Elements, Componds and Mixtures

EXERCISE [PAGE 99]

Exercise | Q 1 | Page 99

Who are my companions?

Group 'A'	Group 'B'
1. Stainless steel	(a) Non-metal
2. Silver	(b) compound
3. Bhajini mixture for milling	(c) Mixture
4. Salt	(d) Element
5. Coal	(e) Alloy
6. Hydrogen	(f) Metal

Solution:

Group 'A'	Group 'B'
1. Stainless steel	(e) Alloy
2. Silver	(f) Metal
3. Bhajini mixture for milling	(c) Mixture
4. Salt	(b) compound
5. Coal	(a) Non-metal
6. Hydrogen	(d) Element

Exercise | Q 2.01 | Page 99

Write the names of elements from the following symbol:

Zn

Solution: Zn- Zinc

Exercise | Q 2.02 | Page 99

Write the names of elements from the following symbol:

Cd

Solution: Cd- Cadmium

Exercise | Q 2.03 | Page 99

Write the names of elements from the following symbol:

Xe

Solution: Xe- Xenon

Exercise | Q 2.04 | Page 99

Write the names of elements from the following symbol:

Br

Solution: Br- Barium

Exercise | Q 2.05 | Page 99

Write the names of elements from the following symbol:

Ti

Solution: Ti- Titanium

Exercise | Q 2.06 | Page 99

Write the names of elements from the following symbol:

Cu

Solution: Cu- Copper

Exercise | Q 2.07 | Page 99

Write the names of elements from the following symbol:

Fe

Solution: Fe- Iron

Exercise | Q 2.08 | Page 99

Write the names of elements from the following symbol:

Si

Solution: Si- Silicon

Exercise | Q 2.09 | Page 99

Write the names of elements from the following symbol:

Ir

Solution: Ir- Iridium

Exercise | Q 2.1 | Page 99

Write the names of elements from the following symbol:

Pt

Solution: Pt- Platinum

Exercise | Q 3.1 | Page 99

What is the molecular formula of the following compound?

Hydrochloric acid

Solution: Hydrochloric acid- HCl

Exercise | Q 3.2 | Page 99

What is the molecular formula of the following compound?

Sulphuric acid

Solution: Sulphuric acid- H_2SO_4

Exercise | Q 3.3 | Page 99

What is the molecular formula of the following compound?

Sodium chloride

Solution: Sodium chloride- NaCl

Exercise | Q 3.4 | Page 99

What is the molecular formula of the following compound?

glucose

Solution: Glucose- $C_6H_{12}O_6$

Exercise | Q 3.5 | Page 99

What is the molecular formula of the following compound?

Methane

Solution: Methane- CH_4

Exercise | Q 4.1 | Page 99

Give scientific reasons.

Buttermilk is churned to get butter.

Solution: Buttermilk has two components- water and fat/cream. Churning helps in the separation of these two components. The fat/cream collects on the top as a result of churning while the remaining part is left behind as liquid.

Exercise | Q 4.2 | Page 99

Give scientific reasons.

In chromatography, the ingredients of a mixture rise up to limited height water rises up to the upper end of the paper.

Solution: Chromatography is a separation technique used to separate the different components in a liquid mixture. Separation of substances by chromatography is based on two properties of the substance:

- the solubility of the substance in the solvent that moves up
- the ability of the substance to stick to the stationary filter paper

These properties are different for different substances and are mutually opposite to each other. It is the reason why all the components of the mixture rise up to a limited height when the water rises up to the upper end of the paper.

Exercise | Q 4.3 | Page 99

Give scientific reasons.

A wet cloth is wrapped around a water storage container in summer.

Solution: A wet cloth is wrapped around water containers in summers to keep the container and the water inside it cools. The water present in the cloth evapourates and along with that water the heat also evapourates thus keeping the container and water cool.

Exercise | Q 5.1 | Page 99

Explain the difference between Metals and non-metals.

Solution:

Physical properties	Metals	Non-metals
Malleability and ductility	They can be beaten into sheets and wires	They cannot form sheets or wires
Sonority	Metals are sonorous, they produce a ringing sound on beating	They are non−sonorous
Conduction	They conduct heat and electricity	Non-metals do not allow heat and electricity to pass through them
Chemical Properties		
Nature of oxides	Metallic oxides are basic in nature	Oxides of non−metals are acidic
Reaction with water	Metals react with water	Non−metals do not react with water
Reaction with acids	Metals react with acids to produce hydrogen gas	They generally do not react with acids

Exercise | Q 5.2 | Page 99

Explain the difference between Mixture and compounds

Solution:

	Mixture		Compound
1	It is obtained by the physical combination of any two substances.	1	It is formed when two or more substances chemically combine in a fixed ratio.
2	The composition of the constituents present in a mixture is not fixed.	2	The composition of elements present in a compound is fixed.
3	It displays the properties of all its constituents.	3	It may or may not show the properties of its constituent elements.
4	The constituents of a mixture can be separated using physical methods.	4	The constituent elements of a compound can be separated only by using chemical methods.
5	No change of energy is involved during the formation of a mixture.	5	Change of energy is involved during the formation of a compound.

Exercise | Q 5.3 | Page 99

Explain the difference between Atoms and molecules.

Solution:

	Atoms		Molecules
1	Atoms are the smallest particles of an element that can take part in a chemical reaction.	1	Molecules are the smallest parts of an element or compound, which exist independently.
2	They do not break up during chemical reactions.	2	They break up during chemical reactions.
3	They may or may not exist in a free state.	3	They exist in free forms.

Exercise | Q 5.4 | Page 99

Explain the difference between Separation by distillation and by separating funnel.

Solution:

Separation by distillation	Separation by separating funnel
1. This method is employed for the separation of two miscible liquids.	This method is employed for separation of two immiscible liquids.
2. It is based on the difference in the boiling points of two liquids.	It is based on the difference in the densities of the two liquids.

Exercise | Q 6.1 | Page 99

Write answer to the following question in your own words.

How are the components of mixtures separated by simple methods?

Solution: The components of mixtures are separated by simple methods like:

Distillation: Distillation and separating funnels are used in the separation of liquid mixtures. Distillation is a method that is used for separating two miscible liquids. It is based on the difference in the boiling points of two liquids. Distillation can either be simple or fractional. Simple distillation can be used for liquids which have a huge difference in their boiling points whereas fractional distillation is used in case of liquids which have close boiling points. Distillation can be used in the production of gasoline, distilled water, xylene, alcohol, paraffin, kerosene apart from separating mixtures.

Separating funnels: Separation using separating funnels is used in the case of immiscible liquids. It is based on the difference in the density of the two liquids. It can be

used in the separation of oil from water etc, two different types of immiscible oils, etc.

Chromatography: It can be used to separate the coloured components of a mixture on the basis of the difference in the speeds of the components on chromatography paper when dissolved in the same solvent. The adsorbent paper acts as the stationary phase; it carries the components of the mixture on the paper. The mixture acts as the mobile phase and the components get separated. The component which moves slowly (i.e., the less-soluble component) appears as a spot on the lower side of the paper. The component which moves faster (i.e., the more-soluble component) appears as a dot on the higher side of the paper.

Centrifugation: Centrifugation is the process where a mixture is separated through spinning. It is used to separate skim milk from whole milk, water from your clothes, and blood cells from the blood plasma.

Exercise | Q 6.2 | Page 99

Write an answer to the following question in your own words.

Which elements (metals and non-metals), compounds and mixtures do we use in our day-to-day life?

Solution: Examples of mixtures we use in our daily life are- lemon and water, sugar and milk, salt and water, cereal and milk, cement, air, etc.

Examples of compounds we use in our daily life are- salt (NaCl), sugar ($C_{12}H_{22}O_{11}$), baking powder ($NaHCO_3$), vinegar (CH_3COOH), ethanol, etc.

Examples of elements we use in our daily life are- aluminum, copper, iron, silver, gold, etc.

Exercise | Q 6.3 | Page 99

Write an answer to the following question in your own words.

In everyday life, where and for what purpose do we use centrifugation?

Solution: We use centrifugation for the following purposes in our daily lives:

- Drying of wet clothes in the spin tub of a washing machine
- Extraction of DNA for forensic and experimental purposes
- Separation of blood components in medical science
- Working of roller coasters in an amusement park
- Removing water from wet lettuce in a salad spinner

Exercise | Q 6.4 | Page 99

Write an answer to the following question in your own words.

Where are the methods of separation by distillation and by separating funnel used? Why?

Solution: Distillation and separating funnels are used in the separation of liquid mixtures. Distillation is a method that is used for separating two miscible liquids. It is based on the difference in the boiling points of two liquids. Distillation can either be simple or fractional. Simple distillation can be used for liquids which have a huge difference in their boiling points whereas fractional distillation is used in case of liquids that have close boiling points. Distillation can be used in the production of gasoline, distilled water, xylene, alcohol, paraffin, kerosene apart from separating mixtures

Separation using separating funnels is used in the case of immiscible liquids. It is based on the difference in the density of the two liquids. It can be used in the separation of oil from water etc, two different types of immiscible oils, etc.

Exercise | Q 6.5 | Page 99

Write an answer to the following question in your own words.

Which precaution will you take while using the methods of distillation and separation by separating funnel?

Solution: Precautions to be used during distillation:

- The apparatus should be set in a proper manner with all the components fitted well.
- Never heat the system that is totally closed from the outside atmosphere to prevent an explosion.
- Add boiling chips to reduce bumping (rapid boiling causing the liquid to expel out of the container).
- Control the rate of heating so as not to overheat to avoid bumping.

Precautions to be used while using separating funnel for separation:

- The funnel should be tightly fixed to the stand in an erect position.
- The liquid in the funnel should be left undisturbed to allow it to separate.

The stopper should be removed carefully without disturbing the setup. Precautions to be used during distillation:

- The apparatus should be set in a proper manner with all the components fitted well.
- Never heat the system that is totally closed from the outside atmosphere to prevent an explosion.
- Add boiling chips to reduce bumping (rapid boiling causing the liquid to expel out of the container).
- Control the rate of heating so as not to overheat to avoid bumping.

Precautions to be used while using separating funnel for separation:

- The funnel should be tightly fixed to the stand in an erect position.
- The liquid in the funnel should be left undisturbed to allow it to separate.
- The stopper should be removed carefully without disturbing the setup.