CBSE Class 9 Science
Important Questions
Chapter 2
Is Matter Aroud 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.

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	Blood
	dioxide	

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

10. Which of the following methods would you use to separate cream from milk?

(a) fractional distillation

(b) distillation

(c) centrifugation

(d) filtration

Ans. (c) centrifugation

11.Cooking of food and digestion of food:

(a) are both physical processes

(b) are both chemical processes

(c) cooking is physical whereas digestion is chemical

(d) cooking is chemical whereas digestion physical

Ans. (b) are both chemical processes

12. Mercury and Bromine are both

(a) liquid at room temperature

(b) solid at room temperature

(c) gases at room temperature

(d) both (a) and (b)

Ans. (a) liquid at room temperature

13. Blood and sea water are:

(a) both mixtures

(b) both are compound

(c) blood is a mixture whereas sea water is a compound

(d) blood is a compound and sea water is a mixture

Ans. (a) both mixtures

14. Sol and Gel are examples of examples of

(a) Solid-solid colloids

(b) Sol is a solid-liquid colloid and Gel is liquid solid colloid

(c) Sol is a solid-solid colloid and Gel is a solid-liquid colloid

(d) Sol is a liquid-solid colloid and Gel is a solid-liquid colloid

Ans. (b) Sol is a solid-liquid colloid and Gel is liquid solid colloid

15. In a water-sugar solution:

(1) water is solute and sugar is solvent

(2) water is solvent and sugar is solute

(3) water is solute and water is also solute

(4) none of these

Ans. (b) Sol is a solid-liquid colloid and Gel is liquid solid colloid

16. Boron and carbon:

(a) are metalloids

(b) boron is metalloid and carbon is non-metal

(c) boron is metallic and carbon is a metal

(d) boron is non-metal and carbon is a metalloid

Ans. (a) are metalloids

CBSE Class 9 Science
Important Questions
Chapter 2
Is Matter Aroud Us Pure

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 $25^{\circ}C$), 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 $25^{\circ}C$. 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

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.	In 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.

12. What is a suspension? What are the properties of suspension?

Ans. A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remains suspended throughout the bulk of the medium.

Properties of suspension:
(a) The particles can be seen by naked eyes.
(b) They scatter a beam of light passing through it.
(c) The particles settle down when left undisturbed.

CBSE Class 9 Science

Important Questions

Chapter 2

Is Matter Aroud Us Pure

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

2. Differentiate between homo generous and heterogeneous mixtures with examples.

Ans.

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

3. How are sol, 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 at293 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 $\times 100$

= $36/136 \times 100$

= 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. 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
	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

(a) What mass of potassium nitrate would be needed to produce a saturated solution of potassium nitrate in50 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. 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 $= 62 \times 50/100 = 31g$ potassium nitrate.

(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 = 19g 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.

12. A solution contains 60g of NaCl in 400g of water. Calculate the concentration in term of mass by mass percentage of the solution.

Ans. Mass of solute (NaCl) = 60g

Mass of solvent (water) = 400g

Mass of solution = Mass of solute + Mass of solvent

= 60 + 400 = 460g

Mass percentage of solution = $\frac{Mass\ of\ solute}{Mass\ of\ solution} \times 100$

= $\frac{60}{460} \times 100$ = $\frac{300}{23}$ = 13.4%

13. Differentiate between metals and non metal based upon the various properties that they show.

Ans.

Metals	Non-metals
They have lusture.	They do not have a lusture.
They are silver grey or golden-yellow in colour.	The show variety of colours.
They are good conductors.	They don't conduct heat and electricity.
They are malleable and ductile.	They are non-malleable and non-ductile.
They are sonorous.	They are non-sonorous.
For eg. Na, Mg, and Al	For eg. Cl, oxygen and carbon

14. Differentiate between mixtures and compound by giving appropriate examples?

Ans.

	Mixture		Compound
1)	Element or compounds just mix together to form a mixture.	1)	Elements chemically react to form new compounds.
2)	It has a variable composition.	2)	It has fixed composition.
3)	It shows the properties of the constituent substances.	3)	The new substances have totally new properties.
4)	The constituents particles can be separated by physical methods.	4)	The constituents can be separated by chemical or electrochemical reactions.
5)	For e.g. air, blood.	5)	For e.g. $NaHCO_3.CaSO_4$

15. Write a method to separate a mixture of salt and ammonium chloride?

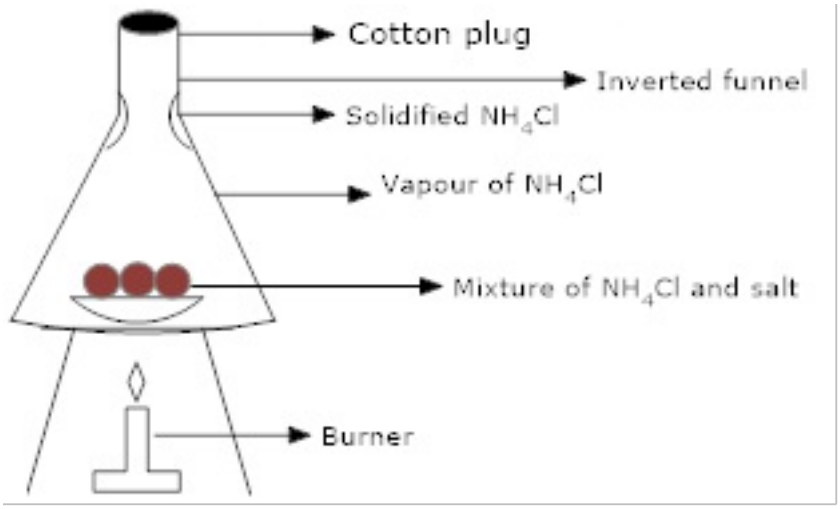
Ans. A mixture of salt and ammonium chloride can be separated by the process of sublimation. Since ammonium chloride changes directly from solid into gaseous state on heating and salt does not so this principle is used to the mixture of two.

(1) The mixture of NH_4Cl (ammonium chloride) and salt is taken in a china dish inside an inverted funnel.

(2) The mixture is heated and because NH_4Cl sublimates thus changes into vapours directly.

(3) Salt which is non-sublimable substance settles into the inverted funnel.

Separation of NH_4Cl salt by sublimation



16. What is crystallization? Where is it used? Why is this better than simple evaporation technique?

Ans. Crystallization is a process that separates a pure solid in the form of crystals from its solution. It is used to purify solids. For e.g. salt from sea water is purified using crystallization. It is a better technique than simple evaporation because:

(a) Some solid may decompose or get charred on heating to dryness during evaporation.

(b) On evaporation, some of the impurities still remain dissolved in the solution.

17. What is chromatography? What are its various applications and underline the basic

principle involved?

Ans. Chromatography is a technique used for separation of those components whose solubility in the same solvent is different.

Its various applications are:

(a) It is used to separate different colours in dye**.**

(b) It is used to separate pigments from natural colours.

(c) It is used to separate drugs from blood.

The basic principle in chromatography is the different solutes have different solubility in the same solvent. For e.g. if we take a spot of ink on a paper and dip it in water than that coloured component which is more soluble in water rises faster and the other which is less soluble remains at the bottom and hence the two component can be separated.

18. A solution of H_2SO_4 acid is labeled is 95%. What is the mass of this that must be diluted with water to get 5L of solution containing 10 g of H_2SO_4 per litre?

Ans. 1L of the diluted solution must contain 10 g of H_2SO_4 .

Therefore, 5L of the diluted solution must contain 50 g of H_2SO_4 .

The concentration of the acid in the bottle is 95%.

This means that

95 g of H_2SO_4 is present in 100 g of the acid solution

50 g of H_2SO_4 will be present in

$$\frac{50\times100}{95} of\ the\ solution$$

52.64 g of the solution