

Class 09 Ch 01 Matter in Our surrounding NCERT Solution

In Text 01 Page 03

1. Which of the following are matter? Chair, air, love, smell, hate, almonds, thought, cold, lemon water, smell of perfume.

Ans: Chair, air, almonds, cold, lemon water, smell of perfume.

2. Give reasons for the following observation:

The smell of hot sizzling food reaches you several metres away, but to get the smell from cold food you have to go close.

Ans: Particles of the smell of hot food has more kinetic energy than that of cold food so diffused into air rapidly and reaches us several metres away.

3. A diver is able to cut through water in a swimming pool. Which property of matter does this observation show?

Ans: Particals of matter(water) have space between them help diver cut through water in a swimming pool.

4. What are the characteristics of the particles of matter?

Ans: The characteristics of particles of matter are:

(a) Particle of matter have spaces between them

(b) Particle of matter are always in motion

(c) Particle of matter attract each other

In Text 02 Page 06

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 chimneys, honey, water, chalk, cotton and iron.

Ans: air, exhaust from chimneys, honey, water, cotton , chalk, and iron

2. (a) Tabulate the differences in the characteristics of states of matter.

Solid: Fixed shape, Fixed Volume, cannot flow, negligible Compressibility

Liquid: No Fixed shape, Fixed Volume, can flow, Compressibility

Gas: No Fixed shape, No Fixed Volume, can flow, High Compressibility

(b) Comment upon the following:

Rigidity: Matter like solid remain in its shape till external force act on it. This tendency to remain in original shape is called rigidity

Compressibility: Particles of matter like liquid and gas have space between them and can be filled in a container by applying pressure and reducing temperature. Thid tendency of fluid is called Compressibility.

Fluidity: Particles of Fluids has less force of attraction and high kinetic energy so they can flow or move about freely in available space . This tendency of fluid to flow is called fluidity.

Filling a gas container: Molecules of fluid have space between them so they can be compressed and easily filled in a gas container.

Shape: This is due to Force of attraction particles of matter maintain their boundaries called shape.

Kinetic energy: Particles of matter are always in motion. The energy possessed by moving molecules is called kinetic energy. Gas > Liquid > Solid

Density: Mass of matter filled in container (fix volume) is called its volume.

3. Give reasons

(a) A gas fills completely the vessel in which it is kept.

Ans: This is because molecules of gases have large space between them so easily compressed and fills completely the vessel.

(b) A gas exerts pressure on the walls of the container.

Ans: A gas exerts pressure on the walls of the container because molecules of gases have high kinetic energy and can move randomly in available space within container.

(c) A wooden table should be called a solid.

Ans: A wooden table should be called a solid because it maintains its boundaries till an external force act on it.

(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.

Ans: We can easily move our hand in air but not in solid block of wood as particles of gas have large space between them.

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

Ans: When water changes into ice its volume increases but mass of water remain same so ice is less denser than water (density = mass /volume). Air trapped inside molecules of ice increases its volume.

In Text 03 Page 09

1. Convert the following temperature to Celsius scale: a. 300 K b. 573 K.

Solution: a. $273\text{K} = 0^\circ\text{C}$ So, $300\text{K} = (300-273)^\circ\text{C} = 27^\circ\text{C}$

b. $573\text{K} = (573-273)^\circ\text{C} = 300^\circ\text{C}$

2. What is the physical state of water at:

a. 250°C : Water changes into vapour at 100°C , So at 250°C it is vapour

b. 100°C ? Water changes into vapour at 100°C So, at 100°C it is water and vapor

3. For any substance, why does the temperature remain constant during the change of state?

Ans: Heat supplied during the change of state absorbed by particles of matter to overcome force of attraction. Thus , the temperature remain constant during the change of state of matter.

When we supply heat energy particles start moving rapidly. When the particles have enough energy to break free from the forces of attraction of each other and changes its states.

4. Suggest a method to liquefy atmospheric gases.

Ans: we can easily liquefy atmospheric gases by applying pressure and decreasing temperature.

In Text 04 Page 10

1. Why does a desert cooler cool better on a hot dry day?

Ans: In desert cooler water continuously sprinkled on outer wall (mess). Due to high temperature and less humidity in hot dry day, this water get evaporated at high rate. Desert cooler blow cool air into the room by fan. Thus, desert cooler cools better on a hot dry day, as compared to on a humid day.

2. How does the water kept in an earthen pot (matka) become cool during summer?

Water molecules present in the pores on the surface of earthen pot (matka) absorb heat from water in the pot as a result of which water turns cooler.

3. Why does our palm feel cold when we put some acetone or petrol or perfume on it?

Ans: The particles of acetone or petrol or perfume gain energy from your palm or surroundings and evaporate causing the palm to feel cool.

4. Why are we able to sip hot tea or milk faster from a saucer rather than a cup?

Ans: A saucer has a larger surface area than a cup which promotes quicker evaporation hence the tea or milk in a saucer cool down faster. Thus we are able to sip hot tea or milk faster from a saucer rather than a cup.

5. What type of clothes should we wear in summer?

Ans: we should wear Cotton clothes in summer because cotton being a good absorber of water helps in absorbing the sweat and exposing it to the atmosphere for easy evaporation.

Exercise:

1. Convert the following temperature to Celsius scale.

(a) $293\text{K} = (293 - 273)^\circ\text{C} = 20^\circ\text{C}$ (b) $470\text{K} = (470 - 273)^\circ\text{C} = 197^\circ\text{C}$

2. Convert the following temperatures to the Kelvin scale.

(a) $25^\circ\text{C} = (25+273)\text{K} = 298\text{K}$ (b) $373^\circ\text{C} = (373+273)\text{K} = 646\text{K}$

3. Give reason for the following observations:

(a) Naphthalene balls disappear with time without leaving any solid.

Ans: This is because at room temperature, naphthalene balls undergo sublimation and they directly get converted into gaseous state .

(b) we can get the smell of perfume while sitting several metres away.

Ans: The molecules of the smell of perfume diffuses rapidly in air having large molecular due to high kinetic energy . Thus ,we can get the smell of perfume while sitting several metres away.

4. Arrange the following substances in increasing order of forces of attraction between the particles— water, sugar, oxygen.

Ans: Sugar < water < oxygen

5. What is the physical state of water at— (a) 25°C --- Water (b) 0°C – water and solid (c) 100°C – water and vapor.

6. Give two reasons to justify—

(a) water at room temperature is a liquid.

Ans: Normal room temperature is less than boiling point (100°C) of water. Molecular force of attraction in water molecules less than that of solid. Thus, water at room temperature is a liquid.

(b) an iron almirah is a solid at room temperature.

Ans: The melting point of solid iron almirah is above room temperature. Molecular force of attraction of solid iron almirah is higher than liquid and gas. Thus an iron almirah is a solid at room temperature.

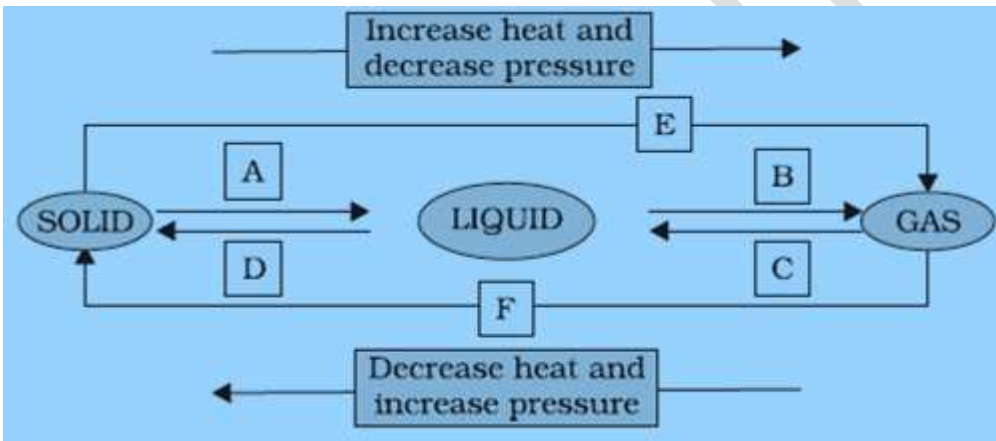
7. Why is ice at 273 K more effective in cooling than water at the same temperature?

Ans: Ice at 273 K absorb more heat from surrounding than water to change into water as ice has less latent heat of melting than water at 0°C . Thus ice at 273 K is more effective in cooling than water at the same temperature

8. What produces more severe burns, boiling water or steam?

Ans: Steam has more latent heat of vaporization than boiling water. Therefore, steam release more heat than boiling water and causes sever burns.

9. Name A, B,C,D,E and F in the following diagram showing change in its state



(A) Solid to Liquid → Melting (or) fusion (or) liquefaction

(B) Liquid to Gas → Evaporation (or) vaporization

(C) Gas to liquid → Condensation

(D) Liquid to Solid → Solidification or freezing

(E) Solid to Gas → Sublimation

(F) Gas to Solid → desublimation or Deposition