NCERT Exemplar Solutions
Class 6 Science - Chapter 5: Separation of Substances

Multiple Choice Questions

Question 1

Paheli bought some vegetables such as French beans, lady's finger, green chillies, brinjals and potatoes all mixed in a bag. Which of the following methods of separation would be most appropriate for her to separate them?
(a) Winnowing
(b) Sieving
(c) Threshing
(d) Hand picking
Solution: (d) Hand picking
Explanation: Since the vegetables are large in size and easily distinguishable by sight, hand picking is the most appropriate method for separating different types of vegetables.

Question 2

Boojho's grandmother is suffering from diabetes. Her doctor advised her to take 'Lassi' with less fat content. Which of the following methods would be most appropriate for Boojho to prepare it?
(a) Filtration
(b) Decantation
(c) Churning
(d) Winnowing
Solution: (c) Churning
Explanation: Churning is used to separate butter (fat) from curd. After churning, the butter can be removed, leaving behind lassi with reduced fat content.

Question 3

Which of the following mixtures would you be able to separate using the method of filtration?
(a) Oil in water
(b) Cornflakes in milk
(c) Salt in water
(d) Sugar in milk
Solution: (b) Cornflakes in milk
Explanation: Filtration can separate insoluble solids from liquids. Cornflakes are insoluble in milk and can be separated using filter paper, while salt and sugar dissolve in their respective liquids.

Question 4

Which amongst the following methods would be most appropriate to separate grains from bundles of stalks?
(a) Hand picking
(b) Winnowing

(c) Sieving
(d) Threshing
Solution: (d) Threshing
Explanation: Threshing is the process of beating or crushing harvested grain crops to separate grains from the stalks and chaff.

Question 5
Four mixtures are given below: (i) Kidney beans and chick peas
(ii) Pulses and rice
(iii) Rice flakes and corn
(iv) Potato wafers and biscuits
Which of these can be separated by the method of winnowing?
(a) (i) and (ii)
(b) (ii) and (iii)
(c) (i) and (iii)
(d) (iii) and (iv)
Solution: (d) (iii) and (iv)
Explanation: Winnowing separates components based on weight differences. Rice flakes and corn have different weights, as do potato wafers and biscuits. The lighter components are blown away by air while heavier ones fall down.

Question 6
While preparing chapatis, Paheli found that the flour to be used was mixed with wheat grains. Which of the following is the most suitable method to separate the grains from the flour?
(a) Threshing
(b) Sieving
(c) Winnowing
(d) Filtration
Solution: (b) Sieving
Explanation: Sieving separates particles based on size differences. Wheat grains are larger than flour particles and will not pass through the sieve, while flour will pass through.

Question 7
You might have observed the preparation of ghee from butter and cream at home. Which method(s) can be used to separate ghee from the residue?
(i) Evaporation
(ii) Decantation
(iii) Filtration
(iv) Churning
Which of the following combination is the correct answer?
(a) (i) and (ii)
(b) (ii) and (iii)
(c) (ii) and (iv)
(d) (iv) only
Solution: (b) Decantation and filtration

Explanation: When ghee is prepared, it separates from solid residue. Decantation can be used to pour off the liquid ghee, and filtration can remove any remaining solid particles.

Question 8

In an activity, a teacher dissolved a small amount of solid copper sulphate in a tumbler half filled with water. Which method would you use to get back solid copper sulphate from the solution?

(a) Decantation
(b) Evaporation
(c) Sedimentation
(d) Condensation

Solution: (b) Evaporation

Explanation: When a salt solution is evaporated, water evaporates leaving behind the solid salt crystals. This is the most effective method to recover dissolved salts.

Question 9

During summer, Boojho carries water in a transparent plastic bottle to his school. One day he left his bottle in the school. The bottle still had some water left in it. The following day, he observed some water droplets on the inner surface of the empty portion of the bottle. These droplets of water were formed due to:

(a) Boiling and condensation
(b) Evaporation and saturation
(c) Evaporation and condensation
(d) Condensation and saturation

Solution: (c) Evaporation and condensation

Explanation: Due to heat, water evaporates from the liquid surface. The water vapor rises to the cooler upper portion of the bottle where it condenses to form water droplets.

Question 10

Paheli asked for a glass of water from Boojho. He gave her a glass of ice cold water. Paheli observed some water droplets on the outer surface of the glass and asked Boojho how these droplets of water were formed. Which of the following should be Boojho's answer?

(a) Evaporation of water from the glass
(b) Water that seeped out from the glass
(c) Evaporation of atmospheric water vapour
(d) Condensation of atmospheric water vapour

Solution: (d) Condensation of atmospheric water vapour

Explanation: The cold glass surface causes water vapor in the atmosphere to condense and form water droplets on the outer surface of the glass.

Very Short Answer Questions

Question 11

Sheela, Saima and Ravi have to dissolve maximum amount of sugar in the same amount of milk so as to win in a game. Ravi took hot boiling milk while Saima took ice cold milk. Sheela managed to get milk at room temperature. Whom do you think would win the game and why?

Solution: Ravi would win the game because the solubility of solids in liquids increases with temperature.
Explanation:

- Ravi (hot boiling milk): Maximum sugar dissolution
- Sheela (room temperature milk): Moderate sugar dissolution
- Saima (ice cold milk): Minimum sugar dissolution

The higher the temperature, the more sugar can be dissolved in the milk.

Question 12
Fill in the blanks with appropriate words:
(i) Small pieces of stone can be removed from rice by _____.
(ii) _____ are obtained from stalks by threshing.
(iii) Husk from wheat flour is generally removed by _____.
(iv) The process of settling of heavier particles is called _____.
(v) Filtration is helpful in separating an insoluble _____ from a _____.
Solution: (i) hand picking
(ii) grains
(iii) sieving
(iv) sedimentation
(v) solid, liquid

True or False Questions
Question 13
State whether the following statements are true or false:
(a) A mixture of oil and water can be separated by filtration.
(b) Water can be separated from salt by evaporation.
(c) A mixture of wheat grains and wheat flour can be separated by sieving.
(d) A mixture of iron filings and rice flour can be separated by magnet.
(e) A mixture of wheat grains and rice flakes can be separated by winnowing.
(f) A mixture of tea leaves and milk can be separated by decantation.
Solution: (a) **False** - Oil and water can be separated by using a separating funnel, not filtration.
(b) **True** - When salt water is evaporated, water evaporates leaving salt behind.
(c) **True** - Wheat grains are larger than flour particles and can be separated by sieving.
(d) **True** - Iron filings are magnetic and can be separated using a magnet.
(e) **True** - Wheat grains and rice flakes have different weights and can be separated by winnowing.
(f) **True** - After tea settles, the liquid can be decanted leaving tea leaves behind.

Short Answer Questions
Question 14
Name and describe briefly a method which can be helpful in separating a mixture of husk from grains. What is the principle of this method?
Solution: Method: Winnowing

Process: The mixture of grains and husk is allowed to fall from a height in the presence of wind or air current. The lighter husk is carried away by air while the heavier grains fall down and are collected.
Principle: This method is based on the principle that when components of a mixture have different weights, the lighter particles can be blown away by wind while heavier particles fall down due to gravity.

Question 15
Match the mixtures in column I with their method of separation in column II:

Column I	Column II
(a) Oil mixed in water	(i) Sieving
(b) Iron powder mixed with flour	(ii) Hand picking
(c) Salt mixed with water	(iii) Decantation
(d) Lady's finger mixed with French beans	(iv) Magnet
(e) Rice flour mixed with kidney beans	(v) Evaporation

Solution:

Column I	Column II
(a) Oil mixed in water	(iii) Decantation
(b) Iron powder mixed with flour	(iv) Magnet
(c) Salt mixed with water	(v) Evaporation
(d) Lady's finger mixed with French beans	(ii) Hand picking
(e) Rice flour mixed with kidney beans	(i) Sieving

Long Answer Questions
Question 16
Both Sarika and Mohan were asked to make salt solution. Sarika was given a teaspoonful of salt and half a glass of water, whereas Mohan was given twenty teaspoons full of salt and half a glass of water.

1. How would they make salt solutions?
2. Who would be able to prepare saturated solution?

Solution:

1. **Making salt solutions:** Both would add salt to water and stir continuously until the salt dissolves completely to form a clear salt solution.
2. **Saturated solution:** Mohan would be able to prepare a saturated solution. When he adds twenty teaspoons of salt to half a glass of water, at some point the water will not be able to dissolve any more salt, even with continuous stirring. The excess undissolved salt will settle at the bottom, indicating that the solution has reached saturation point.

Question 17
Paheli was feeling thirsty but there was only a pot of water at home which was muddy and unfit for drinking. How do you think Paheli would have made this water fit for drinking if the

following materials were available to her: [Alum, tub, muslin cloth, gas stove, thread, pan and lid]

Solution:

Paheli could purify the muddy water using the following steps:

1. **Initial Filtration:** Filter the muddy water through muslin cloth to remove large particles and debris.
2. **Sedimentation:** Tie a piece of alum with thread and submerge it in the filtered water for some time. Alum helps in settling suspended particles. Leave the water undisturbed to allow impurities to settle at the bottom.
3. **Decantation:** Carefully pour the clear water from the top, leaving the settled impurities at the bottom.
4. **Boiling:** Heat the decanted water in a pan with a lid for about 10 minutes to kill harmful microorganisms.
5. **Final Filtration:** After cooling, filter the boiled water through muslin cloth once more to ensure clarity.

The resulting water would be safe for drinking.

Question 18

Read the story titled "WISE FARMER" and tick the correct option to complete the story:
A farmer was sad/happy to see his healthy wheat crop ready for harvest. He harvested the crops and left it under the sun/rain to dry the stalks. To separate the seeds from the bundles of the stalk he handpicked/threshed them. After gathering the seed grains he wanted to separate the stones and husk from it. His wife winnowed/threshed them to separate the husk and later sieved/handpicked to remove stones from it. She ground the wheat grains and sieved/filtered the flour. The wise farmer and his wife got a good price for the flour. Can you tell why?

Solution: (i) Happy
(ii) Sun
(iii) Threshed
(iv) Winnowed
(v) Handpicked
(vi) Sieved

Explanation: The wise farmer and his wife got a good price for the flour because they used correct separation methods to ensure high quality flour free from impurities like stones, husk, and other unwanted materials.

Question 19

You are provided with a mixture of salt, sand, oil and water. Write the steps involved for the separation of salt, sand and oil from the mixture by giving an activity along with the diagram.

Solution:

Method of Separation:

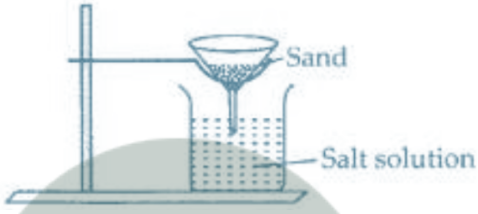
Step 1: Separation of Oil

- Use decantation to separate oil, which floats on top of the mixture
- Carefully pour out the oil layer

Step 2: Separation of Sand

- Filter the remaining mixture through filter paper
- Sand particles (insoluble) will remain on the filter paper
- Salt solution (filtrate) will pass through

Step 3: Separation of Salt



- Evaporate the salt solution by heating

- Water will evaporate leaving behind salt crystals

Result: All three components (oil, sand, and salt) are successfully separated from the mixture.

Question 20

A mixture of iron nails, salt, oil and water is provided to you. Give stepwise methods to separate each component from this mixture.

Solution:

Step-by-step separation process:

Step 1: Separation of Iron Nails

- Use hand picking to remove iron nails directly, or
- Use a magnet to attract and separate the iron nails from the mixture

Step 2: Separation of Oil

- Use decantation method to pour off the oil which floats on the surface, or

- Use a separating funnel for more precise separation

Step 3: Separation of Salt and Water

- Heat the remaining salt-water solution in a pan
- Water will evaporate and can be condensed back if needed
- Salt crystals will remain at the bottom of the pan

Final Result: All four components (iron nails, oil, salt, and water) are successfully separated using different separation techniques based on their physical properties.

Key Learning Points

1. **Hand Picking:** Used for separating large, visible particles
2. **Sieving:** Separates particles of different sizes
3. **Winnowing:** Separates particles of different weights using air
4. **Filtration:** Separates insoluble solids from liquids
5. **Evaporation:** Separates dissolved solids from liquids
6. **Decantation:** Separates liquids of different densities
7. **Magnetic Separation:** Separates magnetic materials from non-magnetic ones
8. **Sedimentation:** Allows heavier particles to settle down

The choice of separation method depends on the physical properties of the components in the mixture.