Subject – Science Class- 7 Topic – chapter-3

(Use Cordova Smart Class Software on the smart board)

A Tick (✓) the correct options.

1. Which process is used for separating wheat from impurities?
   (a) winnowing (b) magnetic separation
   (c) hand-picking (d) threshing ✓
2. Which process is used for separating curd from butter?
   (a) distillation (b) centrifugation (c) sieving ✓ (d) vaporisation
3. Type of homogeneous mixture
   (a) mixture of milk and sugar ✓ (b) mixture of soil and water
   (c) mixture of sand and iron (d) mixture of oil and water
4. Process of converting vapour into liquid is called
   (a) vaporisation (b) condensation (c) distillation ✓ (d) threshing

B Fill in the blanks.

1. Separating out gram from mixture of gram and wheat is called Hand picking
2. Conversion of liquid into vapour is called ~~Vaporisation~~ Evaporation
3. Soft drink is an example of Mixture
4. Filter water is used in making medicines.

C Match the following correctly.

Column A	Column B
1. Sublimation	(a) mixture of sand and iron
2. Sieving	(b) mixture of salt and ammonium chloride
3. Magnetic separation	(c) separating out dirty water from sand
4. Vaporisation	(d) salt from sea water

D Short answer type questions

1. What is lagoon?
2. Explain homogeneous mixtures with examples.
3. What do you mean by filtration? Explain with diagram.
4. Explain the difference between homogenous and heterogeneous mixture.
5. Explain the process of getting pure salt from impure salt with diagram.

E Long answer type questions

1. Write the process of separating sand, salt, iron chips from a mixture.
2. Explain with diagram any four techniques of separation.
3. What is the importance of separation of substances? Explain.

F Activity

Make the following mixtures & separate out the basic components from them.

(a) Camphor + Salt

(b) Water + Baking soda

(c) Salt + Sand

(d) Soil + Iron chips

(e) Water + Mustard oil

ADDITIONAL QUESTIONS FOR PRACTICE

A Tick (✓) the correct options.

1. Threshing can be done by
   - (a) thresher
   - (b) manually
   - (c) both (a) and (b) ✓
   - (d) none of these
2. Stones are separated from sand by
   - (a) winnowing
   - (b) sieving ✓
   - (c) hand-picking
   - (d) threshing
3. Which of the following methods of separation is used to separate tea from tea leaves?
   - (a) centrifugation
   - (b) filtration ✓
   - (c) evaporation
   - (d) hand-picking
4. The impurity that remains on the filter paper is called
   - (a) filtrate
   - (b) residue ✓
   - (c) filter
   - (d) both (a) and (b)
5. Which of the following methods of separation is used to separate two immiscible liquids?
   - (a) filtration
   - (b) distillation ✓
   - (c) evaporation
   - (d) separating funnel

6. Which of the following can be separated by separating funnel?
   (a) kerosene and mustard oil
   (b) water and milk
   (c) water and kerosene ✓
   (d) salt and water

7. During sublimation, solid changes directly into
   (a) liquid on heating
   (b) liquid on cooling
   (c) vapour on heating ✓
   (d) vapour on cooling

B Fill in the blanks.

1. Substances can exist in pure form or in the form of mixture.
2. The substances that are mixed to form a mixture are called components.
3. Homogeneous and Heterogeneous are the two types of mixtures.
4. In heterogeneous mixtures, components are not mixed uniformly.
5. Boiling is an extreme form of evaporation.
6. Kerosene oil is lighter than water.
7. The method of centrifugation is used in dryer of washing machine to separate water from wet clothes.
8. In scrapyards, huge magnets are used to separate iron from scrap materials.

C Short answer questions

1. (a) What are mixtures?
   (b) Name the two types of mixtures.
2. When do we use hand-picking as a method of separation?
3. What is threshing?
4. What is meant by winnowing?
5. Define sedimentation and decantation.
6. Why cannot we use tea strainer to separate mud from water?
7. On what basis does the method of evaporation separate the mixtures?
8. What are the uses of centrifugation? Write any two. 43
9. What type of mixtures are separated by sublimation? 43

D Long answer questions

1. (a) Name the two processes involved in the method of distillation. Act 5
   (b) How will you obtain water from the salt solution? Explain the process.
2. (a) What is centrifugation? On what principle does it depend on?
   (b) How is cream separated from milk during centrifugation?

E Think and answer

Your mother wants to remove pieces of wheat grains from a large quantity of flour. How can she do that quickly?

Chapter 3: Separation of Substances

Multiple Choice Questions **Page No. 37**

1. (b) 2. (d)

Multiple Choice Questions **Page No. 39**

1. (b) 2. (c)

Multiple Choice Questions **Page No. 41**

1. (b) 2. (d)

Multiple Choice Questions **Page No. 43**

1. (a) 2. (c)

Multiple Choice Questions **Page No. 44**

1. (c) 2. (d)

EXERCISE

A. Tick (✓) the correct options.

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

B. Fill in the blanks.

1. hand-picking
2. vaporisation
3. homogeneous mixture
4. Distilled

C. Match the following correctly.

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

D. Short answer type questions

1. Lagoon is a shallow pond where sea water is trapped and allowed to stand for some time.
2. The mixture in which the components are uniformly distributed and each part of the mixture has the same properties is called a homogeneous mixture. For example, salt dissolves in water to form a homogeneous mixture, air is a homogeneous mixture of different gases.
3. The process of separating insoluble substances from a liquid, using a filter, is called filtration.

   We can separate a mixture of mud and water by filtration. For this, take some muddy water in a beaker and place the filter paper cone in a funnel. Now, clamp this funnel on an iron stand and keep an empty beaker below the funnel. Pour the muddy water slowly into the cone using a glass rod (as shown in Fig.).

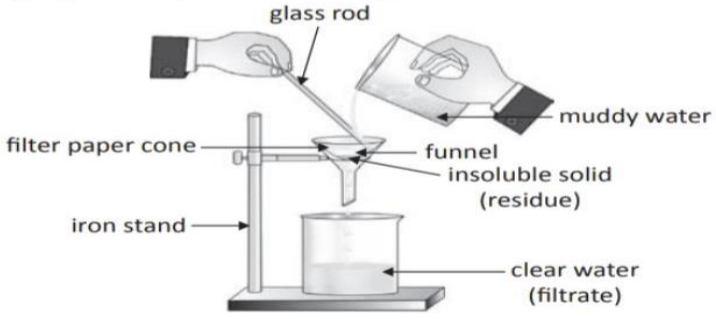

Fig.

We observe that the clear water passes through the filter paper and collects in the beaker kept below the funnel. The clear liquid obtained is called filtrate. The mud particles (being bigger in size) cannot pass through the filter paper and remain on the filter paper. This is called residue.

4.

Homogeneous Mixture	Heterogeneous Mixture
The mixture in which the components are uniformly distributed and each part of the mixture has the same properties is called a homogeneous mixture.	The mixture in which the components do not get mixed uniformly and each part of the mixture has different properties is called a heterogeneous mixture.
For example, salt dissolves in water to form a homogeneous mixture.	For example, water and oil form a heterogeneous mixture.

5. When the impurity in the salt is water insoluble, we can get pure salt from impure salt by first performing the process of filtration and then evaporation.

We will dissolve the impure salt in water. Since, the impurity is water insoluble, it will not dissolve in water. Therefore, we can separate out this impurity by filtration [Fig. (a)]. The filtrate that we get during filtration is then taken in a china dish and heated. The water from the salt solution gets evaporated and the pure salt is left behind in the china dish [Fig. (b)].

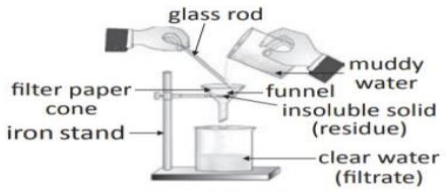

Fig. (a) Filtration

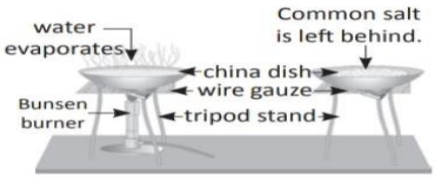

Fig. (b) Evaporation

E. Long answer type questions

1. Sand, salt and iron chips can be separated from a mixture by the processes of magnetic separation, filtration and evaporation.

(i) To separate iron chips from the mixture, we use magnetic separation technique. When we move a magnet through the mixture of sand, salt and iron chips, the iron chips will get attracted to the magnet leaving behind the sand and salt.

(ii) Now, keep the mixture of sand and salt in a beaker and add some water to it. The salt will dissolve in water. Leave the beaker aside for some time. The sand settles down at the bottom. Separate the sand by filtration. The salt solution (i.e., mixture of salt and water) will pass through the filter paper and the residue of sand will remain behind.

(iii) Now, heat the mixture of salt and water. Water evaporates to form water vapour. The salt will remain behind in the beaker.

In this way, sand, salt and iron chips get separated.

2. (i) **Filtration:** The process of separating insoluble substances from a liquid, using a filter, is called filtration.

We can separate a mixture of mud and water by filtration. For this, take some muddy water in a beaker and place the filter paper cone in a funnel. Now, clamp this funnel on an iron stand and keep an empty beaker below the funnel. Pour the muddy water slowly into the cone using a glass rod (as shown in Fig.).

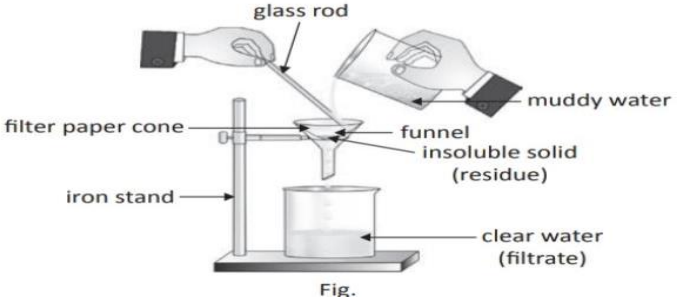

Fig.

Fig.

We observe that the clear water passes through the filter paper and collects in the beaker kept below the funnel. The clear liquid obtained is called filtrate. The mud particles (being bigger in size) cannot pass through the filter paper and remain on the filter paper. This is called residue.

(ii) **Evaporation:** The process during which a liquid changes into vapour on heating (below its boiling point) is called evaporation.

We can separate common salt from water by the process of evaporation.

Dissolve a teaspoonful of salt in about 50 mL of water taken in a china dish. Place the china dish on the tripod stand as shown in Fig. Gently heat the solution of common salt and water taken in the china dish by using a Bunsen burner.

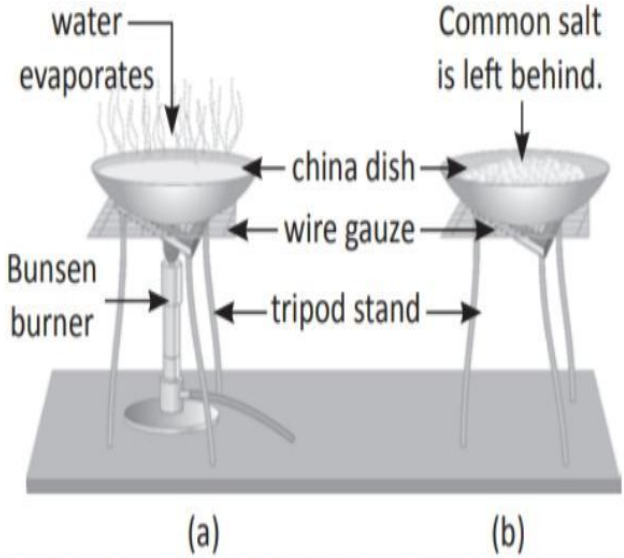

Fig. Separation of common salt dissolved in water by evaporation

We observe that the water present in the salt solution evaporates to form water vapour. When all the water present in the solution of common salt gets evaporated, common salt is left behind in the china dish as a solid.

(iii) **Separating funnel:** When two liquids are immiscible, they can be separated by using a separating funnel. For example, kerosene oil and water can be separated from their mixture with the help of a separating funnel.

The mixture of kerosene and water is allowed to stand for some time in the separating funnel. Kerosene being lighter, forms a layer above water. The water is then drained off in a separate container by opening the stopcock of the separating funnel. Stopcock is closed when the level of kerosene reaches it. Kerosene is left behind in the funnel and can be collected in another beaker.

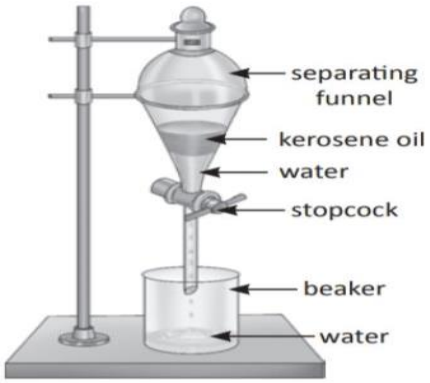

Fig. Separation of water and kerosene oil

(iv) **Magnetic Separation:** This method is used to separate the components of a mixture in which one substance is magnetic in nature. Magnetic substance is attracted towards the magnet.

Various mixtures such as iron-sand mixture, iron-sulphur mixture, iron ores having impurities are separated by this method. When we move a magnet through the mixture of iron filings and sulphur, the iron filings (magnetic) get attracted to the magnet leaving behind sulphur in the container.

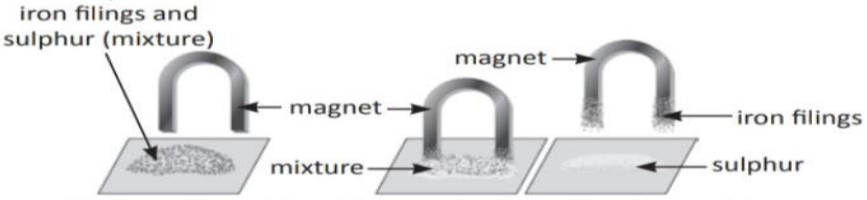

Fig. Separation of iron filings and sulphur from their mixture

3. Separation of substances from their mixtures is important (or necessary) because of the following reasons:

(i) **To remove harmful substances:** The food grains that we usually buy from market contain small pieces of stones and insects. These

pieces of stones and insects are harmful for us. So, we separate them from food grains like wheat, rice and pulses before using them.

(ii) **To obtain useful components:** Crude petroleum is a mixture of various components, such as petrol, diesel, kerosene and petroleum gas. We separate the components of petroleum (a mixture) to obtain these useful components. Kerosene is used as a household fuel, whereas petrol and diesel are used as fuels in vehicles.

(iii) **To remove undesirable substances:** You might have seen your mother preparing tea by adding tea leaves, sugar and milk in the boiling water. After the tea is prepared, she separates the tea leaves from tea by using a tea strainer. She does so in order to separate the used tea leaves (an undesirable component). So, we separate the components of a mixture to remove undesirable substances.

ADDITIONAL QUESTIONS FOR PRACTICE

A. Tick (✓) the correct options.

1. (c) 2. (b) 3. (b) 4. (b) 5. (b)
6. (c) 7. (c)

B. Fill in the blanks.

1. mixture 2. components 3. heterogeneous
4. heterogeneous 5. Boiling 6. lighter
7. centrifugation 8. magnets

C. Short answer questions

1. (a) A mixture is a substance that contains two or more pure substances mixed together in varying proportions.
   (b) The two types of mixtures are homogeneous and heterogeneous mixtures.
2. We use hand-picking as a method of separation when:
   (i) the size, shape or colour of the unwanted substance is different from that of the useful one
   (ii) the quantity of the mixture is small
   (iii) the unwanted substance is present in small quantities
3. The process of separating grains from the stalk by beating them on the ground or by a machine is called threshing.
4. The method of separating heavier and lighter components of a mixture by wind or blowing air is called winnowing.

5. The process of settling down of heavier insoluble particles at the bottom of a liquid is called sedimentation.

   The process of pouring out a clear liquid from a vessel (after sedimentation), without disturbing the sediment (heavy, insoluble settled particles), is called decantation.
6. We cannot use tea strainer to separate mud from water because the particles of mud are too small and can pass through the holes of the tea strainer along with water.
7. The method of evaporation separates the mixtures on the basis of the fact that liquids vaporise easily on heating, whereas solids do not.
8. The uses of centrifugation are as follows (any two):
   (i) It is used to separate butter from cream and cream from milk.
   (ii) It is used in the dryer of washing machines to separate water from wet clothes (drying of wet clothes).
   (iii) It is used in diagnostic laboratories to separate blood components for performing different blood tests.
9. Sublimation method is used to separate a solid that sublimes from its

mixture with a solid that does not sublime.

D. Long answer questions

1. (a) Evaporation and condensation

   (b) We can obtain water from the salt solution by the process of distillation (i.e., evaporation and condensation).

   Pour the salt solution in a kettle and put the lid on it. Place the kettle on the tripod stand and a Bunsen burner below it. Heat the kettle for some time. Steam comes out from the spout of the kettle. Take a frying pan with some ice cubes in it. Hold the frying pan in a slanting position just above the spout of the kettle.

   When steam comes in contact with the frying pan containing ice, it cools and condenses to form droplets of water. These droplets trickle down on the underside of frying pan and then start falling down. When we collect these droplets of water in a glass beaker and taste them, we find that they do not have salty taste. In this way, water get separated from salt through the process of evaporation and condensation.

2. (a) The method of separating finely suspended particles in a liquid by rotating the mixture at a very high speed in a closed container is called centrifugation.

   It is based on the principle that when the spinning machine rotates at a very high speed, it creates a strong force causing the heavier particles of the mixture to settle down faster at the bottom of the liquid leaving behind the lighter particles at the top.

(b) Cream is separated from milk by rotating the milk at a very high speed. For this, the milk is taken in a mixer jar or a food processor jar. On running the mixer, the milk churns due to which milk being heavier in weight separates and settles down, whereas cream being lighter in weight floats on the top of milk and is separated.

E. Think and answer

Pieces of wheat grains can quickly be separated from a large quantity of flour by sieving.