

Property	Solids	Liquids	Gases
4. Fluidity	Do not flow.	Flow from a higher level to a lower level.	Flow in all directions.
5. Effect of Pressure, i.e. Compression	Effect of pressure is very low; almost incompressible.	Effect of pressure is higher than on a solid, can be compressed slightly.	Effect of pressure is very high; can be greatly compressed.

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Exercise-1

1. Define matter:

Ans- Anything that has mass and occupies space is called matter.

2. What are the two main types of matter? Give example for each type?

Ans- The main two types of matter are: living matter and non-living matter and natural matter & Man-made matter.

i) Living matter: The Earth is home to all kinds of plant and animals. They can grow, move and reproduce on their own. For example: Plant, Lotus, human, animals, birds etc.

ii) Non-living matter: Most of the matter in the universe is non-living. It means that it doesn't grow, move or reproduce on its own. It can be natural or man-made. For example: book, chair, table, pen, pencil etc.

- a) Natural Matter: It occurs in nature and can be used to make more useful substances e.g., wood, coal, silk, water, stone, fruits etc.
- b) Man-made matter: It is produce artificially from natural matter e.g. plastics, soaps, detergents, medicines, glass, nylon, steel, ceramic etc.

3. Differentiate between living and non-living matter.

Ans

Living Matter	Non-living matter
1. The Earth is home to all kinds of plants & animals. They can grow, move & reproduce on their own.	1. Most of the matter in universe is non-living. It means that it doesn't grow, move or reproduce on its own.
2. It is natural only.	2. It is man-made or it can be natural.
3. For ex: animal, birds, humans.	3. For ex: chair, table, pen etc.

4. Select natural and man-made matter from the following list: wood, plastic, silk, medicines, detergents, coal, water, ceramic, cotton, glass, nylon fruits.

Ans - Natural matter: wood, silk, coal, water, fruits
Man-made matter: Plastic, medicines, detergents, ceramic, cotton, glass, nylon.

Exercise-11

1. Name the smallest particle from which matter is made up of.

Ans - The smallest particle from which matter is made up of is atom.

8. Give reasons:

a) Liquids and gases flow but solids donot.

Ans - The molecules of liquid and gases are far apart i.e. they have more gaps, intermolecular attraction is very less as compared to the solids. hence liquids & gases can flow but solid don't have gaps, in solid molecules force of attraction is very strong so they can't flow.

b) A gas fills up the space available to it.

Ans - Intermolecular force of attraction is least and intermolecular spaces between them are very large, hence gases can fill up the space available to them.

c) The odour of scent spreads in a room.

Ans - Scent fumes (molecules) being gases fill the spaces between the air molecules and the molecules of air fill the spaces between scent molecules due to diffusion, fumes spread into the room.

d) We can walk through air.

Ans - The molecules of air are far apart. from each other i.e. they have large gaps between them. Hence, we can walk through air easily.

c) Liquids have definite volume but no definite shape.

Ans- The molecules of a liquid are loosely packed and intermolecular force of attraction is small but number of molecules in it remain the same. Hence liquids have definite volume but no definite shape.

f) When a teaspoon of sugar is added to half a glass of water and stirred, the water level in the glass remains unchanged.

Ans- When a teaspoon of sugar is added to half a glass of water and stirred, the water level in the glass remains unchanged because the sugar particles ~~and~~ are adjusted between the water molecules as inter molecular gaps are more in liquids.

g) When an empty gas jar is inverted over a gas jar containing a coloured gas, the gas also spreads into the empty jar.

Ans- This is because gases can diffuse or flow in all directions.

h) A red ink drop added to small amount of water in a glass turns the water red in sometime.

Ans- When we put a drop of red ink in a glass of water, its particles diffuse with particles of water slowly but continuously and the water turns red.

9. Define :

a) Cohesive force

Ans - Cohesive force :- The force of attraction between particles of the same substance is called Cohesive force.

b) Diffusion

Ans - Diffusion :- The phenomenon of intermixing of particles of one kind with another kind is called diffusion.

c) Brownian movement

Ans - Brownian movement :- The zig-zag motion of particles suspended in a medium is called Brownian movement.

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Exercise - 11

2. What are molecules?

Ans - Molecules are the smallest unit of matter. They exhibit all the properties of that kind of matter and is capable of independent existence.

3. Give one difference between atoms and molecules.

Ans - Atoms may or may not have independent existence. While molecules have independent existence.

4. Define:

a) Intermolecular force of attraction.

Ans - The molecules of matter are always in motion and attract each other with a force, and this force is called intermolecular force of attraction due to which they are held together.

b) Intermolecular space.

Ans - The molecules can move only when there are gaps or space between them, this space is called intermolecular space.

5. Name the three states of matter and define them.

Ans - The three states of matter are:

1. Solid State

2. Liquid State

3. Gase State

1. Solid State: The molecules are very close to each other hence intermolecular spaces are small & intermolecular force is strong.



Hence solids have definite volume, rigid, retain a definite shape and are incompressible.

2. Liquids: The molecules are less closely packed have more intermolecular spaces than solid, less stronger forces than solids.



Hence liquids have definite volume but no definite shape. They take the shape of container in which they are put.

3. Gases: The molecules in the gases are far apart with weakest force of attraction. Hence gases have neither definite volume nor definite shape but easily compressible.



6. What are fluids? Give two examples.

Ans - Substances that can flow are called fluids. Both gases and liquids are fluids, e.g. gases (Carbon dioxide, hydrogen), liquids (water, petrol and sulphuric acid).

7. Classify the following into solids, liquids and gases - oxygen, milk, common salt, wax, stone, L.P.G, Carbon dioxide, sugar, mercury, coal, blood, butter, copper, coconut oil, kerosene.

Ans - Solids: Common Salt, wax, Stone, Sugar, Coal, Butter, Copper

Liquids: Milk, Mercury, Blood, Coconut oil, Kerosene

Gases: Oxygen, L.P.G, Carbon dioxide

10. Why is an egg kicked out of a bottle when air is blown inside the bottle?

Ans- When we invert the bottle and blow air into the bottle through the side opening, it creates high pressure inside the bottles and the egg is kicked out of the bottle.

Exercise - III

1. State the three effects of heat on matter.

Ans- When a substance is heated, it can cause.

1. Interconversion of states of matter.
2. Thermal expansion of a substance.
3. Chemical change.

2.a) Define: interconversion of states of matter.

Ans- The process by which matter changes from one state to another and back to original state, without any change in its chemical composition.

b) What are the two conditions for the interconversion of states of matter?

Ans- The two conditions are:

1. Change in temperature
2. By applying pressure

3. Define the following terms:

a) Fusion

Ans- The heating process by which a solid changes into the liquid state is called fusion.

b) Vaporisation

Ans- The heating process by which a liquid changes into its vapour state is called vaporisation.

c) Condensation

Ans- The process by which a substance in gaseous state changes into its liquid state is called condensation.

d) Sublimation

Ans- The change of solid on heating to vapours directly and vice-versa without passing through the liquid state is called sublimation.

Solid $\xrightarrow{\text{heating}}$ Vapour
 $\xleftarrow{\text{cooling}}$

e) Diffusion

Ans- The phenomenon of intermixing or spreading of gaseous molecules is called diffusion.

f) Melting point

Ans- The fixed temperature at which a solid changes into liquid at a given pressure is called its melting point. The temperature remains constant as long as the conversion is going on.

g) Boiling Point

Ans- The fixed temperature at which a liquid starts changing into gaseous state is called its boiling point. The temperature remains constant till the whole

of the liquid changes into gaseous state.

b) Liquefaction

Ans- Change of vapours on cooling to liquid is called liquefaction.

4. Differentiate between

a) Solidification and Condensation

Ans-

Solidification.

- The process of changing liquid into a solid state by cooling is known as solidification.

- Example - Water \rightarrow Ice

Condensation

- The process of changing a gas or vapour state to a liquid by cooling is known as condensation.

- Example: Steam \rightarrow Water

b) Melting and Boiling?

Ans-

Melting

The fixed temperature at which a solid changes into a liquid at a given pressure is called its melting point.

e.g. Ice \rightarrow Water

Boiling?

The fixed temperature at which a liquid starts changing into gaseous state is called its boiling point.

e.g. Water \rightarrow Steam.

c) Gas and vapour

Ans-

Gas	Vapour
The substance which remain in the gaseous state under normal conditions of temperature and pressure are called gases. e.g. Oxygen, hydrogen.	It is a substance which exists in the gaseous state at a temperature which is lower than that of boiling point of its liquid state. E.g. Water vapour, iodine vapour etc.

d) Miscible and immiscible liquids

Ans-

Miscible liquids	Immiscible liquids
Liquids which mix with each other are called miscible liquids. Example - water and alcohol.	Liquids which do not mix with each other are called immiscible liquids. Example - water and oil.

5. Give reasons :

a) How is interconversion of states of matter different from chemical reaction?

Ans- During interconversion of state of matter composition of substance remains the same matter changes from one state to another and back to the original state, while chemical reaction involves re-arrangement of the molecular structure and composition changes.

b) Why a solid does not flow, but a liquid flows?

Ans- In solids there is a strong force of attraction between the molecules and the space between them is very negligible. The molecules are therefore, not free to move. They merely vibrate about their mean positions. But in the case of liquids, the molecules are not very closely packed. They don't attract each other as strongly as the molecules of solids. Thus, the intermolecular spaces are larger and the molecules are able to move about more freely. This makes a liquid flow.

6. How does a liquid change into its gaseous state? Explain.

Ans- As a liquid is heated, its particles start gaining energy and move more vigorously which increases the gaps between the particles and decreases the force of attraction. Ultimately a liquid changes into gaseous state.

7. Water cycle is an example of interconversion of states of water. Explain.

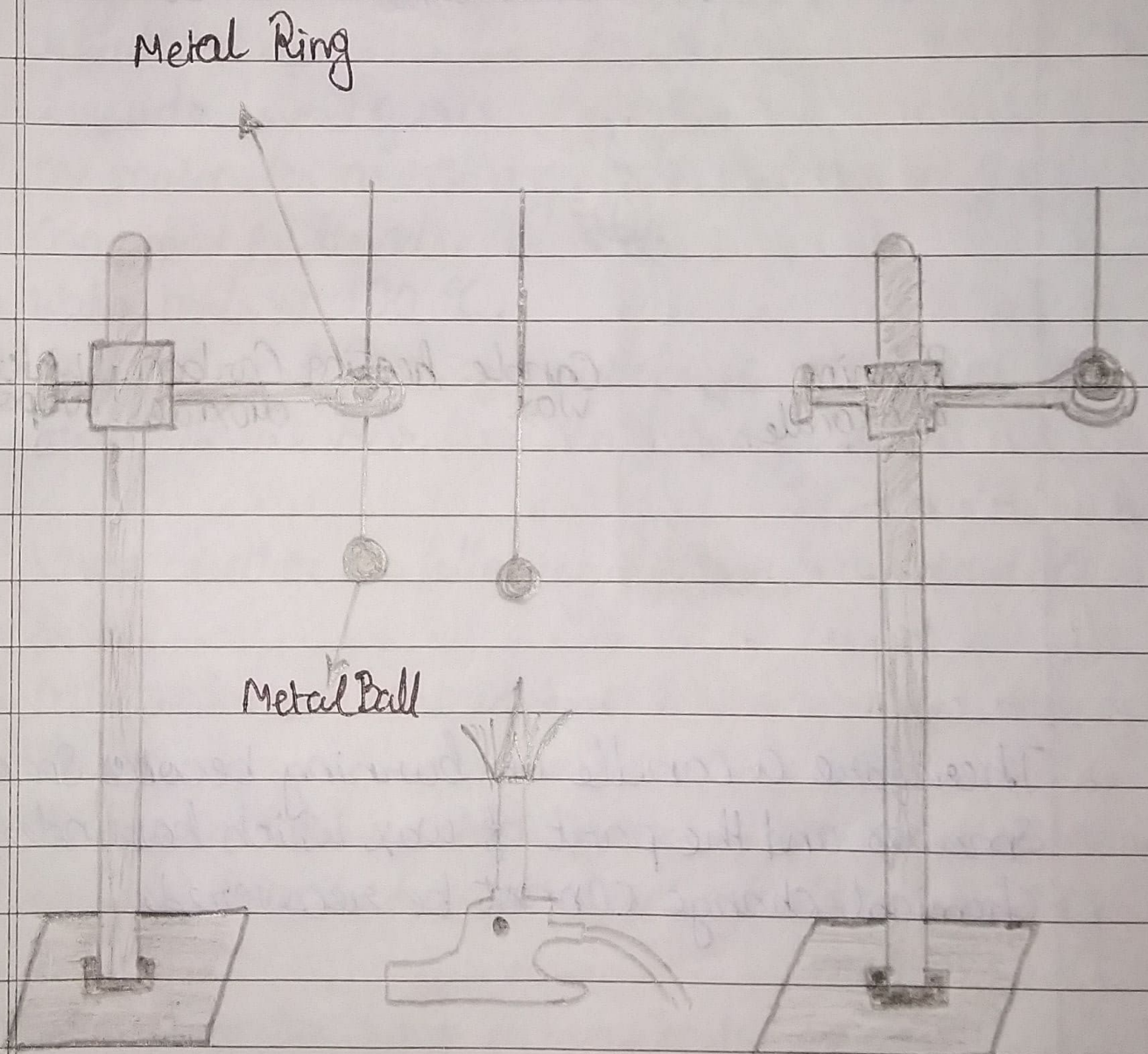
Ans- Water from ocean, river, lakes from leaves of trees (transpiration) changes into vapours when temperature increases or evaporates and enters the atmosphere as clouds. When temperature falls the vapour changes into water and some of it in the form of snow falls on mountains and earth in the form of water and hail and this continues. Thus water cycle is an example of interconversion of states of water.

8. What happens to a metal ball when it is heated? What does this show?

Ans- When a metal ball is heated, it expands. This can be proved by following experiments:

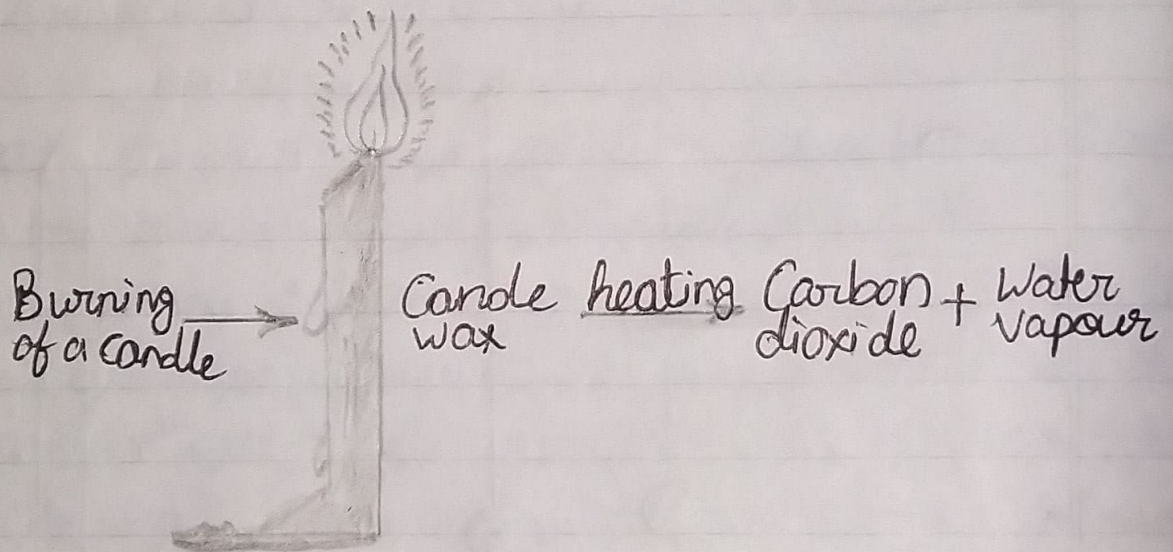
Take a metallic ring and ball. Try to pass the metal ball through the ring. The ball is able to pass through the ring. Now heat the metal ball for 5-6 minutes. The hot ball is not able to pass through the ring. This shows that a solid expands on heating.

Now cool the ball, it again passes through the ring.
This shows that a solid contracts on cooling.



9. Why does a candle become smaller on burning with time?

Ans- On heating the candle wax melts, then turns into vapour ~~and~~ which reacts with air to produce two new substances, Carbon dioxide and water.



Therefore a candle on burning becomes smaller & smaller and the part of wax which has undergone chemical change cannot be recovered.

Objective type questions.

1. Fill in the blanks:

- Water is a matter because it has mass and occupies space.
- Any matter which has a definite volume but no definite shape is called a liquid.
- Liquids and gases can flow.
- The molecules are at a greater distance in gases compared to liquids.
- Water boils at 100 °C.
- The physical state of a substance, which has neither fixed volume nor fixed shape is a gas.

2. Write whether the following statements are true or false.

- Only water can exist in three different states.

Ans - True

- If the container in which a gas is collected has an opening the gas will flow out and spread itself indefinitely.

Ans - True

- Solids have the large intermolecular space.

Ans - False

Correct: Solids have the very small (negligible) intermolecular space.

d) There is no difference between evaporation and boiling.

Ans - False

Correct: There is a difference between evaporation & boiling.

e) All solids, on heating, first change to the liquid and then to the gaseous state always.

Ans - False

Correct: Few solids, on heating, first change to the liquid and then to the gaseous state always.

f) The intermolecular force of attraction is the weakest in gases.

Ans - True

g) A gas has no free surface.

Ans - True.

4. For each of the following statements, say whether it describes a solid, a liquid or a gas.

a) Particles move about very quickly but do not leave the surface: Liquid

b) Particles are quite close together: Solid

c) Particles are far apart and move in all directions: Gas

5. Match the following :

Column A	Column B
a) Solids	i) Can flow in all directions.
b) Sublimation	ii) The temperature at which a liquid changes into its gaseous state
c) Boiling Point	iii) Can have any number of free surfaces.
d) Gases	iv) Gaps between particles
e) Intermolecular Space	v) Change of state from solid to gas.

6. Name the phenomenon which causes the following changes :

- a) Formation of water vapour from water, **Vaporisation**
- b) Disappearance of camphor when exposed to air, **Sublimation**
- c) Conversion of ice into water, **melting**
- d) Conversion of water into steam, **boiling**

7. Give two examples for each of the following:

a) Substances which sublime.

Ans - Naphthalene, Camphor, dry ice.

b) Substances which do not change their states.

Ans - Oxygen, hydrogen, nitrogen

c) Substances which are rigid and not compressible.

Ans - Glass, stone, pen

Multiple Choice Questions

1. Which one is a kind of matter?

Ans - b) Petroleum

2. The state of matter which has no definite shape or volume is called

Ans - c) gas

3. There are large intermolecular gaps in

Ans - d) air

4. All kinds of matter which can sublime is

Ans - d) Iodine

5. All kinds of matter

Ans - a) occupy space and have a definite mass

6. A substance which can change its state

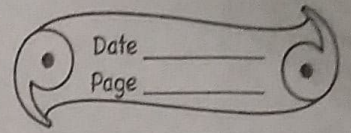
Ans - b) oxygen

7. The process by which a solid changes into a liquid is called

Ans - b) melting

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Ch-4 Elements, Compounds, Symbols and Formulae



2. Answer the following questions.

a) List the characteristics of pure substances.

Ans- The characteristics of pure substances are -

- i) Pure substances are of two types, i.e. elements and compounds.
- ii) Elements are made up of only one kind of atoms and compounds are made up of one kind of molecules.
- iii) They have uniform composition throughout, i.e., they are homogeneous.
- iv) They have a definite set of physical and chemical properties.
- v) They have fixed melting and boiling point.
- vi) Pure substances have characteristic colour, odour and taste.
- v) Pure substances cannot be broken into simpler substances by any physical means.

b) Differentiate between
i) elements and compounds

Elements	Compounds
<p>1. Elements are made up of only one kind of atoms.</p> <p>2. Elements cannot be converted into anything simpler than itself by any physical or chemical process.</p> <p>3. There are only 118 types of elements known to mankind.</p> <p>4. Example - Oxygen, Hydrogen etc.</p>	<p>Compounds are made of only one kind of molecules or compounds always have more than one kind of atoms.</p> <p>2. A compound can be broken down into simpler substances by chemical process.</p> <p>3. There is no upper limit on the type of compounds that can be formed.</p> <p>4. Example - Water (Compound) is made up of oxygen and hydrogen.</p>

ii) Homogeneous and Heterogeneous mixture
Ans -

<u>Homogeneous Mixture</u>	<u>Heterogeneous Mixture</u>
1. It is the mixture, in which the components are uniformly distributed throughout its volume & cannot be seen separately.	1. It is the mixture, in which the components are not uniformly distributed throughout its volume and can be easily seen separately.
2. These are called as Solutions.	2. These are called as Suspensions.
3. The particles appear smaller in size.	3. The particles are either smaller or larger in size.
4. It can't be separated out physically.	4. It can be separated out physically.
5. 'Homo' means the Same.	5. 'Hetero' means different.
6. <u>Example</u> : Tea, fruit juice, medicine, milk, blood, etc Soil solution, Alcohol and water etc.	6. <u>Example</u> : Ice in water, Oil in water, soil and water, Assorted Candies etc.