

B. Short/Long answer questions.

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 sense of smell, touch, sight, hearing and taste.
Matter is composed of tiny particles known as atoms.

2. Name three states of matter?

Ans → The three states of matter are solids, liquids, gases.

Solid - A solid has a definite shape and volume. Example - Wood, Stone, Iron etc.

Liquid - A liquid has a definite but no definite shape. Example - Water, Juice, Milk etc.

Gas - Neither a definite shape nor a definite volume. Example - Hydrogen, Oxygen, water vapour etc.

3. What is a molecule?

Ans → Smallest unit of matter which can exist independently is called molecule. Example - Oxygen molecule (O_2) made up of two (O) atoms.

4. Mention one example of a monoatomic and a diatomic molecule.

Ans → Example of monoatomic molecule - Neon, Argon etc.

Neo.

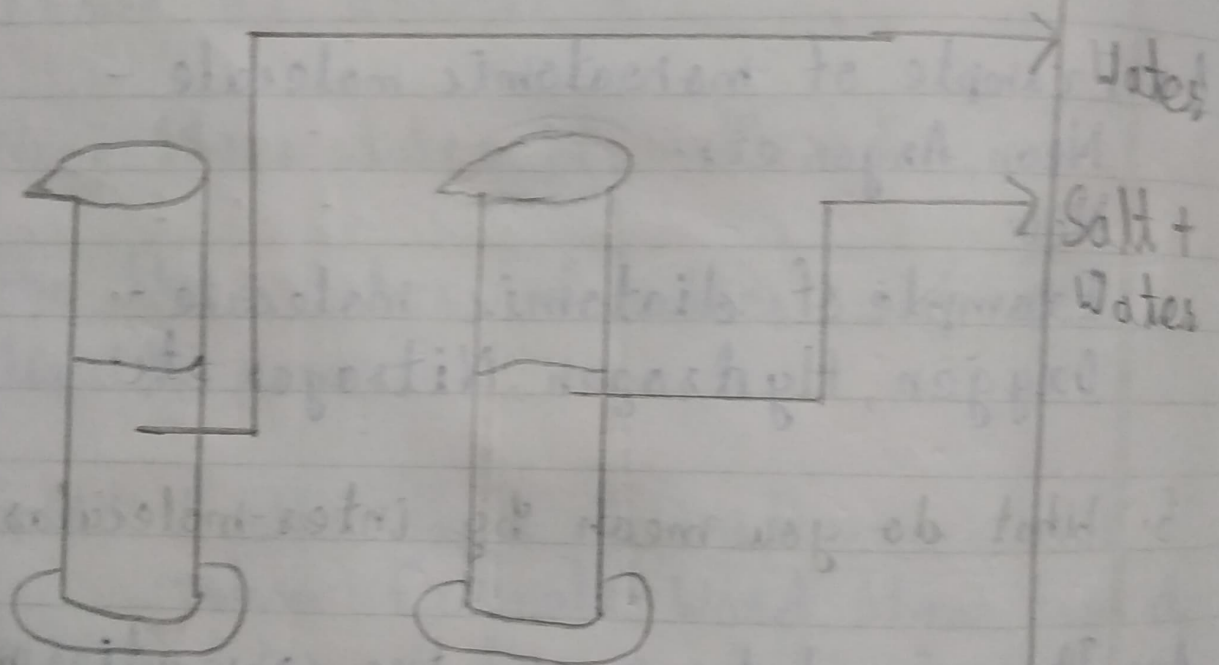
Example of diatomic molecule - Oxygen, Hydrogen, Nitrogen etc.

5. What do you mean by inter-molecular spacing?

Ans → The space between any two consecutive molecules of a substance is called inter-molecular space.

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

Ans To We should take 100ml of water in a measuring cylinder. Add 20 gram of salt in water gently and stir it well so as to dissolve the salt ~~water~~ well in water. It is noticed that the level of water does not change. It shows that the particles of salt have occupied the spaces between the particles of water.



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

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

Ans → The force of attraction between the molecules (like molecules or unlike molecules) is called inter-molecular force of attraction.

8. What are the forces of cohesion and adhesion?

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

Example: The forces between water molecules.

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

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

Example: When a glass 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 which determine its solid, liquid and gaseous state.

Ans → The particles of matter is 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. How do solids, liquids and gases differ in their following properties:

(a) Size

(b) Shape

(c) Density

Ans

Solids

Liquids

Gases

Size

They have a definite size.

Indefinite.

Indefinite.

Shape

They have a definite shape.

Indefinite.

Indefinite.

Density

Highly dense.

Less dense than solids.

Lesser less dense than solids and liquids.

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

Ans → The particles in a substance are not at rest (in motion), and they move randomly in all possible directions in a zig-zag path.

~~12. Describe a simple~~

13. Write down five general properties of solids, liquids and gases.

Ans → Solids here

1. The molecules are very highly tightly packed having negligible or very less intermolecular space.
2. They have the strongest intermolecular force of attraction.
3. The molecules have very small vibration about their mean position i.e. small amplitude.
4. They have a definite shape and volume.

5. They are generally hard and rigid.

6. They are good conductors of heat.

Liquids

1. Molecules are less tightly packed.

2. The intermolecular force of attraction is less than that of solids.

3. The molecules here can move from one place to another.

4. Do not have any particular shape of their own and thus ~~acq~~ acquire the shape of the vessel.

5. A particular quantity of a liquid has a definite volume at a given temperature.

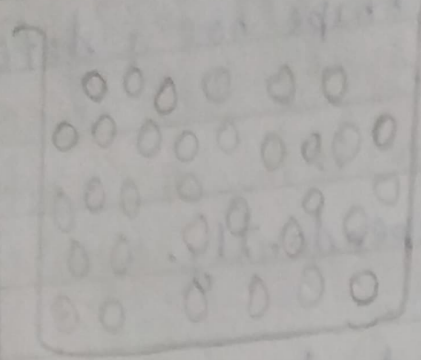
Gases

1. The force of attraction between the molecules is the least.

2. The intermolecular space is the largest.

- 3. Neither have a definite shape nor a definite volume.
- 4. The molecules move independently.
- 5. ~~Worst~~ Worst conductors of heat.
- 15. Describe the molecular model for a liquid. How does it explain that a liquid has no definite shape, but has a definite volume?

Ans → Here the molecules are less tightly packed as compared to solids and also there is lesser intermolecular force of attraction. The intermolecular distance is greater than that in 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 temperature.

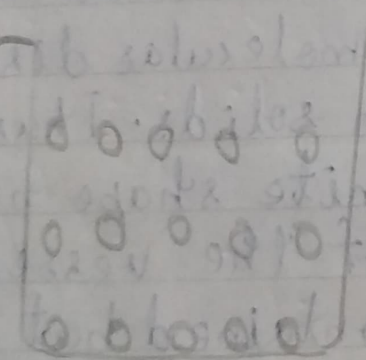


Motion of molecules

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

16. A gas has neither a definite volume nor a definite shape. Describe the molecular model to explain it.

Ans →



Random motion of molecules

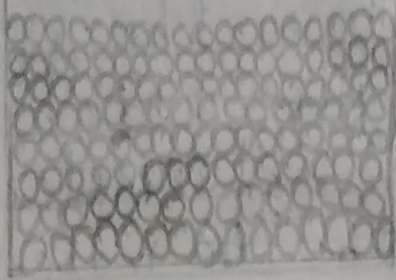
Molecules of a gas are far apart and are free to move about.

Here the molecules are far apart from each other ~~tho~~ i.e. have the greatest intermolecular distance which result ~~to~~ into the weakest intermolecular forces of attraction. The molecules are not bounded by any strong force move about freely and thus gases do not have a shape and also do not have any definite volume.

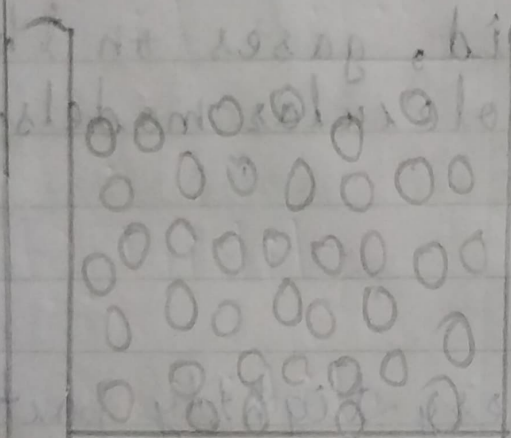
17. Distinguish between the three states of matter solid, liquid, gases on the basis of their molecular models.

Ans) Solids

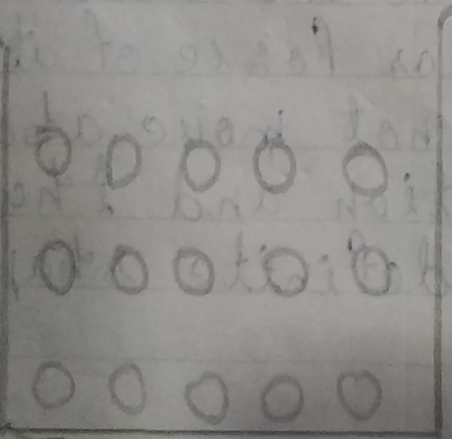
The molecules are very tightly packed ~~an~~ i.e. there is no or very less intermolecular space and there is high intermolecular force of attraction. The molecules do not move about their mean position and thus solids have a definite shape and volume.



Vibration of a molecule
about its mean
position



Motion of molecules



Random motion of
molecules

Liquids

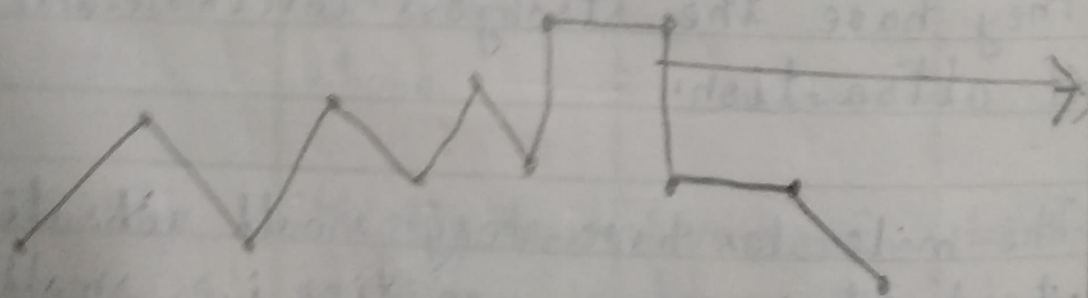
Here the molecules are less tightly packed as compared to solids and also there is lesser intermolecular force of attraction. The intermolecular distance greater than that ~~it~~ in solids. Thus, they do not have a definite shape but acquire the shape of the ~~vessel~~ in vessel in which they are contained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

Gases

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

12) Describe a simple experiment to illustrate that molecules are not at rest, but they constantly move.

Ans) We ~~will~~ should take a beaker. Fill it partly with water. Add some Lyropodium 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 Lyropodium powder move rapidly in a random manner and their path is zig zag as shown in the figure below.

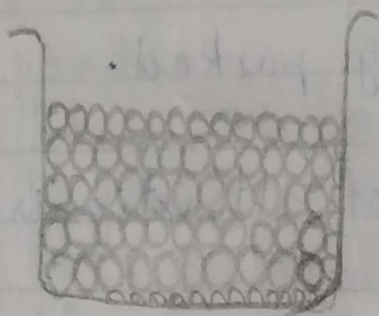


Movement
of particles
of
Lyropodium

Zig zag path of fine particles
of Lyropodium powder.

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

Ans →



Vibration of a molecule on either side of its mean position.

Molecules of a solid are arranged closely and in a definite manner, not free to move about.

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 do not move about their mean position and thus solids have a definite shape and volume.

18. Distinguish between solids, liquids and gases on the basis of their following properties:

- Compressibility
- Fluidity
- Rigidity
- Expansion on heating

Ans: c

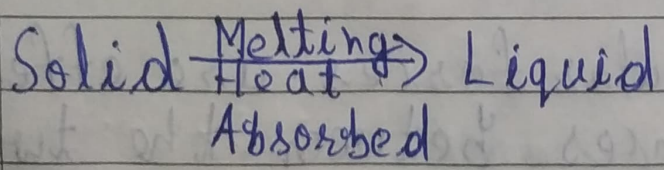
	<u>Solids</u>	<u>Liquids</u>	<u>Gases</u>
a) Compressibility	Not compressible.	Negligibly compressible.	Highly compressible.
b) Fluidity	Not possible.	Can flow.	Can flow.
c) Rigidity	Highly rigid.	Less rigid.	Not rigid.
d) Expansion on heating	Low.	More than solids.	More than liquids.

19. What do you mean by 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 ~~a~~ ~~liq~~ solid to liquid or from liquid to gas is brought by imparting heat to it at a constant temperature.

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



b) The ~~proes~~ 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 or vapourisation, i.e.

Liquid $\xrightarrow[\text{Heat Absorbed}]{\text{Boiling}}$ Gas

20. Complete the following.

a) Solid $\xrightarrow{\text{Melting}}$ Liquid

b) Liquid $\xrightarrow{\text{Boiling}}$ Gas

A. Objective Questions.

1. Write true or false for each statement:

(a) The molecules of each substance are identical. False

(b) The intermolecular forces are effective at all distances between the two molecules. False

(c) The molecules in a substance are in random motion. True

~~(d) The molecules in a substance are~~

(d) In a gas, the molecules can move everywhere in space. True

(e) Liquids are less viscous than gases. (False)

2) Fill In The Blanks

(a) All the molecules of a substance are identical.

(b) The inter-molecular spacing least in solids more in liquids and still more in gases.

(c) The molecular ~~path~~ motion in liquid and gas is in zig-zag path.

(d) In a solid, the molecules vibrate on either side by they remain at their fixed positions.

(e) The inter-molecular forces are the weakest in gases.

(f) A solid exerts pressure downwards
on its base.

(g) Gases are least dense.

(h) Solids are most rigid.

3. Select the correct alternative:

(a) The diameter of a molecule is
approximately

Ans ~~ii~~ iii) 10^{-10} m

(b) The inter-molecular forces are strongest
in

Ans i) solids,

(c) The molecules

Ans ~~ii~~ iii) in a liquid, move within its
boundary

(d) Solids are

Ans more dense

(e) The ~~intermolecular~~ inter-molecular forces in liquids are

Ans) iii) weaker than in solids

4. Match the following columns:

Column A

Column B

(a) A molecule is composed of

(i) does not exist free in nature. (a)

(b) Ice, water and water vapour

(ii) can vibrate only up to about 10^{-10} m from their mean positions. (e)

(c) An atom

(iii) atoms. (a)

(d) Gases

(iv) are the three states of water. (b)

(e) The molecules of a solid

(v) occupy space. (d)