

## Test Yourself

B) Short/Long answer Questions.

Q1) Define matter. What is its composition?

ans) Matter is defined as anything which occupies space and has mass. It can be perceived by sense of smell, touch, sight, hearing and taste. Matter is composed of tiny particles known as atoms.

Q2) Name the three states of matter.

ans) 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 - water, juice, milk, oil, etc.

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

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

Q3) What <sup>is</sup> ~~are~~ a molecule?

ans) The smallest unit of matter which can exist independently is called molecule. Ex: Oxygen molecule ( $O_2$ ) made up of two atoms.

Q/4) What is the approximate size of a molecule?

ans) Matter is made up of molecules which are very small in size ( $\sim 10^{-9}$  m).

Q/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 space.

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

ans) Take 100 ml of water in a measuring cylinder. Add 20 gram of salt in water gently and stir it well to do 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.

Q/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 inter-molecular force of attraction.

Q 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.~~

~~Example: The forces between water molecules.~~

This force of cohesion keeps 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 filled with water is emptied some water particles remain stuck to the glass due to the glass due to the adhesion between water molecules and glass.

Q 9) State three characteristics of molecules of matter which determine its solid, liquid or gaseous state.

ans) The characteristics of matter that determine solid, liquid and gas are:

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

Q) How do solids, liquids and gases differ in their following properties:

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

ans)	<u>Solids</u>	<u>Liquids</u>	<u>Gases</u>
Size	They have definite shape and size	Indefinite	Indefinite
Shape	They have definite shape	Indefinite	Indefinite
Density	Highly dense	Less denser than solids	Less denser than liquids and solids

Q) 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 zig-zag path.

Q12) 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 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 the figure below.



zig zag path of fine particle of lycopodium powder.

Q13) 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 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:

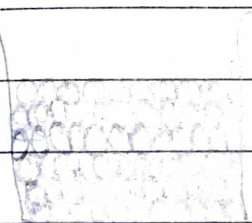
- 1) Molecules are less tightly packed.
- 2) The intermolecular force of attraction is less than of solids.
- 3) The molecules here can move from one place to another.
- 4) Do not have any particular shape of their own and thus acquire the shape of the vessel.
- 5) A particular quantity of a liquid has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

Gases:

- 1) The force of attraction between the molecules is the least.
- 2) The inter-molecular space is the largest.
- 3) Neither have a definite shape nor a definite volume.
- 4) The molecules move independently.
- 5) Worst conductors of heat.

Q14) Give the molecular model of a solid. ~~tip~~ and use it to explain why a solid has a definite volume and a definite shape.

ans)



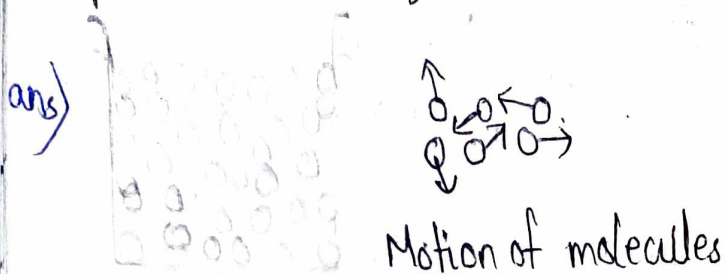
Vibration of a molecule about its mean position

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

Here the molecules are very tightly packed that there is no or very less intermolecular space and ~~there~~ 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 liquid. How does it explain that a liquid has no definite shape, but has definite volume.



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

Hence 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.

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

ans) Hence 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 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.