

Name

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Std.

VII

Div.

D

ODM CONNECT worksheet

Chapter 1

1. MCQs

a) The diameter of a molecule is approximately  
1) 1 cm                       3)  $10^{-10}$  cm  
2) 10 cm                     4) 1m

b) The inter-molecular forces are strongest in  
 1) Solids                     3) Gases  
 2) Liquids                  4) Both (1) and (2)

c) The molecules  
 1) In solid, liquids and gases moves freely anywhere.  
 2) In solid, move freely within its boundary.  
 3) In liquid, move within its boundary.  
 4) In Gas, move ~~freely~~ only within its boundary.

d) The solids are  
 1) more dense  
 2) less dense  
 3) ~~the~~ least dense  
 4) Highly compressible

e) The intermolecular forces in liquids are

- 1) as strong as in solids
- 2) stronger than in solids
- 3) weaker than in solids.
- 4) weaker than in gases.

1. Fill in the blanks

- a) All the molecules of a substance are identical.
- b) The intermolecular spacing is least in the solids, more in liquids and most in gases.
- c) The molecular motion in liquid and gas is in zig-zag path.
- d) In solids, the molecules vibrate but remain in their fixed positions.
- e) The intermolecular <sup>forces</sup> are the weakest in gas.

2) Name the three states of matter.

Ans) The three states of matter are solids, liquids, gas.

3) Define matter. what is its composition?

Matter is anything that has mass and occupies space or volume, and can be perceived by our sense organs.

It is composed of atoms or molecules which is proven by John Dalton. According to ancient philosopher, matter was composed of 5 basic elements:- air (vayu), water (jal) Earth (prithvi), Fire (agni), sky / space (akash) which is known as panchatatva.

4) The molecules in a substance are in motion. Which path do they follow?

The molecules in a substance are in motion. They follow zig-zag path.

5) One litre of water has  $6.02 \times 10^{26}$ . Estimate the size of a molecule

Volume of  $H_2O = 1L = 1000 \text{ cm}^3 = 1000 \times 10^{-6} \text{ m}^3 = 10^{-3} \text{ m}^3$

Volume of  $6.02 \times 10^{26}$  molecule =  $10^{-3} \text{ m}^3$

$\therefore$  Volume of 1 =  $\frac{10^{-3} \text{ m}^3}{6.02 \times 10^{26}} = 1.66 \times 10^{-30} \text{ m}^3$

If we assumed a molecule as a sphere, The diameter is obtain from the formula

$\frac{4}{3} \times \pi \times r^3$

$\frac{4}{3} \times \pi \times \left(\frac{d}{2}\right)^3 = \frac{4}{3} \times \pi \times \frac{d^3}{8} = \frac{1}{6} \pi d^3$



Ans)  
(Continue)

$$\text{Now, } \frac{1}{6} \pi d^3 = 1.66 \times 10^{-20} \text{ m}^3$$

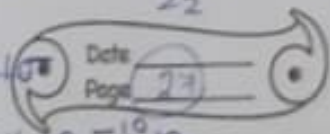
$$\frac{1}{6} \times \frac{22}{7} \times d^3 = 1.66 \times 10^{-20} \text{ m}^3$$

$$d^3 = 1.66 \times 6 \times \frac{7}{22} \times 10^{-20} \text{ m}^3$$

$$d = \sqrt[3]{1.66 \times 6 \times \frac{7}{22} \times 10^{-20} \text{ m}^3}$$

$$d = 1.5 \times 10^{-10} \text{ m}$$

$$d = 1.5 \times 10^{-10} \text{ m}$$



6) What are the forces of cohesion and adhesion?

Ans) The force of cohesion is between the same particles and the force of adhesion is between different particles.

1) How do solids, liquids and gases differ in their following properties?

a) size    b) shape    c) Density

Ans)    Solids                      Liquids                      Gases

|            |                |                  |                  |
|------------|----------------|------------------|------------------|
| a) size    | Definite size  | Indefinite size  | Indefinite size  |
| b) shape   | Definite shape | Indefinite shape | Indefinite shape |
| c) Density | Highly dense   | Less denser      | Least denser     |

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

aim - To show that molecules are in constant motion.

Materials - Ink, glass of water

Procedure - We will drop some ink in the glass of water and will observe it.

Observation - ~~Here~~ We will observe that after some time the water will turn blue as the molecules being in constant motion collide and mix.

conclusion :- Hence proved, particles of matter are in constant motion.

3) Distinguish between the three states of matter - solid, liquid and gas on the basis of their molecular models.

ans)



Solids  
Particles are tightly packed

Liquids  
Particles are loosen a little

Gas  
Particles are very far from each other

- Incompressible
- High density

- compressible
- less density

- compressible
- least density

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

ans)

Solid

- i) Definite shape, size, volume.
- ii) Strong intermolecular force of attraction
- iii) Particles are tightly packed.
- iv) Cannot be compressed

✓ are hard and rigid.

### Liquids

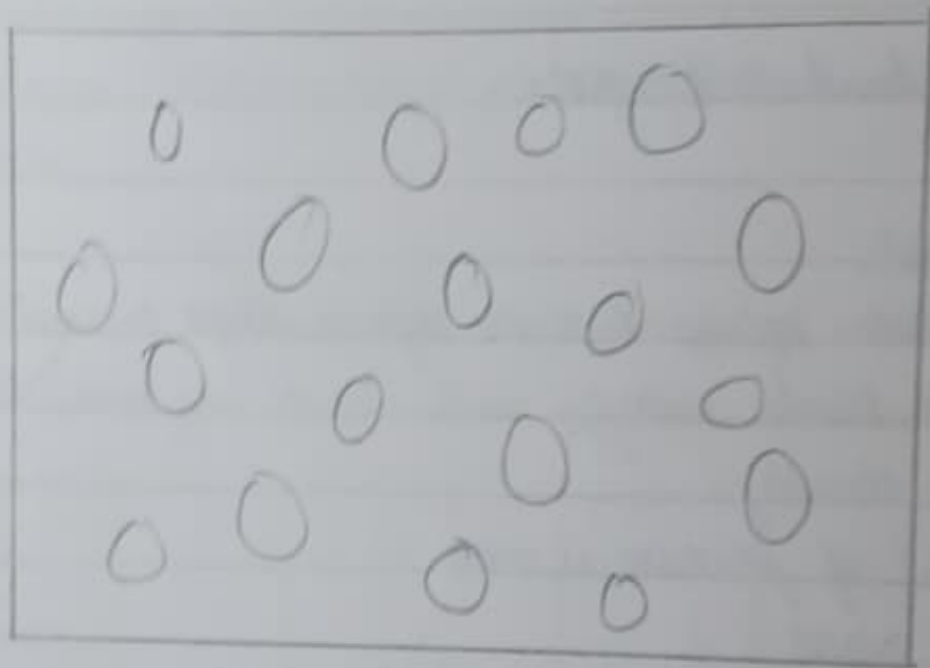
- i) Definite volume but no definite shape.
- ii) More kinetic energy
- iii) Low density
- iv) Effect of pressure is more
- ✓ Less rigid.

### Gases

- i) Indefinite shape and volume
- ii) Intermolecular spaces are more
- iii) Density is low.
- iv) Kinetic energy is maximum
- ✓ No rigidity.

2) Describe a molecular model of a liquid. How does it explain that a liquid has no definite shape, but definite volume.

Ans) In a liquid, particles are <sup>in</sup> close contact, so have a definite volume. However, the particles can move, it has no definite shape and takes the shape of its container.



Molecular model of liquid.