

CHAPTER 2

IS MATTER AROUND US PURE?

VEDA
ACADEMY

CLASS 9TH

NCERT EXERCISE AND SOLUTIONS - SCIENCE



Q. 1. Which separation techniques will you apply for the separation of the following?

- (a) Sodium chloride from its solution in water
- (b) Ammonium chloride from a mixture containing sodium chloride and ammonium chloride
- (c) Small pieces of metal in the engine oil of a car
- (d) Different pigments from an extract of flower petals
- (e) Butter from curd
- (f) Oil from water
- (g) Tea leaves from tea
- (h) Iron pins from sand
- (i) Wheat grains from husk
- (j) Fine mud particles suspended in water

ANSWER:-

- (a) Evaporation
- (b) Sublimation
- (c) Filtration
- (d) Chromatography
- (e) Centrifugation
- (f) Separating funnel
- (g) Filtration
- (h) Magnetic separation
- (i) Winnowing/ sedimentation
- (j) Decantation and filtration

Q. 2. Write the steps you would use for making tea. Use the words solution, solvent, solute, dissolve, soluble, insoluble, filtrate and residue.

ANSWER:-

1. Fill a container with a cup of water and heat it.
2. Add sugar (solvent) and continue heating until the sugar fully dissolves.



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3. This forms a solution of water and sugar.
4. Sugar is completely soluble in water.
5. Add half a teaspoon of tea leaves, which are insoluble in water.
6. Boil the mixture, then add milk, which is soluble in water, and boil again.
7. Filter the tea using a strainer; the liquid tea collected in the cup is the filtrate, while the tea leaves left in the strainer are the residue.

Q. 3. Pragma tested the solubility of three different substances at different temperatures and collected the data as given below (results are given in the following table, as grams of substance dissolved in 100 grams of water to form a saturated solution).

Substance Dissolved	Temperature in K				
	283	293	313	333	353
Potassium nitrate	21	32	62	106	167
Sodium chloride	36	36	36	37	37
Potassium chloride	35	35	40	46	54
Ammonium chloride	24	37	41	55	66

- (a) What mass of potassium nitrate would be needed to produce a saturated solution of potassium nitrate in 50 grams of water at 313 K?
- (b) Pragma makes a saturated solution of potassium chloride in water at 353 K and leaves the solution to cool at room temperature. What would she observe as the solution cools? Explain.
- (c) Find the solubility of each salt at 293 K. Which salt has the highest solubility at this temperature?
- (d) What is the effect of change of temperature on the solubility of a salt?

ANSWER:-

- (a) Mass of KNO_3 to produce a saturated solution water at 313 K = 62 g
 \therefore Mass of KNO_3 in 50 grams of water at 313 K = $(62.0 \times 50) / 100 = 31.0$ g
- (b) Crystals of potassium chloride will be obtained on cooling the saturated solution.
- (c) Solubility of each salt at 293 K is
 - (i) Potassium nitrate \rightarrow 32 g
 - (ii) Sodium chloride \rightarrow 36 g
 - (iii) Potassium chloride \rightarrow 35 g
 - (iv) Ammonium chloride \rightarrow 37 g
 Ammonium chloride has the highest solubility at this temperature.
- (d) On increasing the temperature, solubility of a salt increases.

Q. 4. Explain the following giving examples.

- (a) Saturated solution
- (b) Pure substance
- (c) Colloid



(d) Suspension**ANSWER:-**

- (a) **Saturated solution:** A solution in which no more solute can dissolve at a given temperature is known as a saturated solution.
- (b) **Pure substance:** A pure substance consists of only one type of particle, such as gold or silver.
- (c) **Colloid:** A colloid is a solution where the solute particles are larger than those in a true solution. These particles are not visible to the naked eye and remain stable, like ink or blood.
- (d) **Suspension:** A heterogeneous mixture in which solute particles are large enough to settle over time, such as chalk-water or paints.

Q. 5. Classify each of the following as a homogeneous or heterogeneous mixture. soda water, wood, air, soil, vinegar, filtered tea.

ANSWER:-

Homogeneous: Soda water, vinegar, filtered tea.

Heterogeneous: Wood, air, soil.

Q. 6. How would you confirm that a colourless liquid given to you is pure water?

ANSWER:-

The boiling point of a colourless liquid can help identify its purity. If the liquid boils at 100°C under atmospheric pressure, it is pure water, as pure substances have specific, unchanging melting and boiling points.

Q. 7. Which of the following materials fall in the category of a “pure substance”?

- (a) Ice
- (b) Milk
- (c) Iron
- (d) Hydrochloric acid
- (e) Calcium oxide
- (f) Mercury
- (g) Brick
- (h) Wood
- (i) Air

ANSWER:-

Pure substances are Ice, iron, hydrochloric acid, calcium oxide and mercury.

Q. 8. Identify the solutions among the following mixtures.

- (a) Soil



- (b) Sea water
- (c) Air
- (d) Coal
- (e) Soda water

ANSWER:-

Solution is soda water.

Q. 9. Which of the following will show “Tyndall effect”?

- (a) Salt solution
- (b) Milk
- (c) Copper sulphate solution
- (d) Starch solution

ANSWER:-

Milk and starch solution.

Q. 10. Classify the following into elements, compounds and mixtures.

- (a) Sodium
- (b) Soil
- (c) Sugar solution
- (d) Silver
- (e) Calcium carbonate
- (f) Tin
- (g) Silicon
- (h) Coal
- (i) Air
- (j) Soap
- (k) Methane
- (l) Carbon dioxide
- (m) Blood

ANSWER:-

Elements	Compounds	Mixtures
Sodium	Calcium carbonate	Sugar solution
Silver	Methane	Soil
Tin	Carbon dioxide	Coal
Silicon	Soap	Air, Blood



Q. 11. Which of the following are chemical changes?

- (a) Growth of a plant
- (b) Rusting of iron
- (c) Mixing of iron filings and sand
- (d) Cooking of food
- (e) Digestion of food
- (f) Freezing of water
- (g) Burning of a candle

ANSWER:-

Chemical changes are:

- (a) Growth of a plant
- (b) Rusting of iron
- (c) Cooking of food
- (d) Digestion of food
- (e) Burning of a candle

