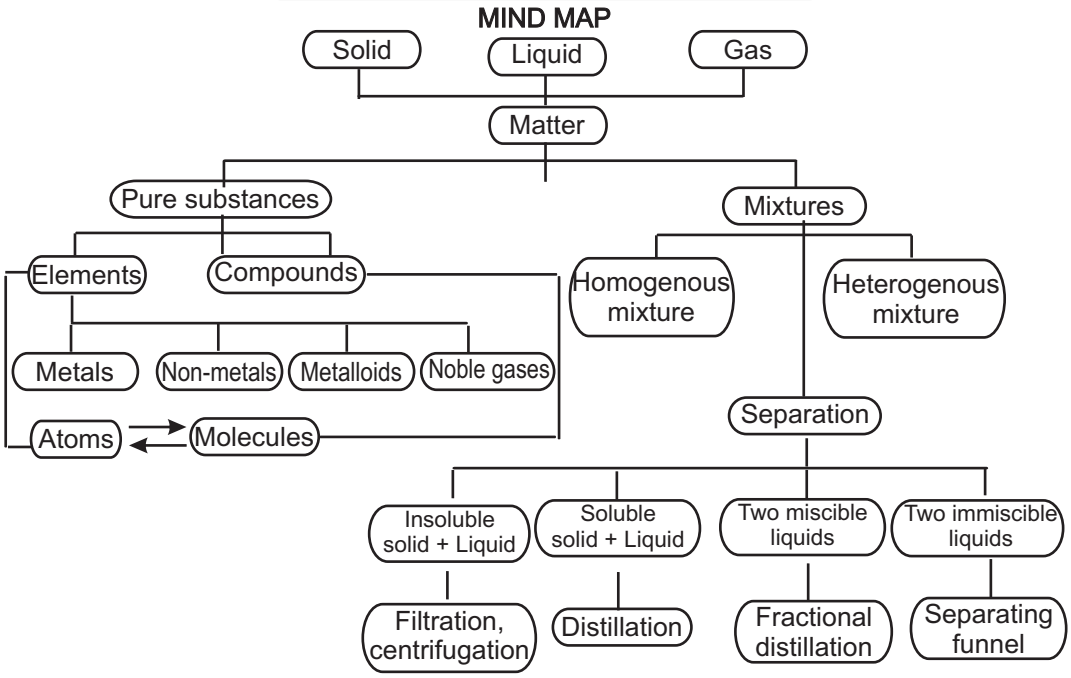
CHEMISTRY

UNIT - 10. Matter Around Us

MIND MAP



TEXT BOOK EXERCISES

I. Choose the correct answer

1. The separation of denser particles from lighter particles done by rotation at high speed is called _____

a) filtration b) sedimentation
c) decantation d) centrifugation **Ans : d) centrifugation**

2. Among the following _____ is a mixture

a)Common Salt b) Juice c) Carbon dioxide d) Pure Silver **Ans :b) Juice**

3. When we mix a drop of ink in water we get a _____

a) Heterogeneous Mixture b) Compound
c) Homogeneous Mixture d) Suspension **Ans : c) Homogeneous Mixture**

4. _____ is essential to perform separation by solvent extraction method.

a) Separating funnel b) Filter paper
c) Centrifuge machine d) Sieve **Ans : a)Separating funnel**

5. _____has the same properties throughout the sample

a) Pure substance b) Mixture c) Colloid d) Suspension
Ans : a) Pure substance

II. State whether True or False. If false, correct the statement.

1. Oil and water are immiscible in each other **Ans : True**
2. A compound cannot be broken into simpler substances chemically.
   Ans : False. A compound **can be** broken into simpler substances chemically.
3. Liquid- Liquid colloids are called gels.
   Ans : False. Liquid- solid colloids are called gel.
4. Buttermilk is an example of heterogeneous mixture. **Ans : True**
5. Aspirin is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Aspirin is a mixture.
   Ans : False. Aspirin is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Aspirin is a **compound.**

III. Match the following

Element	Settles down on standing
Compound	Impure substance
Colloid	Made up of molecules
Suspension	Pure substance
Mixture	Made up of atoms

Ans :

Element	**Madeup of atoms**
Compound	**Made up of molecules**
Colloid	**Pure substance**
Suspension	**Settles down on standing**
Mixture	**Impure substance**

IV. Fill in the blanks

1. A _____ mixture has no distinguishable boundary between its components
   Ans : Homogeneous
2. An example of a substance that sublimes is _____ **Ans : Iodine**
3. Alcohol can be separated from water by _____
   Ans : Fractional distillation
4. In petroleum refining, the method of separation used is _____
   Ans : Fractional distillation
5. Chromatography is based on the principle of _____
   Ans : different solubilities in the same solvent

V. Answer very briefly.

1. Differentiate between absorption and adsorption?

Ans :

S.No.	Absorption	Adsorption
1.	Absorption is the process in which the substance is uniformly distributed through out the bulk of another substance	Adsorption is the process in which the particles of a substance is concentrated only at the surface of another substance
2.	E.g. When a chalk stick is dipped in ink, the solvent of the ink goes deeper into the stick due to absorption.	E.g. When a chalk stick is dipped in ink, the surface retains the colour of the ink due to adsorption of coloured molecules.

2. Define Sublimation.
Ans :
✶ Certain solid substances when heated change directly from solid to gaseous state without attaining liquid state.
✶ The vapours when cooled give back the solid substance. This process is known as sublimation.
✶ Ex. Iodine, Camphor, Ammonium chloride.

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3. A few drops of 'Dettol' when added to water the mixture turns turbid. Why?
Ans : The oil droplets of dettol get suspended in water and create an emulsion.

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4. Name the apparatus that you will use to separate the components of mixtures containing two, i. miscible liquids, ii. immiscible liquids.
Ans :
i) Miscible liquid : Fractional distillation flask, fractionating column, Thermometer.
ii) Immiscible liquids : Separating funnel, Stopclock.

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5. Name the components in each of the following mixtures.
i) Ice cream ii) Lemonade (iii) Air (iv) Soil
Ans :
i)Ice cream : sugar, milk, water
ii) Lemonade : lemon juice, sugar and water
iii) Air : hydrogen, oxygen, carbondioxide, water vapour and other gases.
iv) soil : sand, clay, various types of salts.

VI. Answer briefly .
1. Which of the following are pure substances? Ice, Milk, Iron, Hydrochloric acid, Mercury, Brick and Water.
Ans : Pure substances :
Ice, Iron, Hydrochloric acid and Mercury, Water

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2. Oxygen is very essential for us to live. It forms 21% of air by volume. Is it an element or compound?
Ans : Oxygen is an element.

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3. You have just won a medal made of 22-carat gold. Have you just procured a pure substance or impure substance?
Ans :
✶ 22 carat gold metal is made up of 91.6% gold and 8.4% other metals.
✶ So It is impure substance.

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4. How will you separate a mixture containing saw dust, naphthalene and iron filings?
Ans :
i) To separate iron fillings from a mixture we can use a magnet. This is called magnetic separation method.
ii) By sublimation, naphthalene can be separated from saw dust.

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5. How are homogenous solutions different from heterogeneous solution? Explain with examples.

Ans :

S.No.	Homogenous Mixtures	Heterogeneous Mixtures
1.	A mixuture in which the components cannot be seen separately is called a homogenous mixture.	A mixture in which the components can be seen separately is called a heterogeneous mixture.
2.	It has a uniform composition and every part of the mixture has the same properties	It does not have a uniform composition and properties.
3.	Eg:Tap water, milk, air, ice cream, sugar syrup, ink, steel, bronze and salt solution	Eg:Soil a mixture of iodine and common salt, a mixture of sugar and sand, a mixture of oil and water, a mixture of sulphur and iron filings, and a mixture of milk and cereals.

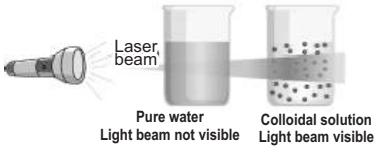
VII. Answer in detail.

1. Write the differences between elements and compounds and give an example for each.

Ans :

S.No.	Elements	Compounds
1.	Made up only one kind of atom.	Made up more than one kind of atom.
2.	The smallest particle that retains all its properties is the atom.	The smallest particle that retains all its properties is the molecule.
3.	Cannot be broken down into simpler substances.	Can be broken down into elements by chemical methods.
4.	E.g: Copper, Oxygen, Hydrogen	E.g. : Water, Sugar, Salt.

2. Explain Tyndall effect and Brownian movement with suitable diagram.



Tyndall effect

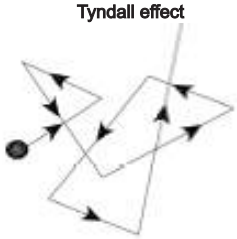
Ans : Tyndall Effect : Tyndall (1869) observed that when a strong beam of light is focused on a colloidal solution the path of the beam becomes visible.

This phenomenon is known as Tyndall effect and the illuminated path is called **Tyndall cone**.

This phenomenon is not observed incase of true solution.

Brownian Movement : When colloidal solution are viewed under powerful microscope, it can be seen that colloidal particles are moving constantly and rapidly in zig-zag directions.

The Brownian movement of particles is due to the unbalanced bombardment of the particles by the molecules of dispersion medium.


Brownian movement

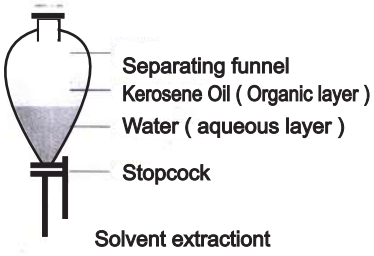
3. How is a mixture of common salt, oil and water separated? You can use a combination of different methods.

Ans :

✶ Two immiscible liquids can be separated by solvent extraction method.

✶ This method works on the principle of difference in solubility of two immiscible liquids in a suitable solvent.

✶ For example mixture of oil and water can be separated by separating funnel.



Solvent extractiont

i) Pour the mixture into a separating funnel.
ii) Close the mouth of the separating funnel.
iii) Shake it for 10 minutes.
iv) Hold the funnel in a stand for 15 minutes.
v) Water remains in the lower layer and oil remains in the upper layer.
vi) By using stop cock oil and water can be collected in different containers.
vii) The salty water is taken in the distillation flask and heated for boiling.
viii) The pure water vapour passes through the inner tube of the condenser.
ix) This on cooling condenses into pure water and gets collected in a receiver.
x) The salt is left behind in the flask as a residue, which can be collected separately.

Additional questions & answers

I. Choose the correct answer

1. Difference in _____ is the principle used in fractional distillation

a) solubility b)melting point c) boiling point d) adsorption

Ans : c) boiling point

2. Filtration method is effective separating _____ mixture

a) Solid-solid b) solid-liquid c) liquid-liquid d) liquid-gas

Ans : b) solid - liquid

3. For a simple distillation process we need to have

a) an evaporating dish. b) a separating funnel.
c) a filter with filter paper. d) a Liebig condenser.

Ans : d) a Liebig condenser.

II. Fill in the blanks

1. _____ sedimentation of particles under the influence of the centrifugal force and it is used for separation of superfine suspensions. **Ans : Centrifugation**
2. A colloid in which both phases are liquid ; and oil - in - water_____ **Ans : emulsion**
3. _____is a heterogeneous system consisting of the dispersed phase and the dispersion medium. **Ans : Colloidal solution**
4. Sand is removed from naphthalene by_____ method. **Ans :Sublimation**
5. The solubility of solid in water _____ with an increase in temperature **Ans : increases**

III. Very Short answer

1. Define a solute and a solvent.

Ans : The component present in lesser amount by weight is called solute and the component present in larger amount by weight is called solvent.

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2. What is solution?

Ans : Homogenous mixture composed of two or more substances.

Activity 1 :

1. Is air a pure substance of Mixture? Justify

Ans :

i) Air does not have a fixed Composition.

ii) The components of air can be separated by physical method. So Air is a mixture.

2. You must have seen brass statues in museums and places of worship. Brass is an alloy made up of approx. 30% zinc and 70% copper. Is Brass a pure substance or a mixture or compound?

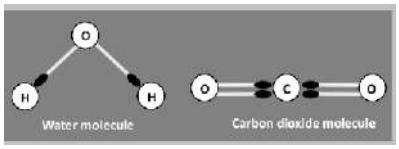
Ans : Brass is a compound.

i) Because it has fixed composition.

ii) Brass cannot be separated by physical method so brass is a compound.

Activity 2 :

Make models of the molecules of compounds by using match sticks and clay balls as shown below,



Activity -3 :

Take some powdered iron filings and mix it with sulphur.

i. Divide the mixture into two equal halves.

ii. Keep the first half of the mixture as it is, but heat the second half of the mixture.

iii. On heating you will get a black brittle compound.

Ans :

Mixture of iron and Sulphur

Iron Sulphide compound

The black compound is Iron (II) sulphide.

Iron + sulphur $\xrightarrow{\text{heat}}$ Iron sulphide

The Iron sulphide formed has totally different properties to the mixture of iron and sulphur as tabulated below:

Substance	Appearance	Effect of magnet
Iron (element)	Dark grey powder	Attracted to it
Sulphur (element)	Yellow powder	None
Iron + Sulphur (Mixture)	Dirty yellow powder	Iron powder attracted to it
Iron sulphide (compound)	Black solid	No effect

From the above experiment, we can summarise the major differences between mixtures and compounds:

Activity 4

Identify whether the given substance is mixture or compound and justify your answer. 1. Sand and water 2. Sand and iron filings 3. Concrete 4. Water and oil 5. Salad 6. Water 7. Carbon dioxide 8. Cement 9. Alcohol.

Ans :

1) Mixture 2) Mixture 3) Compound 4) Mixture 5) Mixture 6) Compound 7) Compound 8) Compound 9) Mixture

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Activity 5

Take bottles containing sugar, starch and wheat flour.

Add one tea spoon full of each one to a glass of water and stir well. Leave it aside for about ten minutes. What do you observe?

Ans :

We can see that in the case of sugar we get a clear solution and the particles never settle down. This mixture is called as true solution. In the case of starch and water we get a cloudy mixture. This mixture is called as colloidal solution In the case of wheat flour mixed with water we get a very turbid mixture and fine particles slowly settle down at the bottom after some time. This mixture is called as suspension.
