DOON PUBLIC SCHOOL, BHUJ

Home Assignment

Dear Students,

This is your home assignment which you have to complete in your Science notebook. Write all the following chapters very neatly in the notebook and learn the same. This Assignment will be checked on reopening of the school. Manage your time effectively as time is free, but it is priceless. I wish you to have great time with your family during this vacation. Take care and stay safe!

Sub: Science **Class: IX**

Ch-1 Matter in Our Surroundings **Date: 08/05/2020**

(Textbook Exercise)

Tick (√) the correct answer from the given four options.

1. Evaporation of a liquid occurs at
a) boiling point
b) a fixed temperatures
c) at temperature lower than boiling point
d) at all temperatures

2. The conversion of gas into liquid is called
a) freezing
b) condensation
c) sublimation
d) fusion

3. The fusion is the process in which
a) liquid changes into solid
b) solid changes into liquid
c) solid changes into gas
d) gas changes into solid

4. The ice floats on water because
a) its density is more than water
b) its density is less than water
c) it has intermolecular space
d) none of the above

5. The density of water is maximum at
a) 0℃
b) 100℃
c) 4℃
d) 273 K

6. Solids and gases mix/dissolve in water
a) because water is a good solvent
b) because water has intermolecular space
c) diffusion is faster in water
d) all of the above

7. 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.

8. As the pressure of air decreases, the boiling point of the liquid
a) decreases
b) increases
c) does not change
d) None of these

9. Which among the following can exist in vapour state
a) oxygen
b) hydrogen
c) carbon dioxide
d) water

10. Cooking of rice at higher altitudes is difficult because
a) water boils at 100℃
b) water boils at <100℃
c) boiling point of water is constant
d) none of the above

Answer in short:

1. Give reasons

a) A gas exerts pressure on the walls of the container.

Ans. A gas exerts pressure on the walls of the container because the molecules of the gas are in constant random motion due to high kinetic energy. These molecules constantly vibrate, move and hit the walls of the container thereby exerting pressure on it.

b) Napthalene balls disappear with time without leaving any solid.

Ans. Napthalene balls disappear with time without leaving any solid, because napthalene balls sublime and directly changes into vapour state without leaving any solid.

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

Ans. Steam at 100℃ will produce more severe burns as ex tra heat is hidden in it called latent heat whereas the boiling water does not have this hidden heat.

3. Define sublimation.

Ans. Sublimation is the change of gaseous state directly to solid state without going through liquid state and vice-versa. i.e., change of solid state directly to gaseous state without going through liquid state.

4. Distinguish between evaporation and boiling.

Ans.

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.

5.Explain why solids have fixed shape but liquids and gases do not have fixed shapes.

Ans. Solids have fixed shape due to strong intermolecular force of attraction between them. The liquids and gases have molecules with less intermolecular force of attraction and hence they can flow and take shape of the container.

6. What are fluids?

Ans. The states of matter that can flow due to less intermolecular force of attraction, are liquids and gases and are called as fluids.

7. Why is water liquid at room temperatures?

Ans. At room temperatures, the molecules of water have some intermolecular force of attraction and the room temperature cannot provide sufficient heat for these molecules to overcome their force of attraction and therefore remain in that phase.

8. One kg cotton and one kg sand, which is more denser? Why?

Ans. One kg sand is more denser than 1 kg cotton because density=mass/volume.

The volume required by cotton is more than the sand and density and volume are inversely proportional.

9. Name the factors that affect evaporation.

Ans. The rate of evaporation will increase with

1) an increase of surface area,

2) an increase of temperature,

3) a decrease in humidity,

4) an increase in wind-speed.

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

Ans. Cotton has large number of pores in it, the air gets trapped in it thereby reducing its density (by increasing the volume of cotton by air). Therefore cotton floats on water. But when these pores get filled with water it starts sinking.

Answer in detail.

1. (a) Which method will you use to separate : (i) components of air (ii) acetone and water? Explain each.
(b) What is the difference in the apparatus used for distillation and fractional distillation?

Answer.
(a) (i) Separation of constituents of air by fractional distillation:

Air consists mainly of nitrogen and oxygen. Carbon dioxide and other gases are also present in trace amounts. To separate these different gases first we need to liquify the air. When the air is compressed and cooled down, at 0℃, water present in air freezes to ice. On further cooling, carbon dioxide separated as dry ice at about -78℃. on further cooling under pressure, air gets liquefied at -200°C. After this, through fractional distillation each gas can be separated on the basis of their boiling points. The gas having lower boiling point will be obtained first and the gas having highest boiling points will be obtained at last.

Nitrogen has a boiling point of -196℃ while oxygen has -183℃. The nitrogen gas will start to escape through the outlet and it is collected. The liquid oxygen will be collected in the fractionating column.

(ii) Separation of acetone and water:

It can be done by simple distillation method. In this method, the components of mixture are separated on the basis of difference in boiling points of constituent liquids. First, the lower boiling point liquid will start boiling and its vapours can be collected and condensed to obtain the liquid. In this case acetone will come out first and left over will be water only.

(b) Fractional distillation uses a complex apparatus with a fractionating column which is long tube packed with metal wire, metal ribbon or glass beads that give extra condensing surfaces, allowing the liquid to vaporize and condense at every minute change reduce in temperature.

Simple Distillation includes a simple apparatus with a flask to contain the mixture, a condenser and a flask to collect purified components.

2. (a) List any four properties of a colloid and mention any two properties in which colloids differ from suspension.

(b) State what is Tyndall effect? Which of the following solutions will show Tyndall effect? Starch solution, sodium chloride solution, Tincture iodine, air.

Answer.
(a) Properties of a colloid (any four)

(i) A colloid is a heterogeneous mixture.

(ii) The size of particles of a colloid is too small to be individually seen by naked eyes.

(iii) Colloids are big enough to scatter a beam of light passing through it and make its path visible.

(iv) They do not settle down when left undisturbed, that is, a colloid is quite stable.

(v) They cannot be separated from the mixture by the process of filtration. But, a special technique of separation known as centrifugation can be used to separate the colloidal particles.

Two properties in which colloids differ from suspension are (ii) and (iii) as the particles of a suspension are large enough to be observed with a naked eye and these particles settle down well when the mixture is left undisturbed.

(b) Tyndall effect is the phenomenon of scattering of a beam of light by the particles of a colloid.

Starch solution and tincture iodine are colloid and thus will show Tyndall effect.

3. How is the high compresssibilty property of gas useful to us?

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

1) LPG liquefied petroleum gas is a fuel which is made up of petroleum gas. On compressing this petroleum gas it forms liquid.

2) Oxygen cylinders in the hospitals have compressed gas filled in it.

3) CNG – compressed natural gas, it has natural gas, methane which is compressed and used as a fuel in vehicles and at home.

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

Ans. The gases from the atmosphere diffuse and dissolve in water. The gases like oxygen and carbon-dioxide diffuse in water, are essential for the survival of aquatic animals and plants.

The plants and animals breathe in this dissolved oxygen present in water for their survival and plants can use carbon-dioxide present in water for photosynthesis.

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

Ans. The rate of evaporation depend on the following factors:

1) Surface area: If the surface area is increased the rate of evaporation also increase.

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

b) Tea in saucer cools faster than in a cup.

2)Temperature: If the temperature is increased the rate of evaporation also increases. Due to increase in temperature the particles gain more kinetic energy and change their phase from liquid to gaseous. Water will evaporate faster in sun than in shade.

3) Humidity: It is the amount of water vapour present in air. The air can hold definite amount of water vapour, at a given temperature. If the amount of water vapour is high in the air then the rate of evaporation decreases.

On 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 vapour move away with the wind, decreasing the amount of water vapour in the surrounding.

Sub: Science **Class: IX**

Ch-2 Is Matter Around Us Pure? **Date: 08/05/2020**

(Textbook Exercise)

Tick (√) the correct answer from the given four options.

1. Air is regarded as a mixture because
a) Its pressure may very
b) Its temperature may change
c) Its volume changes under different conditions
d) Its composition may vary

2. Which of the following is a compound?
a) Stainless steel
b) Bronze
c) Graphite
d) Hydrogen sulphide

3. The process used to separate oil and water is:
a) Distillation
b) Sublimation
c) Separating funnel
d) chromatography

4. In which of the following the constituents are present in any ratio?
a) Mixture
b) Compound
c) Solution
d) Colloid

5. A mixture of common salt, sulphur, sand and iron filings is shaken with carbon disulphide and filtered through a filter paper. The filtrate is evaporated to dryness

in a china dish. What will be left in the dish after evaporation?
a) Sand
b) Sulphur
c) Iron filings
d) Common salt

6. Two substances A and B when bought together form a substance C with the evolution of heat. The properties of C are entirely different from those of A and B. the substance C is:
a) A compound
b) An element
c) A mixture
d) None of the above

7. Camphor can be purified by:
a) Distillation
b) Filtration
c) Sedimentation
d) Sublimation

8. Which one of the following will result in the formation of a mixture?
a) Crushing of a marble tile into small particles
b) Breaking of ice cubes into small pieces
c) Adding sodium metal to water
d) Adding milk in water

9. Purity of a solid substance can be checked by its:
a) Boiling point
b) Melting point
c) Solubility in water
d) Solubility in alcohol

10. A mixture of ethanol and water can be separated by:
a) Filtration
b) Decantation
c) Fractional distillation
d) Sublimation

Answer in short.
1. State any one difference between pure and impure substances.
Ans.

- The constituents, which make up a pure substance cannot be separated by physical means.
- The constituents of an impure substance can be separated by physical means

2. What do you understand by the statement 'the solubility of NaCl is 36.5 g at room temperature'?
Ans. It means that, at room temperature 36.5 g of Nacl can be dissolved in 100 g (or 100 ml) of water.

3. Define an element.
Ans. Element is a basic form of matter that cannot be broken down into simpler substances by chemical reactions.

4. How Tyndall effect can be observed in the canopy of a dense forest.
Ans. Tyndall effect refers to the process by which light is scattered by colloids or suspension making the path of the light to be visible.
In the forests, the air contains mists which acts as the colloids hence when light seeps in through the canopy one clear sees its path.

5. What is tincture of iodine? Identify the solute and solvent in it.
Ans. Tincture of iodine means the solution of iodine and alcohol. The solute is iodine and solvent is alcohol.

6. (a) Name the separation technique you would follow to separate
(i) Dyes from black ink.
(ii) A mixture of salt and ammonium chloride
(iii) Cream from milk
(iv) Sodium chloride from its solution in water
Ans.
i) chromatography
ii) sublimation
iii) centrifugation
iv) evaporation

7. List three differences between a physical change and a chemical change.

Physical Change	Chemical Change
• The chemical composition of a substance does not change.	• The chemical composition of a substance changes.
• Change is only in the state of matter and not in the chemical identity	• Change is in chemical identity, but may or may not be in the state of matter.
• Most changes are reversible	• Most changes are irreversible.
• No new substances are formed. For example, • Ice → Water → Steam	• New substances are formed. For example, • methane → carbon dioxide and water (on heating)

8. Define solubility. How does solubility. How does solubility of a solid in water change with temperature?
Ans. Solubility is the property of a solid, liquid, or gaseous chemical substance called solute to dissolve in a solid, liquid, or gaseous solvent to form a solution of the solute in the solvent.
For many solids dissolved in liquid water, the solubility increases with temperature. The increase in kinetic energy that comes with higher temperatures allows the solvent molecules to more effectively break apart the solute molecules that are held together by intermolecular attractions.

9.Give an example for each of following:
a)Solid -liquid homogeneous mixture
b)Gas- gas homogeneous mixture
c)Liquid -liquid heterogeneous mixture
Ans.
a) salt in water
b) Air
c) Water and oil

10. Give the applications of Chromatography.
Ans. Applications of Chromatography are
1. To separate colours in a dye.
2. To separate pigments from natural colours.
3. To separate drugs from blood.

Answer in detail.

1. Why is crystallization better than evaporation?
Ans. Crystallization is a process that separates a pure solid in the form of its Crystals from a solution.
Crystallization is better than evaporation because

- Some solids decompose or some, like sugar may get charred on heating to dryness.
- Some impurities may remain dissolved in the solution even after filtration. On evaporation these contaminate the solid.

2. How can you prove that water is a compound?
Ans. Water is a compound because if we pass electricity through it then at two different electrodes, we get two different gases i.e., oxygen and hydrogen during electrolysis of water. The ratio of oxygen: hydrogen is 1:2 by number of molecules.

- The properties of oxygen and hydrogen gases are entirely different from that of liquid water.
- The ratio of oxygen hydrogen combination is always constant i.e., 1:2 by volume.
- To separate the components of water, we need electrolytic cell, and it is not a simple process.

3. (a) Define solution.
(b) Give different types of solutions with one example each.
Ans.
(a) Solution: It is a homogeneous mixture of two or more substances. It consists of solute and solvent.
(b) Different types of solution:
i) Based on solvent – Aqueous and non-aqueous, aqueous solution – has water as solvent (sugar + water)
Non-aqueous solution has same other solvent but not water. Example,
(sulphur + Carbondisulphide)

ii) Depending on the amount of solute dissolved in solvent – Dilute solution and concentrated solution.
Dilute solution – less amount of solute particles are present in a solvent.

iii) Amount of solute present in its maximum capacity at a given temperature – Saturated and unsaturated solution.
Saturated solution – It is a solution in which no more solute can further dissolve in a given solvent at a given temperature.
Unsaturated solution – It is a solution in which some more solute can further dissolve in a solvent at a given temperature.

iv) Depending on the size of solute particles

True Solution	Suspension	Colloid
Size is very small and particles cannot be seen through naked eyes	Size is very big and can be seen through naked eyes	Size is intermediate between true solution and suspension.

4. Preeti saw a labour entering into the sewage manhole immediately after removing the lid. She promptly stopped the labour from entering into the manhole and told him to wait for sometime before he enters into it.
(a) What will happen if the labour immediately enters into the manhole (for cleaning) after removing the lid?
(b) Name two gases that are released from the manhole.
(c) What value of Preeti is seen in the above act?
Ans.
(a) If the labour immediately enters the manhole on removing its lid he would die due to suffocation and poisonous gases which are compressed and released by sewage.
(b) Two gases released from the sewage manhole are Methane, Carbon-dioxide and Hydrogen Sulphide.

(c) Preeti shows the value of moral responsible behavior and aware citizen.

5. Give the difference between true solution, colloidal solution and suspension.
Ans. The difference between true solution, colloidal solution and suspension.

Property	**True Solution**	**Colloidal Solution**	**Suspension**
1. Particle size	Less than 1 nm.	Between 1 nm and 100 nm	More than 100 nm.
2. State	Stable	Stable	Unstable
3. Tyndall Effect Scattering of light	No	Yes	No
4. Separation by filtration	Not possible	Not possible	Is possible
5. Nature	Transparent	Transluscent	Transluscent