

Matter

Short / Long answer questions

B.

1. Define matter. What is its composition?

Ans: Matter is defined as anything which occupies space and has mass. It can be perceived by our senses of smell, touch & sight, hearing and taste.

Ex: - Air, Water, table, Bruphure, oil, Plants etc.

Ancient Indian Philosophy thought that matter is made up of

Q. Name the three states of matter.

A: The three states of matter are solid, liquids and gases.

Solid → A solid has a definite shape and definite volume.

Ex: → wood, stone, iron, ice etc.

Liquid → A liquid has a definite <sup>Volume</sup> ~~shape~~ not a definite ~~volume~~ shape.

Ex: → Water, juice, milk, oil, etc.

Gases → A gas neither has definite shape nor a definite volume.

ex: → air, hydrogen, oxygen, water vapour etc.

Q.3. What is a molecule?

A: → The smallest unit of matter which can exist independently is called molecule.

Ex: → Oxygen molecule ( $O_2$ ) made up of two

Q1) Mention one example each of a monoatomic and a diatomic molecule

Ans: Monoatomic Molecule:  $\rightarrow$  Helium, Neon.

Diatomic Molecule:  $\rightarrow$  Hydrogen ( $H_2$ )  
Oxygen ( $O_2$ )

Thus, the diameter of a water molecule is nearly  $1.27 \times 10^{-9}$  metre.

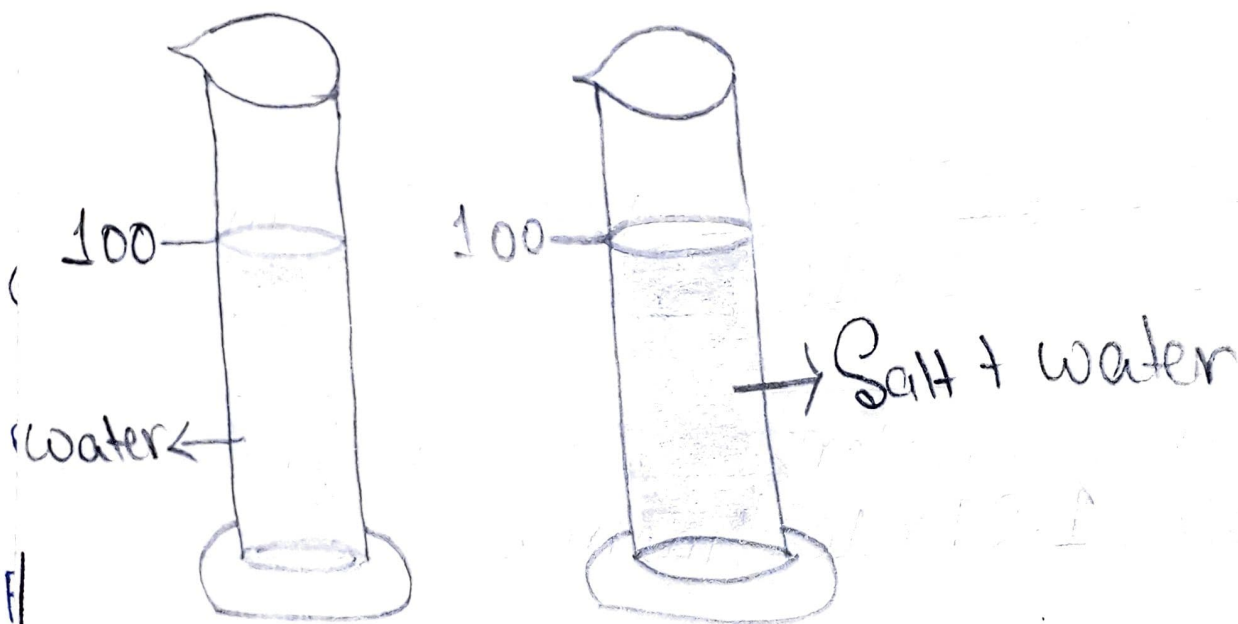
5-~~Q~~ What do you mean by inter-molecular space?

A:  $\rightarrow$  Intermolecular Space - The space between any two consecutive molecules of a substance is called intermolecular space.

6-~~Q~~ Describe a simple experiment to illustrate the existence of inter-molecular spacing.

A:  $\rightarrow$  Take 100 ml of water in a measuring cylinder. Add 20 g of salt in water gently and stir it well so as to dissolve the salt well in water. It is noticed

that the level of water does not change. It shows that the particles of salt occupy spaces between the particles of water.



a) Water alone

b) Salt added to water

The particles of salt occupy the spaces between the particles of water.

7. What do you mean by inter-molecular forces?

Ans: Intermolecular force of attraction - The force of attraction between the molecules (like molecules or unlike molecules) is called intermolecular force of attraction.

8. What are the forces of attraction cohesion and adhesion?

Ans: The force of attraction between the molecules of similar kind is called force of cohesion.

Ex: The forces between water molecules.

\* This force of cohesion keep the molecules of substance bind together.

\* The force of attraction between different types of molecules is called force of adhesion.

Ex: When a glass filled with water is emptied some water particles remain

Stuck to the glass due to the adhesion between water molecules and glass.

9. State three characteristics of molecules of matter.  
A: The particles of matter called molecules, have the following characteristics:

1. They are very small in size.
2. They have spaces between them.
3. They are in constant random motion.
4. They always attract each other.

10. State the approximate spacing between two molecules of a matter.

Ans: The spacing between particles of a matter is called inter-molecular space.

10. How do the Solids, liquids and gases differ in their following properties?

- a) Size
- b) Shape
- c) Density



Ans's	Solids	liquid	Gases
Size	They have definite Size	Indefinite	Indefinite
Shape	They have definite Shape	Indefinite	Indefinite
Density	Highly dense	less dense than Solids	less denser than liquids & Solids

(11)

The molecules in substance are in motion. What type of path do they follow?

A:→

The particles in substance aren't at rest (in motion), and they move randomly in all possible directions in Zig-Zag path.

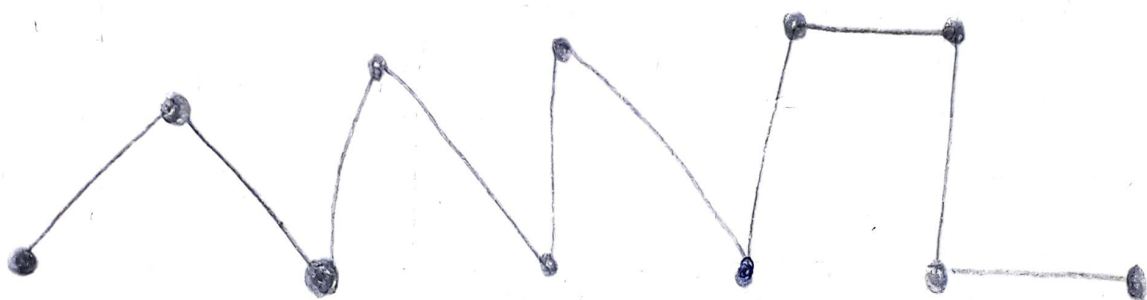
(12)

Describe a simple experiment to illustrate that molecules aren't at rest, but they constantly move.

A:→

Take a beaker. Fill it partly with water. Add some lycopodium powder in the beaker containing water. Stir the contents of the beaker with a glass rod. Take out few drops of this suspension on a glass plate. Place it on the table and illuminate it with a

table lamp. Observe the glass plate through a microscope. It is found that the fine particles of lycopodium powder move rapidly in a random manner and their path is Zig-Zag as shown in figure below.



Zig-zag path of fine particle of

lycopodium powder.

13) Write down five general properties of Solid, Liquids and gases.

Ans: → Solids :-

- \* The molecules here are very tightly packed having negligible or very less intermolecular space.
- \* They have the strongest intermolecular ~~formed~~ force of attraction.
- \* The molecules have very small vibration about their mean position i.e. small.

Amplitude.

- \* They have a definite shape and volume.
- \* They are generally hard and rigid.
- \* They are good conductors of heat.

Liquids:

- \* Molecules here are very tightly packed.
- \* The intermolecular force of attraction is less than that of solids.
- \* The molecules here can move from one place to another.
- \* Don't have any particular shape of their own and thus acquire the shape of the vessel.
- \* A particular quantity of a liquid has a definite volume at a given temperature.

Gases:

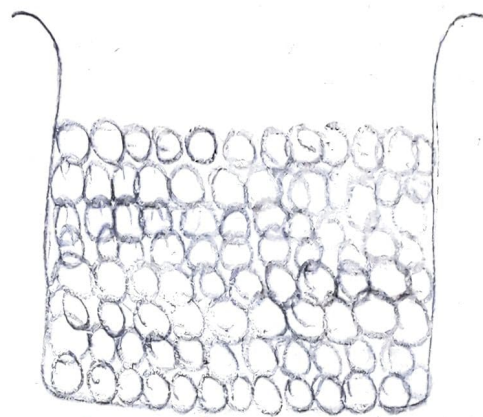
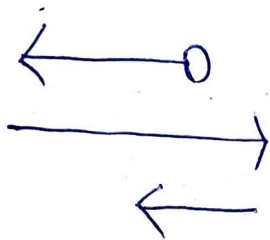
- \* The force of attraction between the molecules is the least.
- \* The intermolecular space is the largest.
- \* Neither have a definite shape nor a definite volume.

- Q1. The molecules move independently.

5. Worst Conductors of heat.

14) Give the molecular model for a solid and use it to explain why a solid has a definite volume and a definite shape.

Ans: 4



vibration of a molecule about its mean position.

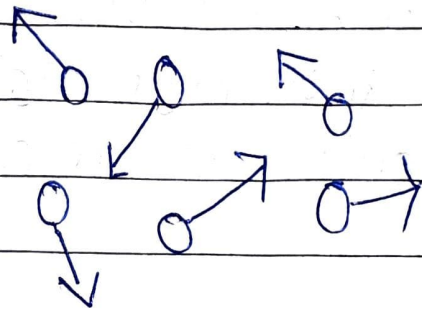
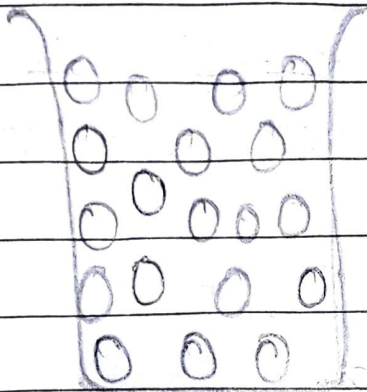
Molecules of a solid arranged closely pack in definite manner, not free to move.

~~In a definite manner, not free~~

Here the molecules are very tightly packed that there is no or very less intermolecular space and there is high intermolecular force of attraction (force of cohesion). The molecules don't move about their mean position and thus solid has a definite shape and volume.

15  
a) Describe the molecular model for a liquid.  
How does it explain that a liquid has no definite shape, but has a definite volume?

Ans:



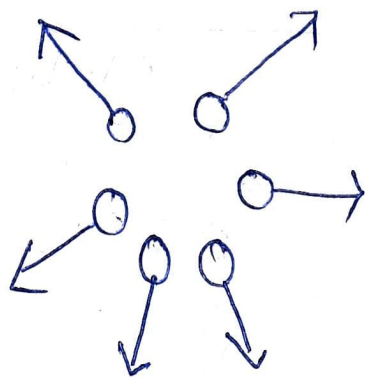
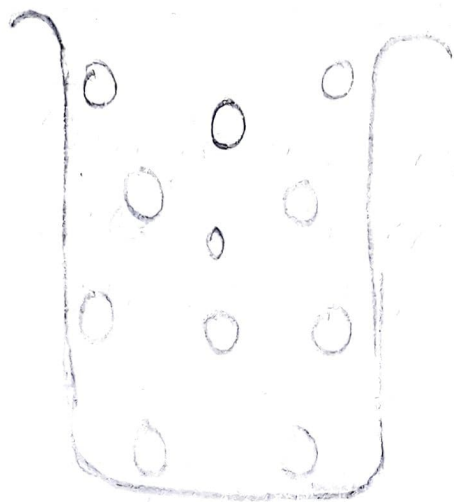
Motions of molecules

Molecules of a liquid arranged less closely are free to move about, within the liquid.

Here the molecules are less tightly packed as compared to solids and also there is lesser force of intermolecular force of attraction. The intermolecular distance is greater than that in the solids. Thus they don't have a definite shape but acquire the shape of vessel in which they are contained but have a definite volume at a given temperature.

Q18) A gas has neither a definite volume nor a definite shape. Describe the molecular model to ~~exa~~ explain it.

Ans: → Here the molecules are far apart from each other i.e. have the greatest intermolecular distance which result into ~~result into~~ the weakest intermolecular forces of attraction. The molecules as aren't



Random motion of molecules.

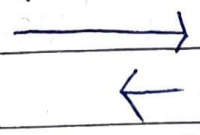
Molecules of a gas are far apart and are free to move about.

Bound by any strong force move about freely and thus thus gases do not have a definite shape and also don't have any definite volume.

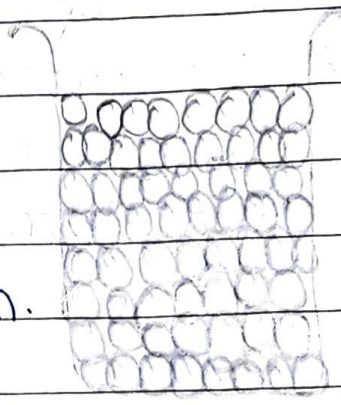
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Distinguish between the ~~two~~ three states of matter - Solid, liquid and gas on the basis of their molecular models.

As Solids:



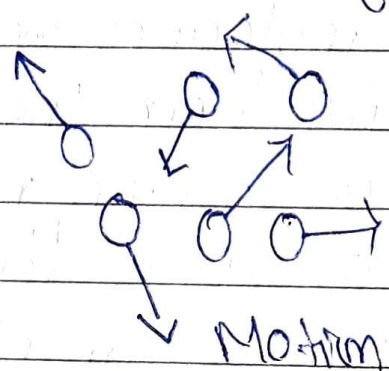
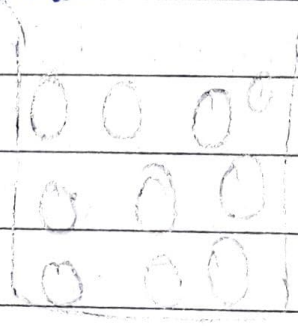
vibration of a molecule about its mean position.



Here the molecules are very tightly packed that there is no or very less intermolecular space and there is high intermolecular force of attraction (force of cohesion).

The molecules don't move about their mean position and thus Solids have a definite shape and volume.

Liquids: →

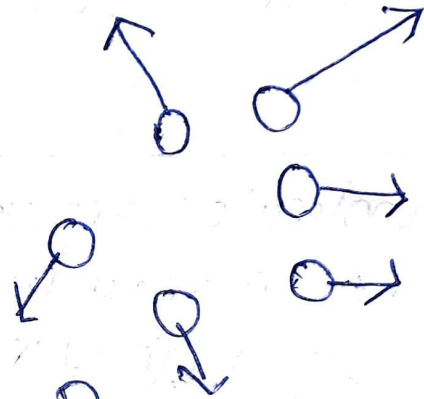
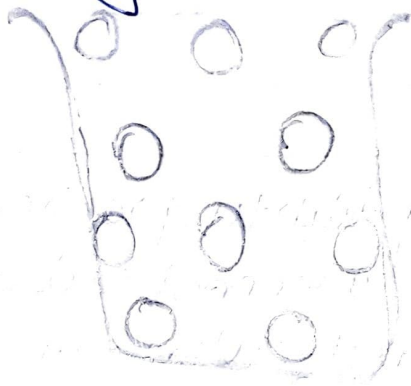


Motion of molecules.

Here the molecules are less tightly packed as compared to Solids and also there

7  
VI is lesser force of intermolecular attraction. The intermolecular distance is greater than in the solids. Thus they don't have a definite shape but acquire the shape of the vessel in which they are contained but have a definite volume at a ~~given~~ given temperature.

Gases:



Random motion of molecules.

Here the molecules are far apart from each other i.e. have the greatest intermolecular distance which result into the weakest intermolecular forces of attraction. The molecules as aren't not bound by any strong force move about freely and thus gases don't have a definite shape and also don't have any definite volume.



1800. Distinguish between Solids, liquids and gases on the basis of their following properties: →

- a) Compressibility
- b) fluidity
- c) rigidity
- d) expansion on heating.

A:→

	Solid	liquid	Gases
a) Compressibility	Not Compressible	Negligibly Compressible	Highly Compressible
b) Fluidity	Not possible	Can flow	Can flow
c) Rigidity	Highly rigid	less rigid	Not rigid
d) expansion on heating	low	More than Solids	More than liquids

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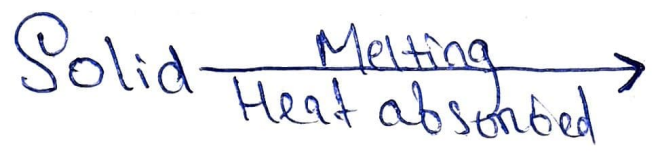
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What do you mean by the change of state of matter? Explain:

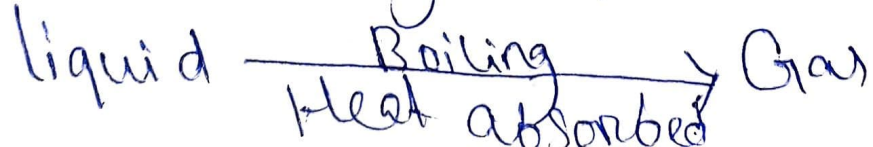
- a) the change of a solid into a liquid at a constant temperature, and
- b) the change of a liquid into a gas at a constant temperature.

Ans: The change in state of matter of a substance from solid to liquid or from liquid to gas is brought by imparting heat energy to it at a constant temperature.

a) The process of change of a substance from solid state into its liquid state on absorption of heat at a particular temperature, called the melting point, is ~~called~~ called melting or fusion i.e.



b) The process of change of a substance from a liquid state to its gaseous state at a particular temperature, called the boiling point, is called boiling vaporisation, i.e.



20 Complete the following

(a) Solid Melting → Liquid

(b) liquid Boiling → Gas