

Board – CBSE

Class –9th

Topic – Is Matter Around Us Pure

1. What is meant by a pure substance?

Ans. A pure substance is the one that consists of a single type of particles, i.e., all constituent particles of the substance have the same chemical nature. Pure substances can be classified as elements or compounds.

2. List the points of differences between homogeneous and heterogeneous mixtures.

Ans. A homogeneous mixture is a mixture having a uniform composition throughout the mixture. For example. salt in water, sugar in water, copper sulphate in water

A heterogeneous mixture is a mixture having a non-uniform composition throughout the mixture. For example. sodium chloride and iron fillings, salt and sulphur, oil and water

3. Differentiate between homogeneous and heterogeneous mixtures with examples.

Ans. A homogeneous mixture is a mixture having a uniform composition throughout the mixture. For example, mixtures of salt in water, sugar in water, copper sulphate in water, iodine in alcohol, alloy, and air have uniform compositions throughout the mixtures. Cannot be separated by simple physical means.

On the other hand, a heterogeneous mixture is a mixture having a non-uniform composition throughout the mixture. For example, composition of mixtures of sodium chloride and iron fillings, salt and sulphur, oil and water, chalk powder in water, wheat flour in water, milk and water are not uniform throughout the mixtures. Constituents can be separated by simple physical means.

4. How are sol, solution and suspension different from each other?

Ans. Sol is a heterogeneous mixture. In this mixture, the solute particles are so small that they cannot be seen with the naked eye. Also, they seem to be spread uniformly throughout the mixture. The Tyndall effect is observed in this mixture. For example. milk of magnesia, mud

Solution is a homogeneous mixture. In this mixture, the solute particles dissolve and spread uniformly throughout the mixture. The Tyndall effect is not observed in this mixture. For example. salt in water, sugar in water, iodine in alcohol, alloy

Suspensions are heterogeneous mixtures. In this mixture, the solute particles are visible to the naked eye, and remain suspended throughout the bulk of the medium. The Tyndall effect is observed in this mixture. For example, chalk powder and water, wheat flour and water.

5. To make a saturated solution, 36 g of sodium chloride is dissolved in 100 g of water at 293 K. Find its concentration at this temperature.

Ans. Mass of solute (sodium chloride) = 36 g (Given)

Mass of solvent (water) = 100 g (Given)

Then, mass of solution = Mass of solute + Mass of solvent

$$= (36 + 100) \text{ g}$$

$$= 136 \text{ g}$$

Therefore, concentration (mass by mass percentage) of the solution

$$= \frac{\text{Mass of solute}}{\text{Mass of solvent}} \times 100$$

$$= \frac{36}{136} \times 100\% = 26.47\%$$

6. How will you separate a mixture containing kerosene and petrol (difference in their boiling points is more than 25°C), which are miscible with each other?

Ans. A technique known as simple distillation can be used to separate the mixture of miscible liquids, where the difference in boiling point is more than 25°C, to name a few – kerosene and petrol. The whole concept is established on the volatility property of substances. The following are the various steps in the process of simple distillation:

- (a) In a distillation flask, take the mixture.
 - (b) Treat the mixture with heat while a thermometer is affixed.
 - (c) We observe evaporation of petrol as it has a low boiling point.
 1. As the vapours advance towards the condenser, a dip in the temperature causes condensation of the vapours into liquid which can be accumulated in a flask.
 - (e) We notice that kerosene tends to remain in the flask in a liquid state due to comparatively higher boiling point.
 - (f) Consequently, the liquids are separated.
7. Name the techniques used to separate the following:

2. Butter from curd.
3. Salt from seawater
4. Camphor from salt

Ans. 1. A process known as centrifugation is used to separate butter from curd. The process is governed on the principle of density.

2. We can use the simple evaporation technique to separate salt from seawater. Distillation causes water to evaporate leaving solid salt behind, hence the production of salt.

3. Sublimation can be used to separate camphor from salt as during the phase change, camphor does not undergo a liquid phase.

8. Classify the following as chemical or physical changes.

- Cutting of trees
- Melting of butter in a pan
- Rusting of almirah
- Boiling of water to form steam
- Passing of electric current through water, and water breaking down into hydrogen and oxygen gas
- Dissolving common salt in water
- Making a fruit salad with raw fruits
- Burning of paper and wood

Ans. • Cutting of trees → Physical change

• Melting of butter in a pan → Physical change

• Rusting of almirah → Chemical change

• Boiling of water to form steam → Physical change

• Passing of electric current through water, and water breaking down into hydrogen and oxygen gas → Chemical change

• Dissolving common salt in water → Physical change

• Making a fruit salad with raw fruits → Physical change

• Burning of paper and wood → Chemical change

9. Try segregating the things around you as pure substances or mixtures.

Ans. Pure substance- Water, salt, sugar

Mixture- Saltwater, soil, wood, air, cold drink, rubber, sponge, fog, milk, butter, clothes, food

10. What type of mixtures is separated by the technique of crystallization?

Ans. By the technique of crystallization, pure solids are separated from impurities. For example, salt obtained from the sea is separated from impurities; crystals of alum (Phitkari) are separated from impure samples.