

Science

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(Chapter 1)(Matter in Our Surroundings)(Intext Questions)

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Question 1:

The mass per unit volume of a substance is called density (density = mass/volume). Arrange the following in order of increasing density – air, exhaust from chimney, honey, water, chalk, cotton, and iron.

Answer 1:

The given substances in the increasing order of their densities can be represented as: Air < Exhaust from chimney < Cotton < Water < Honey < Chalk < Iron

Question 2:

- Tabulate the differences in the characteristics of states of matter.
- Comment upon the following: rigidity, compressibility, fluidity, filling a gas container, shape, kinetic energy, and density.

Answer 2:

- The differences in the characteristics of states of matter are given in the following table.

| S No | Solid state | Liquid state | Gaseous state |
|------|---|---|---|
| 1. | Definite shape and volume. | No definite shape. Liquids attain the shape of the vessel in which they are kept. | Gases have neither a definite shape nor a definite volume. |
| 2. | Incompressible | Compressible to a small extent. | Highly compressible |
| 3. | There is little space between the particles of a solid. | These particles have a greater space between them. | The space between gas particles is the greatest. |
| 4. | These particles attract each other very strongly. | The force of attraction between liquid particles is less than solid particles. | The force of attraction is least between gaseous particles. |
| 5. | Particles of solid cannot move freely. | These particles move freely. | Gaseous particles are in a continuous, random motion. |

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b) Rigidity can be expressed as the tendency of matter to resist a change in shape. **Compressibility** is the ability to be reduced to a lower volume when force is applied.

Fluidity is the ability to flow.

By **filling a gas container** we mean the attainment of shape of the container by gas.

Shape defines a definite boundary.

Kinetic energy is the energy possessed by a particle due to its motion.

Density is mass per unit volume.

Question 3:

Give reasons:

- a) A gas fills completely the vessel in which it is kept.
- b) A gas exerts pressure on the walls of the container.
- c) A wooden table should be called a solid.
- d) We can easily move our hand in air, but to do the same through a solid block of wood, we need a karate expert.

Answer 3:

- a) There is little attraction between particles of gas. Thus, gas particles move freely in all directions. Therefore, gas completely fills the vessel in which it is kept.
- b) Particles of gas move randomly in all directions at high speed. As a result, the particles hit each other and also hit the walls of the container with a force. Therefore, gas exerts pressure on the walls of the container.
- c) A wooden table has a definite shape and volume. It is very rigid and cannot be compressed i.e., it has the characteristics of a solid. Hence, a wooden table should be called a solid.
- d) Particles of air have large spaces between them. On the other hand, wood has little space between its particles. Also, it is rigid. For this reason, we can easily move our hands in air, but to do the same through a solid block of wood, we need a karate expert.

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Question 4:

Liquids generally have lower density as compared to solids. But you must have observed that ice floats on water. Find out why.

Answer 4:

The mass per unit volume of a substance is called density (density = mass/volume).

As the volume of a substance increases, its density decreases.

Though ice is a solid, it has large number of empty spaces between its particles. These spaces are larger as compared to the spaces present between the particles of water. Thus, the volume of ice is greater than that of water. Hence, the density of ice is less than that of water. A substance with lower density than water can float on water. Therefore, ice floats on water.

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