

Write true or false

a The molecules of each substance are identical = False

b The inter-molecular forces are effective at all distances between the two molecules. = False

c The molecules in a substance are in random motion. = True

d. In a gas the molecules can move anywhere in space = True

e liquids are less viscous than gases = False

3.

Select the correct ans

- a. The diameter of a molecule is approximately -  $10^{-10}$  m
- b. The inter-molecular force are strongest + in - Solid
- c. The molecules - in a liquid move within its boundary.
- d. Solid are - more dense
- e. The intermolecular space force in liquids are - weaker than in solids

2.

Fill up

- a. A solid exerts pressure downwards on its base
- b. Gases are least dense.

### Fillup

- d. All the molecules of substance are identical.
- e. The inter-molecular force are the weakest in gases.
- f. In a solid, the molecules ~~vibrate~~ but they remain at their fixed position.
- g. The molecules motion in liquid and gas is in Zig-Zag path.
- h. The inter molecular spacing is least in liquid and more and still more in gases.

### Match the following

- a. A molecule is composed of atom
- b. Ice, water and water vapour - can vibrate only up to about 10<sup>-10</sup> m from their mean positions.

## 1-1 Match the following

- c. An atom - does not exist free in nature
- d. Gases - occupy space
- e. The molecules of a solid - are the three state of matter.

### \* Short / long answer questions:

1. Define matter. What is its composition?  
A. 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 the three states of matter.

\* 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 ect.

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

Example - Water, Juice, milk, oil etc.

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

Example - air, hydrogen

What is a molecule?

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

Example - oxygen molecule ( $O_2$ ) made up of two (O) atoms.

What is the approximate size of a molecule?  
Matter is made up of molecules which are very small in size ( $\sim 10^{-10}m$ )

What do you mean by inter-molecular spacing?

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

Describe a simple experiment to illustrate the existence.

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.

What do you mean by inter-molecular forces?

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

~~What do you mean by inter-molecular force?~~

~~What do~~

What do you mean by inter-molecular force.

119 Q What are the forces of cohesion and adhesion?

A: The force of attraction between molecules of similar kind is called cohesion. Example The force between water molecules. This force of cohesion binds the molecules of the substance together. The force of attraction between different molecules is called force of adhesion. Example - When a glass filled with water is emptied some water particles remain to the glass due to the adhesion between water molecules and glass.

10 Q State three characteristics of molecules in matter.

A: The particles of matter called molecules have following characteristics:  
They always attract each other.  
They are very small in size.  
They are in constant random motion.  
~~They~~ They have spaces between them.

11 Q State the approximate spacing between two molecules of a matter. S

12. How do the solid, liquid and gases differ in their following properties  
Size  
Shape  
Density

Ans Size      Solid      liquids      gases

Size = They have      indef      inde-  
definit      unit      finit  
shape      e      e

Shape - They have      ind-      ind-  
definit      efin-      efi-  
shape      ite      nite

Density - Highly      Less than      Less denser than  
dense      solid      liquids and solids

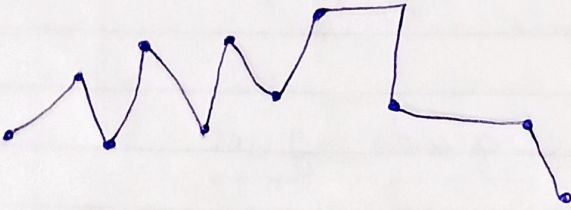
13. Write down The molecules in a substance are in motion. What type of path they follow?

A The molecules in The particles in a substance are not at rest (in motion) and they move randomly in all possible direction in a zig-zag path.

14. Describe a simple experiment to illustrate that molecules are not at rest, but they constantly <sup>move</sup>



13.



Zig zag path vdf

14.

14. Take a beaker. Fill it partly with water. Add some Lycopodium powder to the beaker. Contain some water. Stir the contents of the beaker with water. 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 paths of Lycopodium powder move rapidly in a random manner and their paths in zig zag as shown in figure below.

15. 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.

2. They have the strongest intermolecular force of attraction.

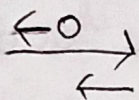
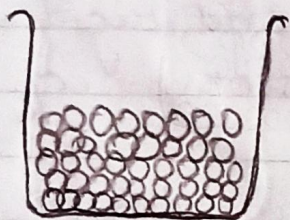
3. The molecules have very small vibration about their mean position. i.e. small amplitude

4. They have a definite shape and volume.
5. They are generally hard and rigid.
6. They are good conductors of heat.

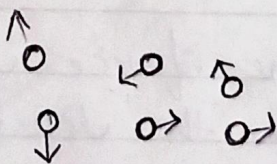
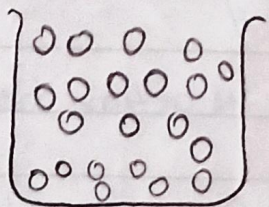
1. Liquids: Molecules are less tightly packed.
2. The intermolecular force of attraction is less than of solids.
3. The molecules here can move from one place to another.
4. Do not have any particular shape of their own and thus acquire the shape of the vessel.
5. A particular quantity of a liquid has a definite volume at a given temperature.

1. Gases: The force of attraction between the molecules is the least.
2. The intermolecular space is the largest.
3. Neither have a definite shape is the largest.
4. The molecules move independently.
5. Worst conductors of heat.

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



vibration of a molecule  
on either side ~~to~~ its  
mean position



Motion of Molecules

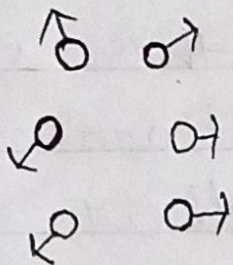
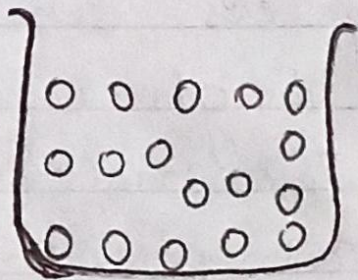
16. Here the molecules are very tightly packed that is most or very less intermolecular space are there is high intermolecular force of attraction. The molecules do not move about their mean position and thus solid have a definite shape and volume.

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

A. Here the molecules are less tightly packed as compare to solid and also there is lesser force of intermolecular attraction. The intermolecular distance is greater than that in the solids and also there thus they do not have a definite shape but acquire the shape of the vessel in which they are contain but have the shape of the vessel in which they are containing but have a definite volume at a given temperature.

18.

19



Random motion of molecules.

A

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

20. Distinguish between the three state of matter  
Solid: liquid and gas on the basis of their molecular

A. Hence the molecules are very tightly <sup>mols</sup> packed that there is no or very less intermolecular space and there high intermolecular force of attraction.

The molecules do not move about their mean position and thus solid have a definite shape and volume.

liquids:

Hence the molecules are very tightly packed that there is ~~no~~ <sup>less</sup> very less ~~is~~ <sup>is</sup> compared to solids and also there is lesser force of intermolecular ~~and~~ force attraction.

20A

	Solids	Liquids	Gases
a. Compressibility	Not compressible	Negligibly compressible	Highly compressible
b. Fluidity	Not possible	Can Flow	Can Flow
c. Rigid	Highly rigid	Less rigid	Not rigid
d. expansion on heating	Low	More than solid	More than liquids.



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 i.e. have the greatest intermolecular distance which results 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.

20. Distinguish between solid, liquids and gas on the basis of their following properties:
- compressibility
  - fluidity
  - rigidity
  - expansion on heating

2.1A. What do you mean by the change of state of matter? explain.

20.A

a. Solid Heat  $\rightarrow$  Liquid

b. Liquid Boiling  $\rightarrow$  Gas