SpeedLabs

Science

CBSE 9th

TEEVRA EDUTECH PVT. LTD.

Is Matter around Us Pure Exercise

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.

Ans. (a) Sodium chloride from its solution in water → Evaporation

(b) Ammonium chloride from a mixture containing sodium chloride and ammonium chloride → Sublimation

(c) Small pieces of metal in the engine oil of a car → Centrifugation or filtration or decantation

(d) Different pigments from an extract of flower petals → Chromatography

(e) Butter from curd → Centrifugation

(f) Oil from water → Using separating funnel

(g) Tea leaves from tea → Filtration

(h) Iron pins from sand → Magnetic separation

(i) Wheat grains from husk → Winnowing

(j) Fine mud particles suspended in water → Centrifugation

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

Ans. First, water is taken as a solvent in a saucer pan. This water (solvent) is allowed to boil. During heating, milk and tea leaves are added to the solvent as solutes. They form a solution. Then, the solution is poured through a strainer. The insoluble part of the solution remains on the strainer as residue. Sugar is added tothe filtrate, which dissolves in the filtrate. The resulting solution is the required tea.

3. Pragya 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) Pragya 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. What salt has the highest solubility at this temperature?

(d) What is the effect of change of temperature on the solubility of a salt?

Ans. (a) At 313 K, 62 grams of Potassium nitrate dissolved in 100 grams of water. So to produce a saturated solution of potassium nitrate in 50 grams of water, we need 62 x 50 = 31 grams of potassium nitrate 100

(b) Some soluble potassium chloride will separate out in the form of crystals at room temperature because the solubility of potassium chloride will decrease with decrease in temperature.(c)

(i) Solubility of Potassium nitrate at 293 K is 32 grams.

(ii) Solubility of Sodium chloride at 293 K is 36 grams.

(iii)Solubility of Potassium chloride at 293 K is 35 grams.

(iv)Solubility of Ammonium chloride at 293 K is 37 grams.

(v) The solubility of Ammonium chloride is highest at this temperature.

(d) The solubility of salt increases with increase in temperature.

4. Explain the following giving examples.

(a) Saturated solution (b) Pure substance

(c) Colloid (d) Suspension

Ans. (a) Saturated solution

A saturated solution is a solution in which the maximum amount of solute has been dissolved at a given temperature. The solution cannot dissolve beyond that amount of solute at that temperature. Any more solute added will settle down at the bottom of the container as a precipitate.

Suppose 500 g of a solvent can dissolve a maximum of 150 g of a particular solute at 40°C. Then, the solution obtained by dissolving 150 g of that solute in 500 g of that solvent at 300 K is said to be a saturated solution at 300 K.

(b) Pure substance

A pure substance is a substance consisting of a single type of particles i.e., all constituent particles of the substance have the same chemical properties.

For example, salt, sugar, water are pure substances.

(c) Colloid

A colloid is a heterogeneous mixture. The size of the solutes in this mixture is so small that they cannot be seen individually with naked eyes, and seems to be distributed uniformly throughout the mixture. The solute particles do not settle down when the mixture is left undisturbed. This means that colloids are quite stable. Colloids cannot be separated by the process of filtration. They can be separated by centrifugation. Colloids show the Tyndall effect. For example, milk, butter, foam, fog, smoke, clouds.

(d) Suspension

Suspensions are heterogeneous mixtures. The solute particles in this mixture remain suspended throughout the bulk of the medium. The particles can be seen with naked eyes. Suspension shows the Tyndall effect. The solute particles settle down when the mixture is left undisturbed. This means that suspensions are unstable. Suspensions can be separated by the method of filtration. For example, mixtures of chalk powder and water, wheat flour and water.

5. Classify each of the following as a homogeneous or heterogeneous mixture.

Soda water, wood, air, soil, vinegar, filtered tea

Ans. Homogeneous mixtures. Soda water, air, vinegar

Heterogeneous mixtures. Wood, soil, filtered tea

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

Ans. Every liquid has a characteristic boiling point. Pure water has a boiling point of 100°C (373 K) at 1 atmospheric pressure. If the given colourless liquid boils at even slightly above or below 100°C, then the given liquid is not pure water. It must boil at sharp 100°C. Thus, by observing the boiling point, we can confirm whether a given colourless liquid is pure water or not.

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

Ans. The following materials fall in the category of a “pure substance”.

(a) Ice (c) Iron (d) Hydrochloric acid

(e) Calcium oxide (f) Mercury

8. Identify the solutions among the following mixtures.

(a) Soil (b) Sea water (c) Air

(d) Coal (e) Soda water

Ans. The following mixtures are solutions.

(b) Sea water (c) Air (e) Soda water

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

(a) Salt solution (b) Milk

(c) Copper sulphate solution (d) Starch solution

Ans. Milk and starch solution will show the “Tyndall effect”.

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

Ans.

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

11. Which of the following are chemical changes?

(a) Growth of a plant (b) Rusting of iron

(c) Mixing of iron fillings and sand (d) Cooking of food

(e) Digestion of food (f) Freezing of water

(g) Burning of candle

Ans. The following changes are chemical changes.

(a) Growth of a plant

(b) Rusting of iron

(d) Cooking of food

(e) Digestion of food

(g) Burning of candle