

# NCERT SOLUTIONS

## CLASS IX SCIENCE

### CHAPTER 1- MATTER IN OUR SURROUNDINGS

1) Which of the following is matter? Chair, air, love, smell, hate, almond, thought, cold, cold drink, smell of perfume.

Soln:

Chair, Air, Almond, Cold drink.

2) Give a reason for the following observation: The smell of hot sizzling food reaches you several meters away, but to get the smell from cold food you have to go close.

Soln:

Generally, particles in the higher temperature possess high kinetic energy thus moves faster over a longer distance. Therefore the smell of the hot food reaches the person several meters away.

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

Soln:

The property of water (liquid) that states the intermolecular space between the particles and the weak force of attraction is depicted in the action of diving through waters.

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

Soln:

The characteristics of particles of matter are:

- (a) They have intermolecular space between them
- (b) They are continuously moving
- (c) They attract each other

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

Soln:

Increasing density: air<exhaust from chimney<cotton<water<honey<chalk<iron

6) Answer the following.

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

Soln:

(1) Difference in the characteristics of three states of matter.

| Characteristics      | Solid             | Liquid             | Gas                 |
|----------------------|-------------------|--------------------|---------------------|
| Shape                | Fixed shape       | No Fixed shape     | No Fixed shape      |
| Volume               | Fixed volume      | Fixed volume       | No Fixed volume     |
| Rigidity/Fluidity    | Rigid/cannot flow | Can flow/not rigid | Can flow/not rigid  |
| Intermolecular force | Maximum           | Less than solids   | Very less           |
| Intermolecular space | Very less         | More than solids   | maximum             |
| Compressibility      | negligible        | compressible       | Highly compressible |

(2) (i) Rigidity: The tendency of a substance to maintain its shape when subjected to external force.

- (ii) Compressibility: The property of the particles to reduce its intermolecular when subjected to an external force thus increasing its density.
- (iii) Fluidity: The ability of the substance to flow or move about freely.
- (iv) Filling the gas container: The gaseous particles vibrate randomly in all directions. Hence it takes the shape of the container.
- (v) Shape: The intermolecular force in solid is the maximum and has a definite shape whereas the liquids and gases take the shape of the container.
- (vi) Kinetic energy: It is defined as the energy possessed by the particles due to their motion. Gases have the highest kinetic energy followed by liquids and the solids have the least kinetic energy.
- (vii) Density: It is defined as the ratio of mass of the particles to the volume occupied by it. Solids have the highest density and the gas the least.

#### 7) 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.

**Soln:**

a). The gas particles possess high kinetic energy and constantly move in random directions covering the entire volume in which they are kept in.

Due to its high kinetic energy, the gas molecules hit the walls of the container creating vibrations. It is due to the collision with the walls they create pressure.

The particles of a wooden table are closely packed without any intermolecular spaces in between them. It cannot be compressed, nor does it flow and is rigid. It satisfies all the conditions of a solid therefore it is considered to be a solid.

In the case of water, the force of attraction between the molecules are very small hence they can be separated easily by an external force. Whereas in case of a solid wooden block the intermolecular force of attraction is the maximum and requires a high external force to penetrate through it. This is the reason for our hand to move freely in water than the solid.

#### 8) Liquids generally have a lower density than solids. But you must have observed that ice floats on water. Find out why.

**Soln:**

Though ice is a solid, it has a lot of vacant space in between its structure and has a lower density than water (because it has a smaller mass to volume ratio than water). Hence as we know earlier, the heavier substance sinks while the lighter one floats above.

#### 9) Convert the following temperature to celsius scale: (a) 300K (b) 573K

**Soln:**

$$0^{\circ}\text{C} = 273\text{K}$$

$$\text{And } 1^{\circ}\text{C} = 1\text{K}$$

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

$$27^{\circ}\text{C}$$

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

$$300^{\circ}\text{C}$$

#### 10) What is the physical state of water at: (a) $250^{\circ}\text{C}$ (b) $100^{\circ}\text{C}$

**Soln:**

(a) At  $250^{\circ}\text{C}$  the water is at a gaseous state since it exceeded its boiling point.

(b) At  $100^{\circ}\text{C}$  the water is at its boiling point, that is it is at the transition point. Hence it would be present in both liquid and gaseous state.

#### 11) For any substance, why does the temperature remains constant during the change of state?

**Soln:**

During the change of state, the substance converts itself from one form of physical state to another. When it is being converted, the energy supplied are utilised to form or break the intermolecular bonds thereby keeping the temperature of the substance constant.

**12) Suggest a method to liquefy atmospheric gases.**

**Soln:**

The physical state of matter is defined by the intermolecular spaces between them. The gases have the highest empty space between them while the liquids have comparatively lower space. Hence the gases can be liquefied by reducing the gap between the molecules. This can be done either by reducing the temperature or increasing the pressure.

**13) Why does a desert cooler cool better on a hot dry day?**

**Soln:**

In the outer wall of the desert cooler, the water gets continuously sprinkled. Due to the dry weather outside, this water gets evaporated at a high rate. During the evaporation process, the heat inside the cooler is absorbed since the evaporation uses the surrounding temperature for the phase change. As a result of the cooler temperature inside the cooler, the air passing through the interior of the cooler gets cooled down and it pushed into the room by a fan.

**14) How does the water kept in an earthen pot (matka) become cool during summer days?**

**Soln:**

The earthen pot naturally is porous in structure. The water stored in it penetrates through the walls and at the outer surface gets evaporated. During the evaporation process the surrounding surface that is the inner surface gets cooled down as the heat from the adjacent layer is used for evaporation. This process cools the inner surface of the earthen pot and the water inside the pot loses its heat through the same process.

**15) Why does our palm feel cold when we put on some acetone or petrol or perfume on it?**

**Soln:**

Acetone, petrol and perfume are volatile substance and gets evaporated when in contact with air. Hence during the evaporation process, they absorb heat from their surroundings. We therefore feel cold as the heat from our palm is absorbed.

**16) Why are we able to sip hot tea or milk faster from a saucer than a cup?**

**Soln:**

A saucer has a larger surface area than a cup which promotes quicker evaporation. It is because of this the tea or milk in a saucer cools down faster.

**17) What type of clothes should we wear in summer?**

**Soln:**

In summer, it is preferred to wear light coloured cotton clothes because they reflect heat and cotton because they have pores and absorb sweat and allows them to evaporate causing a cooling effect in the skin.

#### **Exercises:**

**1) Convert the following temperature to celsius scale: (a) 300K (b) 573K**

**Soln:**

$$0^{\circ}\text{C} = 273\text{K}$$

$$\text{And } 1^{\circ}\text{C} = 1\text{K}$$

$$(\text{a}) 300\text{K} = (300 - 273)^{\circ}\text{C}$$

$$27^{\circ}\text{C}$$

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

$$300^{\circ}\text{C}$$



2) Convert the following temperature to kelvin scale: (a) 25°C (b) 373°C

Soln:

$$0^{\circ}\text{C}=273\text{K}$$

$$\text{And } 1^{\circ}\text{C}=1\text{K}$$

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

$$298\text{K}$$

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

$$646\text{K}$$

3) Give reasons for the following observations:

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

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

Soln:

(a) Naphthalene balls with the supply of energy directly gets converted from solid to gaseous state without going through the liquid phase. This process is known as the sublimation.

(b) A perfume consists of flavoured volatile substance which disperses faster than air. This is the reason for us to be able to smell the perfume while sitting several metres away.

4) Arrange the following in increasing order of forces of attraction between the particles: Water, sugar, oxygen.

Soln:

$$\text{Oxygen(gas)} < \text{water(liquid)} < \text{sugar(solid)}$$

5) What is the physical state of water at: (a) 25°C (b) 0°C (c) 100°C?

Soln:

(a) At 25°C the water will be in liquid form (normal room temperature)

(b) At 0°C the water is at its freezing point, hence both solid and liquid phases are present.

(c) At 100°C the water is at its boiling point, hence both liquid and gaseous state of water is present.

6) Give two reasons to justify:-

(a) Water is liquid at room temperature

(b) Iron almirah is a solid at room temperature.

Soln:

(a) The water changes its phase at 0°C and 100°C. Therefore, at room temperature water is found in a liquid state. Also the water has tiny, weak hydrogen bonds which, in their billions, hold water molecules together for small fractions of a second. Water molecules are constantly on the move.

(b) The melting and boiling points of iron however is as high as 1538°C. The room temperature is about 20-25 degree centigrade. So, the iron almirah is a solid at room temperature.

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

Soln:

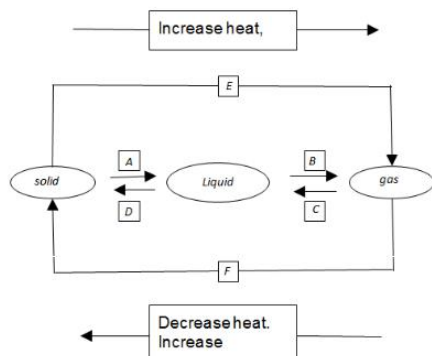
When the energy is supplied, the ice primarily used it to break the molecular bonds between the particles to convert itself to liquid form. Hence it absorbs more heat and creates a cooling effect. However in case of water, it does not absorb any extra heat but only the one required to increase the temperature.

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

**Soln:**

The steam at  $100^{\circ}\text{C}$  has a extra energy trapped in it called the latent heat which was used for the phase change from liquid. It therefore produces more severe burns than the boiling water which contains very negligible amount of energy.

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



**Soln:**

A: Melting (or) fusion (or) liquefaction

B: Evaporation (or) vaporization

C: Condensation

D: Solidification

E: Sublimation

F: Sublimation

**Choose the best answer**

1. Liquid evaporation happens at

- (a) Temperature lower than boiling point
- (b) constant temperature
- (c) at boiling point
- (d) All temperatures

Answer : Temperature lower than boiling point

2. Transformation of gas state into liquid state is called

- (a) Freezing
- (b) Sublimation
- (c) Condensation
- (d) Fusion

Answer: Condensation

3. Fusion is a phenomenon in which

- (a) Liquid changes into solid
- (b) Gas changes into solid
- (c) liquid changes into gas
- (d) Solid changes into liquid

Answer: Solid changes into liquid

4. In water ice floats because

- (a) Its density is equal to water

- (b) Its density is less than water
- (c) It has very less amount of intermolecular space
- (d) Not in the option

Answer: Its density is less than water

**5. Ice at 273K is greater effective in cooling than water at the same temperature because**

- (a) It has latent(hidden) heat
- (b) The molecules use the heat to overcome the force of attraction
- (c) Both (a) and (b)
- (d) Not in the option

Answer: It has latent(hidden) heat

**6. The density of water is maximum at**

- (a) 1°C (b) 10°C (c) 4°C (d) 223 K

Answer: 4°C

**7. Solids and gases mix/dissolve in water**

- (a) Due to good solvent is water
- (b) Diffusion is faster in water Because water has intermolecular space
- (c) Because water has intermolecular space
- (d) all of the above

Answer: all of the above

**8. Choose the correct statement from the following:**

- (a) the volume of gas " expands on heating
- (b) two gases cannot diffuse into each other
- (c) gas is converted into solid, it is called condensation
- (d) gases cannot diffuse in solids

Answer: the volume of gas " expands on heating

**9. As the pressure of air decreases, the boiling point of the liquid**

- (a) decreases
- (b) increases
- (c) does not changes
- (d) none of these

Answer: decreases

**10. At normal pressure (1 atmospheric pressure) the boiling point of water is**

- (a) 98°C
- (b) 100°C
- 1. c) 110°C
- 2. d) 90°C

Answer: 100°C

**11. The pressure of air is measured in atmosphere and pascal. 1 atmospheric pressure is equal to**

- (a) 1.01 32 5 x 10<sup>5</sup> Pa
- (b) 1.01325 x 10<sup>4</sup> Pa
- (c) 10.1325 x 10<sup>5</sup> Pa
- (d) 10.1325 x 10<sup>6</sup> Pa



Answer:  $1.01325 \times 10^5 \text{ Pa}$

**12. Cooking of rice at higher altitudes is difficult because**

- (a) Boiling of water is constant
- (b) water boils at  $100^\circ\text{C}$
- (c) water boils at  $<100^\circ\text{C}$
- (d) none of these

Answer: **water boils at  $<100^\circ\text{C}$**

**Small answers type questions.**

**Question no 1.**

**Define matter. Explain in one or two sentences.**

Answer: Matter is anything near you. Molecules and Atoms are all made up of matter. A matter has mass and takes some space

**Question no 2.**

**Mention different States of matter with an example**

Answer: The three different states of matter are solid, liquid and gas.

**Question no 3.**

**Define diffusion.**

Answer: The interchanging of particles of one substance of other substance. They change from high concentration of region to low concentration region is called as diffusion

**Question no 4.**

**If the temperature increase what happens to the rate of diffusion?**

Answer : With increasing temperature, the rate of diffusion increases as particles get more energy and vibrate more.

**Question no 5.**

**Mention the state of matter which have the capacity to maintain its shape when outside force is applied to it.**

Answer: Solid

**Question no 6.**

**What is boiling point?**

Answer: A particular temperature at which liquid starts boiling at normal atmospheric pressure is called boiling point.

**Question no 7.**

**What is melting point?**

Answer: A particular temperature at which liquid starts melting at normal atmospheric pressure is called melting point.

**Question no 8.**

**What is meant by latent heat vaporization?**

Answer: Latent heat of vaporization is the amount of heat energy needs to transform 1 kilogram of liquid to gas state at its boiling point at normal atmospheric air pressure is called as latent heat vaporization.

**Question no 9.**

**Explain latent heat of fusion.**

Answer:

Latent heat of fusion is the amount of heat energy needs to transform 1 kilogram of solid into liquid at its melting point is known as latent heat of fusion.

**Question no 10.**

**What is sublimation ?**

Answer : Sublimation is the process where a substance directly changes from solid state to gaseous state without going through liquid state and vice-versa.

**Question no 11.**

**What is dry ice?**

Answer : Solid carbon dioxide formed by cooling and by giving pressure on carbon dioxide gas which does not melt so it is known as dry ice.

**Question no 12.**

**What is humidity?**

Answer : A quantity representing the amount of water vapour in the atmosphere or in a gas.

**Question no13.**

**Name any two properties of solids.**

Answer. (1) Solids are rigid and have fixed shape. (2) compression is not all possible.

**Question no 14.**

**What will be the result if the pressure is decreased on solid carbon dioxide (dry ice)?**

Answer: If the pressure is decreased on solid carbon dioxide it will directly change into gaseous state without process of melting.

**Question no 15.**

**Name any 3 substances that show sublimation.**

Answer: Camphor, ammonium chloride and naphthalene balls, iodine crystals.

**Question no 16.**

**Sponge is a solid substance, we can still compress it. Why?**

Answer: Sponge is a solid with little pores in sponge. When we press the sponge, the air present in these pores is goes out and that why we are able to compress it.

**Question no 17.**

**What is normal atmospheric pressure?**

Answer: The atmospheric pressure at sea level is 1 atmosphere and taken as the normal atmospheric pressure.

**Question no 18.**

**What mean by Kelvin?**

Answer : Kelvin is the SI unit of temperature ( $0^{\circ}\text{C} = 273 \text{ K}$ ).

### **Short Answer Type Questions**

**Question no 1.**

**We can see water droplets present on the outer surface of a glass container, containing ice. Why?**

Answer: The water vapor present in atmospheric air, come in together with the cold outer surface of the container thereby condensing it to form water droplets.

**Question no 2.**

**Solids have constant shape but liquids and gases do not have constant shape. Why?**

Answer: Solids have constant shape because of tight intermolecular attractive force between them. The liquids and gases have particles with less intermolecular attractive force and so they can flow and stick to shape of the container.

**Question no 3.**

**Compression of liquid and gases is easy, but it is tough to compress solids. Why?**

Answer: Liquids and gases have intermolecular space; on giving external pressure on them the molecules can come together thereby reducing the space between them. But in case of solids there is no intermolecular space to do so.

**Question no 4.**

**When a balloon is kept under the sun, it bursts after a certain period. Why?**

Answer: The balloon is fully filled by air. When balloon kept in hot sun gets heated and the air inside it also gets heated. The particles of air get energized, and its starts vibrating fastly thereby exerting large force on the walls of the balloon. Because of this expansion of gases the balloon bursts.



increasing rapidly thereby exerting large force on the walls of the balloon. Because of the expansion, it gases the balloon bursts.

**Question no 5.**

**Why do people break out in a sweat a lot on a hot humid day?**

Answer: On a hot, humid day, the heat in our body starts sweating due to the cooling mechanism i.e., by evaporation and gets a cooling effect. More water cannot be held by air on a humid day and so the sweat is seen.

**Question no 6.**

**Differentiate between evaporation and boiling.**

Answer:

Evaporation Boiling 1. Evaporation is a surface phenomenon. Boiling is a bulk phenomenon. 2. It is a slow process. It is a fast process. 3. It takes place at all temperatures. It takes place at a definite temperature.

| Evaporation   | Boiling  |
|---|--|
| 1. Evaporation takes place at all possible temperatures | Boiling takes place at a definite temperature. |
| 2. It is a surface phenomenon                           | It is a bulk phenomenon                        |
| 3. It is slow process                                   | It is fast process                             |

**Question no 7.**

**Why is it preferable to use a pressure cooker at greater altitudes?**

Answer: At greater altitudes, there is low atmospheric pressure and the boiling of water is very fast and faster rate of evaporation happens. Therefore, more pressure is needed to increase the cooking process and this is completed by using a pressure cooker in which the pressure increases inside the container and prepares the food faster.

**Question no 8.**

**What are fluids?**

Answer: A substance that has no fixed shape and yields easily to external pressure; a gas or a liquid.

**Question no 9.**

**Which of the following is denser; One kg cotton or one kg sand? Why?**

Answer: One kilogram (kg) sand is denser than 1 kg cotton because density = mass/volume. The required volume by cotton is more than the sand and density and volume are inversely proportional.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

**Question no 10.**

**Cotton is solid but it floats on water. Why?**

Answer: Cotton has greater number of pores, in which air is trapped thus increasing the volume and reducing its density. Therefore cotton floats on water. But when water enters into the pores, it starts sinking and size is reduced.

**Question no 11.**

**Why are solids generally denser than liquids and gases?**

Answer. Density of a substance is given by a formula = Mass/Volume .

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

In case of solids, the molecules are closely packed and hence larger mass is concentrated in very small volume. Hence their density is more. But in case of liquids and

gases, their molecules have intermolecular space and hence they don't have large mass concentrated in a small volume. So the density of solids is generally more than that of the liquids and gases.

**Question no 12.**

**People sprinkle water in open ground on a hot sunny day. Why?**

Answer: In a hot sunny day, the roof surface or ground absorbs a large amount of heat and always remain hot, on spreading water on these surfaces, The heat gets absorbed by the water from the surface because of its latent heat of vaporization and makes the surface cool.

**Question no 13.**

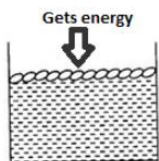
**On a hot sunny day, why do we feel pleasant and cool sitting under a tree?**

Answer: Trees have lots of leaves which always perform transpiration. Transpiration is the loss of water through small tiny pores of leaves called stomata. Cooling effect occurs when this water comes on the surface of leaf after which the water evaporates. So we feel pleasant and cool sitting under a tree on a hot sunny day.

**Question no 14.**

**The temperature at which liquids change into vapors is very high. If water vaporizes at  $90^{\circ}\text{C}$ , then how is it possible for water to evaporate at any other temperature or room temperature?**

Answer: The water molecules present on the surface of the exposed area which are in small fractions, gets the energy from the surroundings. By gaining a higher kinetic energy, they are able to break the force of attraction between them and hence get converted into vapor state. This phenomenon of change of a liquid into vapors that takes place at any temperature below its boiling point is called evaporation.



**Question no 15. The melting point of ice is  $273.16\text{ K}$ . What does this mean? Explain in detail.**

Answer: Ice is in solid state at  $0^{\circ}\text{C}$  i.e.,  $273^{\circ}\text{ K}$ . The molecules of ice are closely packed. These molecules/particles have to overcome the attractive force with which they are held and hence they get this heat from the environment but the temperature remains constant as their energy is used to overcome the force of attraction between the molecules. The particles start freely vibrating and a stage is reached when the solid ice melts and is converted to liquid state at the same temperature i.e.,  $273\text{ K}$ .

**Question no 16. What is the usage of high compressibility property of gas?**

Answer: The gases have high compressibility. This property is used in the following situation:

- (1) Oxygen cylinders that are in the hospitals have compressed gas filled in it.
- (2) LPG (liquefied petroleum gas) is a fuel which is formed by compressing petroleum gas.
- (3) CNG (compressed natural gas) is a natural gas, methane, which is compressed and used as a fuel in vehicles and at homes.

**Question no 17**

**With the help of an example, explain how water is essential in the diffusion of gases.**

Answer: Gases like carbon dioxide and oxygen diffuse in water which is essential for the survival of aquatic animals and plants. Animals breathe in this oxygen dissolved in water for their survival and plants can use carbon dioxide dissolved in water for photosynthesis.

**Long Answer Questions**

**Question no 1.**

**Temperature and Pressure determine the state of a substance. Describe in detail.**

Answer (1) Take any matter i.e., solid, liquid or gas which when experiencing an increase in temperature, change their state.

When water is heated,



Example:  $solid_{(ice)} \rightarrow liquid_{(water)} \rightarrow gas_{(steam)}$

Take ice cubes in a beaker and heat them slowly. The temperature increases and the ice melts from solid to form a liquid. Heat this liquid further and it will become steam.

(2) On lowering down the temperature of any matter, show change in their state.

If this process is reversed,

$Gas_{(steam)} \rightarrow liquid_{(water)} \rightarrow Solid_{(ice)}$

Take the steam that is coming out of a boiling water and allow it to cool down, it condenses to form water and on further cooling, we get ice.

(3) On applying pressure and reducing temperature, we can liquefy gases or change them into solid.

Example: Take carbon-dioxide gas, reduce its temperature and apply a lot of pressure on it so that it changes into solid carbon di oxide which is also known as dry ice

It is used as a refrigerant for cooling.

It changes into a gas when the pressure is decreased.

The petroleum gas is cooled and with an increase in pressure, changes into liquid state as in an LPG cylinder.

We release the pressure exerted on it and hence it comes out in the form of a gas.

#### Question no 2.

**Explain examples the various factors on which rate of evaporation depends.**

**Answer:** The evaporation rate depends on the following factors:

(1) Temperature: If the temperature is increased, the rate of evaporation also increases as temperature is directly proportional to the rate of evaporation. Because of the increase in temperature, the particles gets more kinetic energy and change their phase from liquid to gaseous. Water will evaporate faster under the sun than in shade.

(2) Surface area: An increase in the surface area increases the rate of evaporation.

(a) To dry the clothes we spread them to dry faster.

3) Humidity: Humidity is the amount of water vapor present in air. The air can hold a definite amount of water vapor, at a given temperature. If the amount of water vapor is high in the air, then the rate of evaporation decreases (i.e) it is inversely proportional. On a hot and humid day, desert coolers are not effective as the air cannot hold any more moisture to get the cooling effect.

(4) Wind speed: With the increase in wind speed, the rate of evaporation increases. The particles of water vapor go away with the wind, decreasing the amount of water vapor in the surrounding.

#### Concept oriented Questions.

##### Question no 1:

**Ram parked his bicycle on a sunny day in a parking stand of his school campus. When the school got over, Ram saw his burst cycle tyre. Thereafter he kept lesser air in his cycle tyres and did not inflate them fully.**

**(a) Why did the tyre burst?**

**(b) Why is air compressible?**

**(c) What value of Ram is reflected in the above act?**

**Answer.** (a) The tyre burst because the air inside the tyre got heated and therefore exerted pressure on the walls of the tyre.

(b) Air is compressible because it has large intermolecular spaces.

(c) Ram showed the value of intelligence, awareness and self responsibility.

##### Question 2.

**Kumar's friend visited his house in Mumbai and he was surprised to see air conditioners installed in all of his rooms. His friend asked Kumar to use water-coolers and save electricity. On this Kumar told, him that the water-cooler is not at all effective in coastal areas.**

**(a) Why are water-coolers not effective in coastal areas?**

**(b) What are the other two factors on which evaporation of water depends?**

**(c) What value of Kumar's friend is seen in this act?**

**Answer (a)** Water-coolers are not effective in coastal areas because of high rate of humidity.



**Answer** (a) Water coolers are not effective in coastal areas because of high rate of humidity.

(b) The other two factors on which evaporation of water depends are surface area and temperature .

(c) Kumar's friend showed the hallmarks of a concerned, morally responsible citizen.

**Question no 3.**

*Shela lived in a village and could not afford a refrigerator in her house. She knew how to keep water cold and preserve all perishable items in her house. She kept wet cloth surrounding the earthen pot to keep water cool and she also kept vegetables fresh by keeping them in a wet gunny bag and sprinkled water over it.*

*(a) Why did Shela keep a wet cloth surrounding the earthen pot?*

*(b) Suggest one more method of keeping the house cool in summer.*

*(c) What value of Shela is reflected in the above case?*

Answer (a) The wet cloth gave the cooling effect to the pot, as the water in the cloth evaporated and evaporation causes cooling effect.

(b) By sprinkling some water on the lawn/veranda of the house can keep the house cool.

(c) Shela showed how responsible she is and she also made sure that she uses the knowledge that she gained from outside.

**Question no 4.**

*Uma commutes in a CNG fitted van to school every day along with many other students. She told the van driver to get the CNG connection certified and check it for any leakage or loose connection of pipes from time to time. She told the driver to be more careful during summers.*

*(a) What is CNG?*

*(b) Why should one be more careful with CNG cylinders during summer?*

*(c) What value of Uma is seen in the above act?*

Answer (a) CNG is Compressed Natural Gas which is used as a fuel.

(b) During summer season, the CNG connections and the cylinder must be checked because the gas expands due to heat and there would be leakages which would cause a fire in the vehicle.

(c) Uma showed the hallmarks of a concerned citizen with a responsible moral behavior.