalk powder and water, sand and water, grains and stones.

b) How is fine sand separated from larger particles? Explain.

Ans.- (a) Mustard seeds and powdered common salt are separated by sieving. Chalk powder and water are separated by sedimentation and decantation. Sand and water are separated by sedimentation and decantation. Grains and stones are separated by hand picking.

(b) Fine sand is separated from larger particles through sieving. When the components of a mixture are of different sizes, a sieve can be used to separate them. A sieve is a shallow vessel that has small holes. The size of the holes in the sieve depends on the size of components to be separated.

Q2.- How will you obtain clear water from a sample of muddy water?

Ans.- We can obtain clean water from muddy water by filtration.

Things needed: Muddy water, filter paper, glass rod, iron stand, funnel, two beakers.

Method: Take some muddy water in a beaker. Now, take a circular piece of filter paper and fold it twice. Open it out to make a cone. Place this filter paper cone in a

funnel. Clamp the funnel containing the filter paper on an iron stand. Keep an empty beaker below the funnel. Pour the muddy water slowly into the cone, using a glass rod. The clear water passes through the filter paper and collects in the beaker kept below the funnel. The clear liquid obtained is called filtrate.

Observation: Take out the filter paper cone and open it out. Mud particles can be seen on the filter paper. This is called residue. In filtration, the mud particles (bigger in size) cannot pass through the filter paper and remain behind on the filter paper.

Conclusion: The mixture of mud and water can be separated by the process of filtration.

Q3.- What happens if a saturated solution of a substance and water is : a) heated and b) cooled?

Ans.- (a) The solubility of a saturated solution increases with the rise in temperature. It means, by heating we can dissolve more solute in a saturated solution.

(b) When the saturated solution of a substance is cooled, the solubility of the substance decreases and some of the dissolved substances separates in the form of crystals.

Q4.- a) Why do we need to separate substances from a mixture?

b) Differentiate between homogeneous and heterogeneous mixtures with examples.

Ans.- (a) Separation of substances from a mixture is often necessary for the removal of harmful and undesirable substances and to obtain useful components.

(b) Homogeneous mixture is a mixture in which the constituents are uniformly distributed and each part of the mixture has the same properties.

For example, salt dissolves in water to form a homogeneous mixture. Particles of salt and water are uniformly distributed and each part of the mixture has the same properties.

Heterogeneous mixture is a mixture in which the constituents do not get mixed uniformly and each part of the mixture has different properties.

For example, sand and sawdust form a heterogeneous mixture. Each part of the mixture has different properties.