

Important Questions for CBSE Class 9 Science Chapter 2 – Is Matter Around Us Pure

1 Marks Questions

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

Ans. You can do it by yourself like try mixing chalk powder and water then separate them.

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

soda water, wood, air, soil, vinegar, filtered tea.

Ans.

Homogeneous mixture	Heterogeneous mixture
Soda water, air, vinegar, filtered tea.	Wood, soil.

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

Ans. If we allow the given liquid to evaporate by heating it as in a clean china dish so:

- any residue remaining in the china dish will indicate that water is not pure but contains impurities.
 - no residue in china dish will indicate that water is pure.
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4. 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. Pure substances are: ice, iron, hydrochloric acid, calcium oxide, mercury.

5. Identify the solutions among the following mixtures.

- (a) Soil**
- (b) Sea water**
- (c) Air**
- (d) Coal**
- (e) Soda water.**

Ans. Sea water, air and soda water are solutions.

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

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

Ans. Milk and starch solution have larger particles since they are not true solutions so they will show Tyndall effect.

7. 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	Mixture
Sodium	Calcium	Soil
Silver	carbonate	Sugar
Silicon	Soap	solution
Tin	Methane	Air
Coal	Carbon dioxide	Blood

8. 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.

Ans. Rusting of iron, cooking of food, digestion of food, burning of a candle are chemical changes.

9. Which of the following solution scatter light?

(a) colloidal solution

(b) suspension

(c) both

(d) none

Ans. (c) both

2 Marks Questions

1. What is meant by a substance?

Ans. Substance can be defined as that kind of matter where constituent particles cannot be separated from each other by any physical process since they are all similar in chemical properties.

2. 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. We can separate a mixture containing kerosene and petrol by distillation technique since difference in their boiling points is more than 25°C . So through distillation we can get them separated.

3. Name the technique to separate

- (i) butter from curd,
- (ii) salt from sea-water,
- (iii) camphor from salt.

Ans. (i) centrifugation method.
(ii) evaporation method.
(iii) sublimation method.

4. What type of mixtures are separated by the technique of crystallisation?

Ans. From impure samples of solids, pure solid crystals can be obtained by the method of crystallization for eg to obtain pure sugar from impure sample of the same.

5. What is a mixture? What are its various types?

Ans. A mixture is constituted by more than one substance (element/or compound) mixed in any proportion. They are of two types:

- (a) Homogenous mixture
 - (b) Heterogeneous mixture
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6. Define solute, solvent and solution?

Ans. Solute: - It is the component of the solution which is added to the solvent.

Solvent: - It is the component of the solution to which the solute is added or it dissolves the solute.

Solution: - It is constituted by solute and solvent.

For e.g. solution of NaCl- has NaCl as solute and water as solvent.

7. What is a solution? What are the properties of solution?

Ans. A solution is a homogenous mixture of two or more substance. The various properties of solution are: -

(a) It is a homogenous mixture.

(b) The particles of a solution are smaller than 1nm and hence cannot be seen by naked eyes.

(c) It does not scatter the beam of light passing through it.

(d) The component of solution cannot be separated from each other by the process of filtration.

8. Differentiate between elements and compounds.

Ans.

Elements	Compounds
It cannot be broken down into simpler substances.	It can be broken down into elements by chemical or electrochemical reactions.
It is made up of only one kind of atoms.	It is made up of more than one kind of atoms.
For eg. Copper, oxygen, iron etc.	For eg. Water, methane, sugar etc.

9. What is tyndall effect? Which kinds of solution show it?

Ans. The scattering of a beam of light by particles of solution when light is passed through it is called tyndall effect. Those solutions where size of the particle is very small for e.g. colloidal solution shows tyndall effect.

10. Differentiate between homogeneous and heterogeneous mixture?

Ans.

	Homogeneous mixture		Heterogeneous mixture
1)	They have a uniform composition of their constituents.	1)	They have a non-uniform composition of their constituents.
2)	For e.g. sugar in water, Sulphur in CS ₂ etc.	2)	For e.g. sand, self, sugar and wood etc.

11. What is centrifugation? Where it is used?

Ans. Centrifugation is a technique used for separation of constituents of mixture and is based upon the principle that denser particles stay at bottom and lighter particles stays at the top when spun rapidly. It is used separate cream from milk.

3 Marks Questions

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

Ans.

Homogeneous mixture	Heterogeneous mixture
(i) They have uniform composition throughout the mixture.	(i) They do not have a uniform composition throughout the mixture.
(ii) Their components cannot be separated by filtration but separation takes place by distillation method only.	(ii) Their components can be separated by filtration method.
(iii) examples are salt & water mixture, sugar & water mixture.	(iii) examples are a mixture of Sulphur powder and iron fillings, kerosene oil and water.

2. Differentiate between homogeneous and heterogeneous mixtures with examples.

Ans.

Homogeneous mixture	Heterogeneous mixture
(i) They have uniform composition throughout the mixture.	(i) They do not have a uniform composition throughout the mixture.
(ii) Their components cannot be separated by filtration but separation takes place by distillation method only.	(ii) Their components can be separated by filtration method.
(iii) examples are salt & water mixture, sugar & water mixture.	(iii) examples are a mixture of Sulphur powder and iron fillings, kerosene oil and water.

3. How are solution and suspension different from each other?

Ans.

Sol=kind of colloidal solution	Solution= true solution	Suspension
(i) It has dispersed phase and dispersion phase. (ii) It appears homogeneous but is heterogeneous. (iii) Particles are visible with the help of electron microscope. (iv) Particle size is 10^{-7} to 10^{-5} cm. Eg. gold sol, milk of magnesia etc	(i) It has soluble solute and solvent phase. (ii) It is homogeneous. (iii) Particles are not visible by all means. (iv) Particle size is less than 10^{-7} cm. Eg sugar solution, salt solution	(i) It has insoluble solute suspended in the solvent medium. (ii) It is heterogeneous. (iii) Particles are visible by naked eyes. (iv) Particles size is more than 10^{-5} cm Eg muddy river water, dust storm.

4. 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 sodium chloride (solute) = 36 g

Mass of water (solvent) = 100 g

Mass of solution = 36 + 100 = 136 g

Therefore, concentration percentage = mass of solute/mass of solution $\times 100$

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

$$= 26.47 \%$$

5. 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 the water breaking down into hydrogen and oxygen gases,
- dissolving common salt in water,
- making a fruit salad with raw fruits, and
- burning of paper and wood.

Ans. cutting of trees = chemical 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 the water breaking down into hydrogen and oxygen gases = 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

6. 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) Evaporation method

(b) Sublimation method

(c) by heating and then after filtration

(d) by Chromatography

(e) by method of centrifugation

(f) by using separating funnel

(g) by filtration method using strainer

(h) with the help of a magnet

(i) by winnowing

(j) by centrifugation

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

Ans. Take more amount of solvent (water) in a pan and after heating it add little amount of solute (sugar) to the solvent. Solute will dissolve completely in the solvent forming true solution, then add tea leaves that are insoluble along with another soluble liquid milk. After boiling allow filtration with a sieve so the filtrate you obtain is tea while the residue has tea leaves that are thrown away.

8. 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).

(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?

Substance Dissolved	Temperature in K				
	283	293	313	333	353
	Solubility				
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

(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?

Ans. (a) At 313 K temperature the amount of potassium nitrate required was 62g in 100ml of water so in 50g water we will need to dissolve potassium nitrate. $= 62 \times 50 / 100 = 31\text{g}$

(b) At 373K saturated solution preparation needs 54g potassium nitrate and at room temperature (293 K) saturation solution formation occurs with 35g potassium nitrate hence $= 54 - 35 = 19\text{g}$ potassium nitrate will precipitate out as undissolved salt.

(c) Solubilities are (in 100 mg of water) 32,36,35,37 respectively for the mentioned salts and the highest solubility is of ammonium chloride at this temperature.

(d) Solubility of salts is directly proportional to the temperature i.e. if temperature increases then solubility will increase and if the temperature decreases solubility will also decrease.

9. Explain the following giving examples.

- (a) saturated solution**
- (b) pure substance**
- (c) colloid**
- (d) suspension**

Ans. (a) saturated solution: It is a solution in which no more solute particles can be dissolved at a particular temperature.

(b) pure substance: Such substance that has a uniform composition i.e. has particles with identical properties is called pure substance eg sugar, salt, water, nitrogen etc.

(c) colloid: It is a kind of heterogeneous mixture/solution in which particle size is between 1nm and 1000nm. Colloids have dispersion medium and dispersed phase.eg smoke, milk, shaving cream, jelly, cheese etc.

(d) suspension: It is a kind of heterogeneous mixture in which insoluble solid particles remain suspended in the medium and dispersion particles are visible to the unaided eyes.eg muddy river water, chalk powder in water, dust storm, sand in water etc.

10. Write a method to separate different gases from air.

Ans. Air is a homogeneous mixture of various gases.

It can be separated from its various components by fractional distillation.

(a) First compress and cool the air by increasing the pressure and decreasing the temperature.

(b) We obtain the liquid air; now allow the liquid air to warm up slowly in fractional distillation column.

(c) The various gases separate from each other according to their boiling points at various heights of the fractionally column.

11. What is a colloid? What are its various properties?

Ans. Colloids are the heterogeneous mixture of substances in which the particle size is too small and cannot be seen by naked eyes.

(1) It is a heterogeneous mixture, but appears homogenous.

(2) The size of particles is too small to be individually seen by naked eyes.

(3) They scatter beam of light passing through it and makes its path visible.

(4) The particles of colloid do not settle down when left undisturbed.
