

A) Objective Questions

1) Write true or false for statement:

a) The molecules of each ~~of~~ substances are identical.

False

b) The inter-molecular forces are effective to all distance between the two molecules.

False

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

True

d) In a gas, the molecules ~~is~~ can move anywhere in space.

True

e) Liquids are less viscous than gases.

False

2) Fill in the blanks:

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

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

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- c) The molecular motion in liquid and gas is in zig zag path.
 - d) In a solid, the molecules vibrate on either side but they remain at their fixed position.
 - e) The inter-molecular forces are the weakest in gases.
 - f) A solid exerts pressure downwards on its bases.
 - g) Gases are least dense.
 - h) Solids are most rigid.

3. Select the correct alternative:

a) The diameter of a molecule is approximately

- i) 1 cm ii) 10 cm ~~iii) 10^{-10} m~~ iv) 1 m

b) The inter-molecular forces are strongest in

- ~~i) solid~~ ii) liquid iii) gases iv) both (i) and (ii)

c) The molecules

- i) in solid liquid and gas, move free anywhere.
- ii) in a solid, move freely within boundary.
- iii) in a liquid, move within its boundary.
- iv) in a gas, move only within its boundary.

d) Solids are

- i) more dense
- ii) less dense
- iii) least dense
- iv) highly compressible

e) The inter-molecular forces in liquid are:

- i) as strong as in solid
- ii) stronger than in solids
- iii) weaker than in solids
- iv) weaker than in gases

4. Match the following columns:

Column A

Column B

a) A molecule is composed

of

b) Ice, water and water vapour

e) An atom

d) Gases

e) The molecules of a solid

i) does not exist free in nature

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

iii) atoms.

iv) are the three states water.

v) occupy space

B. Short / Long answer questions

1) Define matter. What is its composition?

Answer:- 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.

2) Name the three states of matter.

Answer:- The three states of matter are solids, liquids and gases.

Solids - A solid has a definite shape and definite volume.

Example :- Wood, stone, iron, ice etc.

Liquid - A liquid has a definite volume but not definite shape.

~~Example:- air, hydrogen, oxygen, water vapour etc.~~
Example:- water, juice, milk, oil etc.

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

Example:- air, hydrogen, oxygen, water vapour etc.

3) What is a molecule?

Ans:- The smallest unit of matter which can exist independently is called molecule.

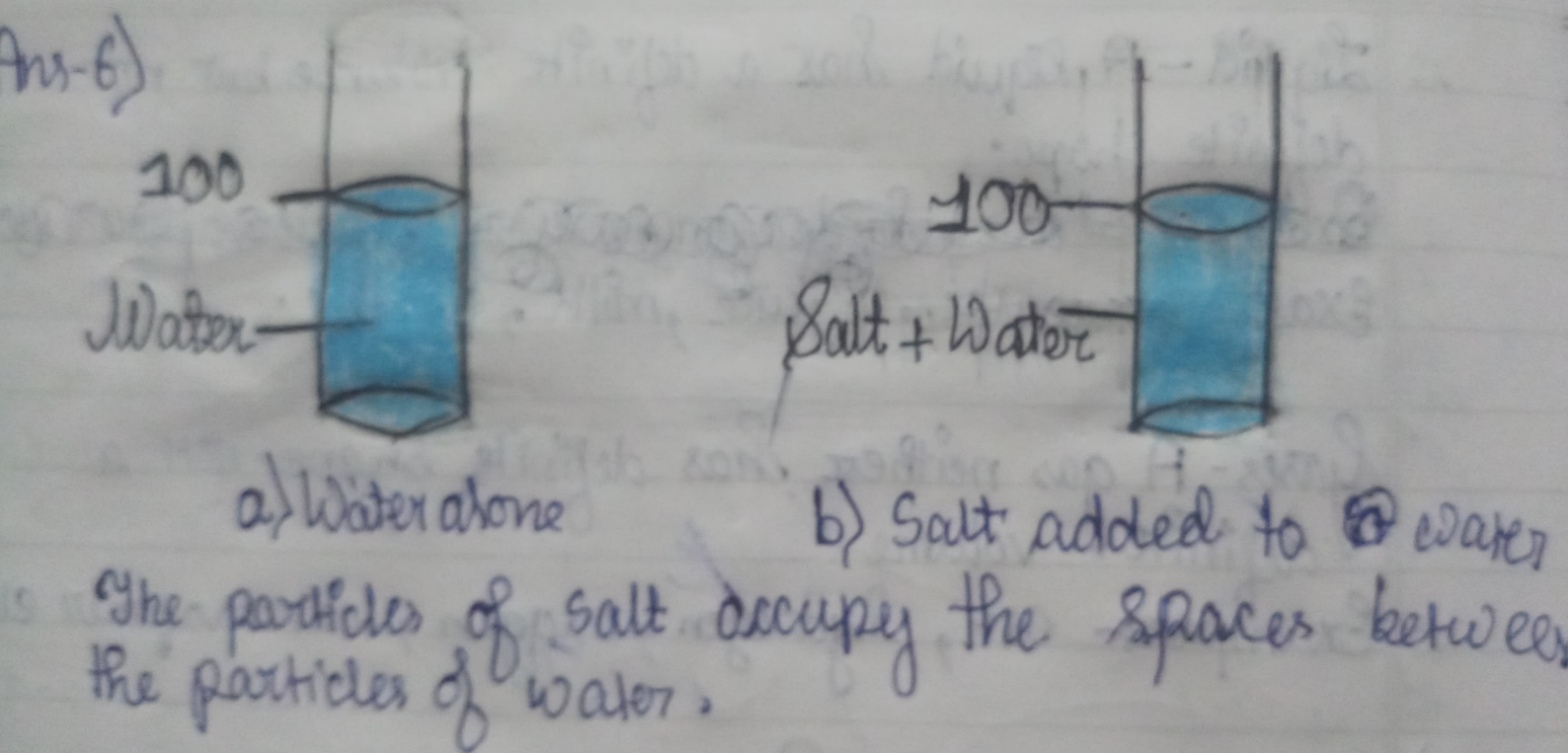
Example:- Oxygen molecule (O_2) made up of two (O) atoms.

4) Mention one example each of a monoatomic and diatomic molecules.

Ans:- One Example of monoatomic :- argon
One Example of diatomic :- Oxygen

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

Ans:- Intermolecular space - The space between any two consecutive molecules of a substance is called intermolecular spacing.



6) Describe a simple experiment to illustrate the existence of intermolecular spacing?

Ans:- Take 100 ml of water in a measuring cylinder. Add 20 gram 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.

7) What do you mean by inter molecular forces?

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

8) What are the forces of cohesion and adhesion?

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

Example:- The forces between water molecules. The forces of cohesion keep the molecules of the substance bind together.

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

Example :- 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 which determine its solid, liquid and gaseous state.

Ans:- The three characteristics of molecules of matter which determine its solid, liquid and gaseous state are:-

- i) Inter-molecular space,
- ii) force of attraction between the molecules
- iii) movement of molecules.

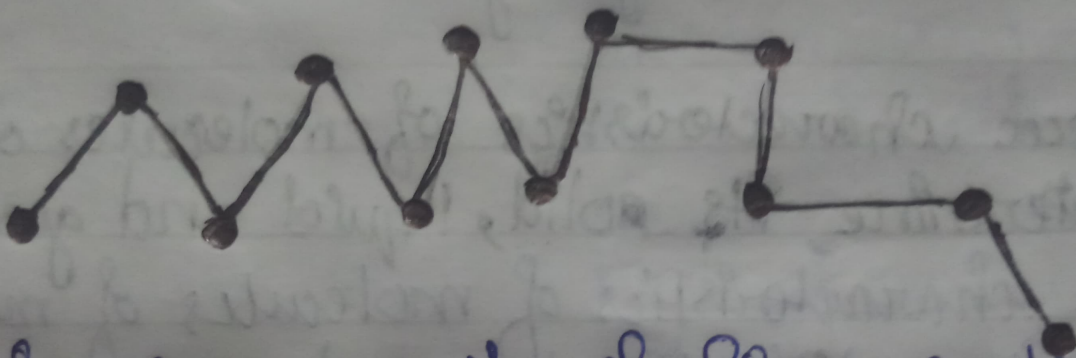
10) How do solids, liquids and gases differ in their following properties.

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

Ans:-

	Solids	Liquids	Gases
Size	They have definite size	Indefinite	Indefinite
Shape	They have definite shape	Indefinite	Indefinite
Density	Highly dense	Less denser than solids	Less denser than liquids and solids

Ans) 12)



Zig Zag path of fine particles of
lycopodium powder

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 experiment to illustrate that molecules are not at rest, but they constantly move.

Ans:- 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 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.

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

Ans:- Solids:

- 1) The molecules here are very 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 small amplitude.
- 4) They have a definite shape and volume.
- 5) 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 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.
~~The molecules here can move from one place to another.~~
- 3) Neither have a definite shape nor a definite volume.
- 4) 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.

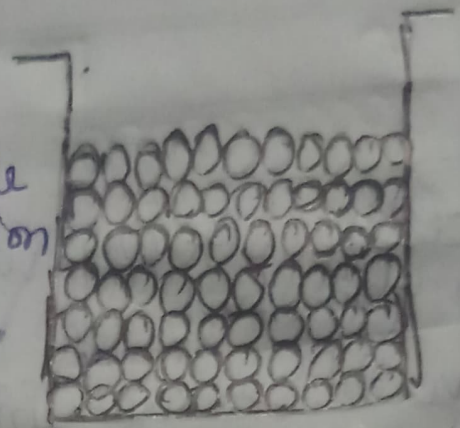
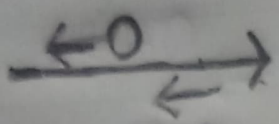
Ans:- Here the molecules are very tightly packed that there is no or very less intermolecular space and there is high intermolecular force of attraction (force of cohesion). The molecules do not move about their mean position and thus solids have a definite shape and volume.

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

Here the molecules are less tightly packed ~~that~~ as compared to solids and also there is lesser force of intermolecular attraction. The intermolecular distance is

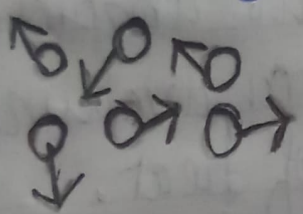
Ans: 14

vibration of a molecule about its mean position

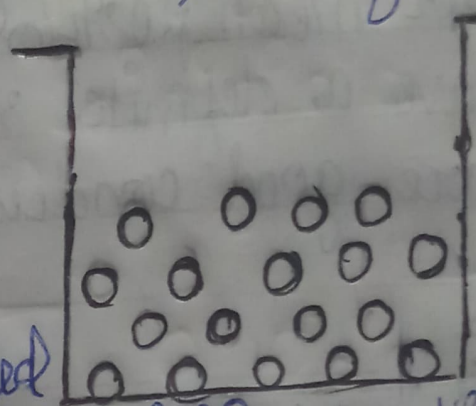


Molecules of a solid are arranged closely and in a definite manner, not free to move about.

Ans: 15

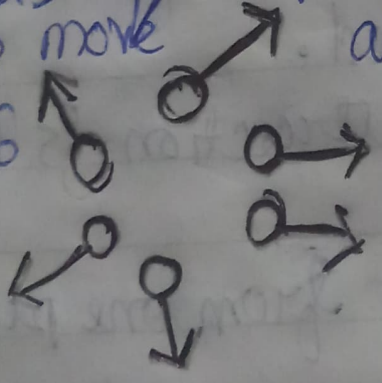


Motion of molecules free to move about, Molecules of a liquid are arranged less closely and are free to move about within the liquid.

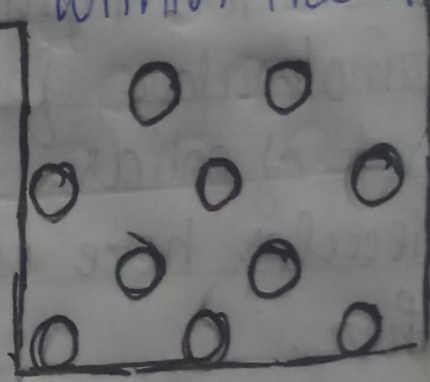


less closely and are free to move about within the liquid.

Ans: 16



Random motion of a molecule



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

greater than that in the solids. Thus, they do not 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.

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

Here the molecules are far apart from each other have the greatest intermolecular distance which result into the weakest intermolecular forces of attraction. The molecules as 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.

~~Here the molecules are far apart from each other have the greatest intermolecular distance which result into the weakest intermolecular forces of attraction. The molecules as 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.~~

17) Distinguish between the three states: solid, liquid and gases on the basis of their molecular model.

Ans:- Solid

Here the molecules are very tightly packed that there is no or very less 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.

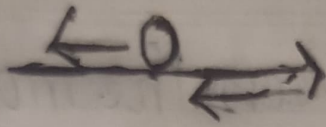
Liquids:

Here the molecules are less tightly packed as compared to solids and also there is lesser force of intermolecular attraction. The intermolecular distance is greater than that in the solids. Thus, they do not 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.

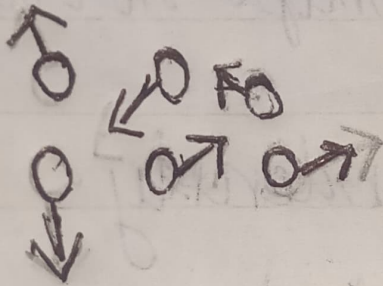
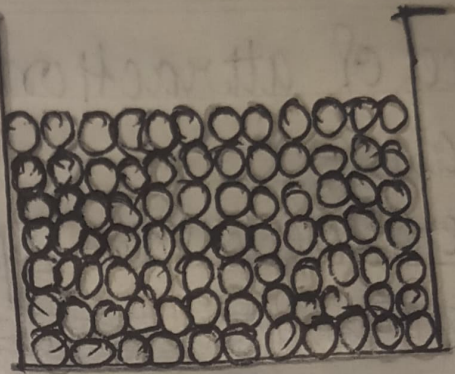
Gases:

Here the molecules are far apart from each other have the greatest intermolecular distance which result into the weakest intermolecular forces of attraction. The molecules as 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.

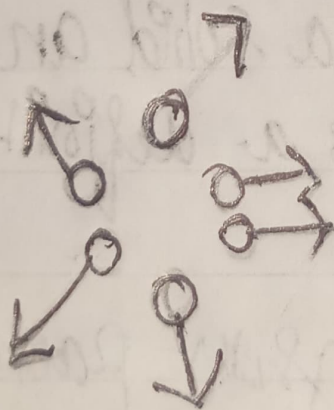
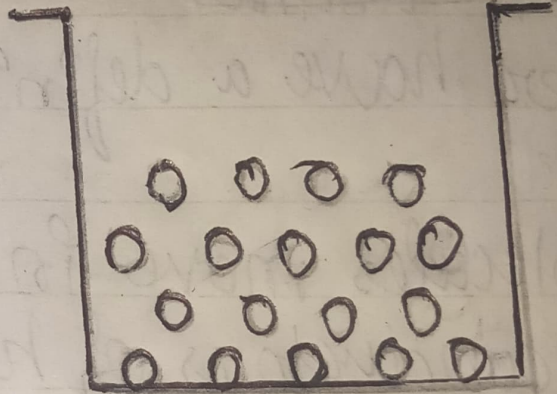
Ans-17



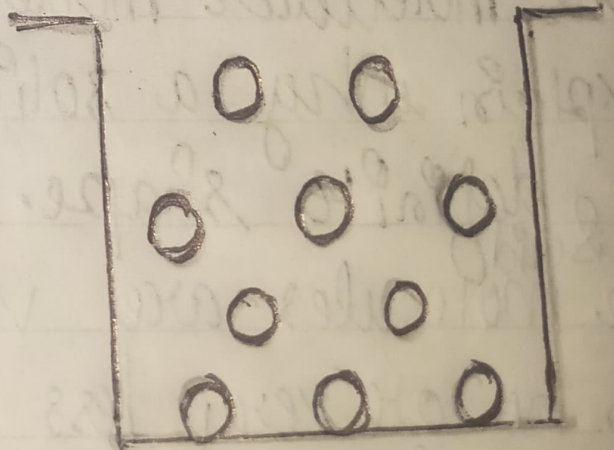
Vibration of a molecule on either side of its mean position.



Motion of molecules



Random motion of molecules



Q no-18) Distinguish between solid, liquids and gases on the basis of their following ~~for~~ properties:

- a) compressibility
- b) fluidity
- c) rigidity
- d) expansion on heating

	Solids	Liquid	
a) Compressibility	Not compressibility	Negligibly compressibility	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:

Ans:- The change in state of matter of a substance from solid ~~state into its liquid state~~ or to liquid or from liquid to gas is brought by imparting heat energy to it at a constant temperature. ~~solid~~ ~~the melting point~~ is called ~~melting~~ or ~~fusion~~

a) The change of a solid into a liquid at a constant temperature. ~~or~~

ans- 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 melting or fusion.

Solid $\xrightarrow[\text{Heat absorbed}]{\text{Melting}}$ Liquid

b) The change of a liquid into a gas at a constant temperature.

ans- 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 or vaporisation.

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

20. Complete the following :

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

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