



पुना International School

Shree Swaminarayan Gurukul, Zundal

Class – IX

Subject: SCIENCE

Experiment (2020_21)

Exp. No	Aim
1	Preparation of: a) a true solution of common salt, sugar and alum b) a suspension of soil, chalk powder and fine sand in water c) a colloidal solution of starch in water and egg albumin/milk in water and distinguish between these on the basis of • transparency • filtration criterion • stability
2	Perform the following reactions and classify them as physical or chemical changes: a) Iron with copper sulphate solution in water b) Burning of magnesium ribbon in air c) Zinc with dilute sulphuric acid d) Heating of copper sulphate crystals e) Sodium sulphate with barium chloride in the form of their solutions in water
3	Preparation of stained temporary mounts of (a) onion peel, (b) human cheek cells & to record observations and draw their labeled diagrams.
4	Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants, striped, smooth and cardiac muscle fibers and nerve cells in animals, from prepared slides. Draw their labeled diagrams.
5	Determination of the density of solid (denser than water) by using a spring balance and a measuring cylinder.
6	Verification of the law of conservation of mass in a chemical reaction.

Experiment - 1

Aim

To prepare:

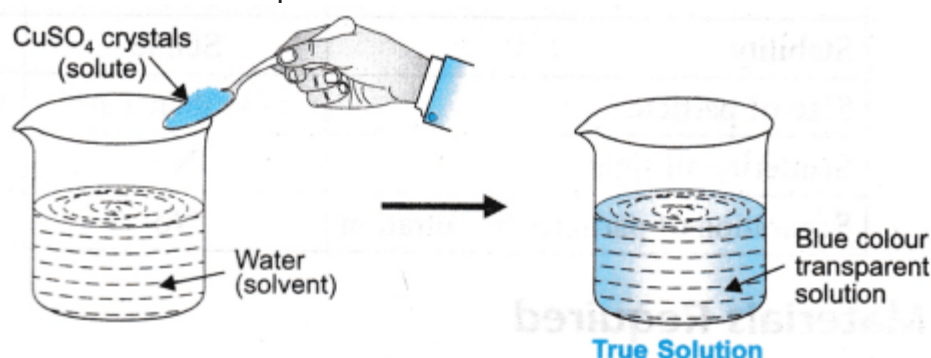
1. a true solution of common salt, sugar and alum in water.
2. a suspension of soil, chalk powder and fine sand in water.
3. a colloidal solution of starch in water and egg albumin in water and distinguish between these on the basis of:
 - transparency
 - filtration criterion
 - stability

Theory

1. **True solution:** A solution that has solute particles of size smaller than 1 nm (10^{-9} metres) in diameter, and cannot be seen with naked eyes. They do not scatter a beam of light, the particles do not separate by filtration and the particles do not settle down.
2. **Suspension:** It is a heterogeneous mixture in which solute particles do not dissolve but remain suspended, particles can be seen with naked eyes, it scatters a beam of light, particles can be separated from the mixture by filtration.
3. **Colloidal solution:** The solution appears to be homogeneous, the particles can scatter a beam of light, they do not settle down when left undisturbed, it is stable and particles cannot be seen by naked eyes. The particles cannot be filtered. The size of particles is between 10^{-7} cm to 10^{-4} cm in diameter.

Properties of True Solutions

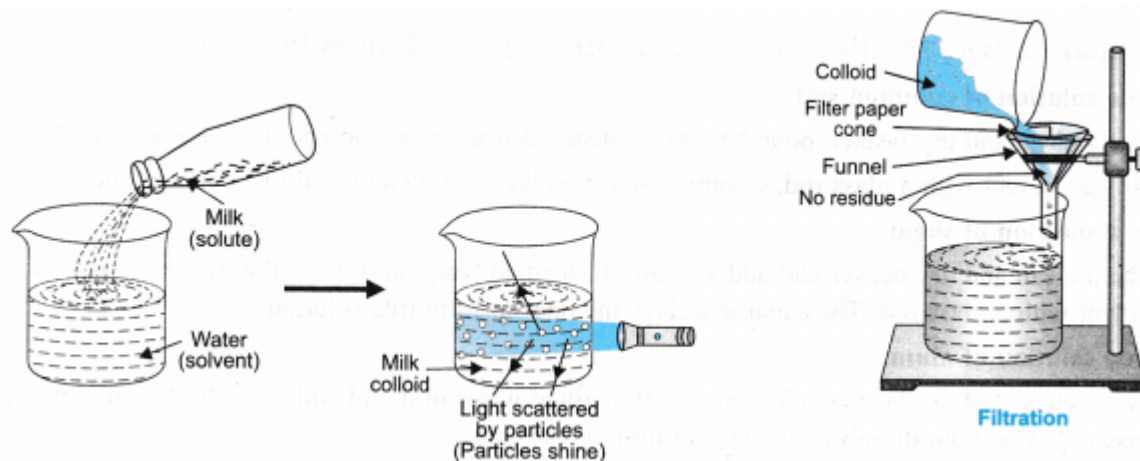
1. A true solution is a homogeneous mixture of solute and solvent.
2. The particle size of solute is less than 1 nm ($1 \text{ nm} = 10^{-9} \text{ m}$).
3. The components do not scatter light and do not show Tyndall effect.
4. The particles cannot be separated by filtration.
5. The solution is stable (remains uniform).
6. The solution is transparent.



Properties of Colloid

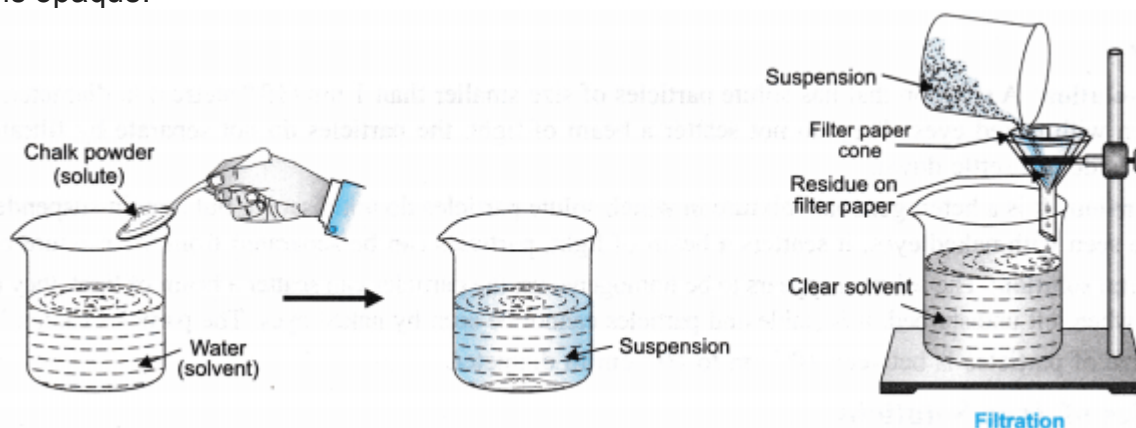
1. It is a heterogeneous solution but appears to be homogeneous.
2. The particle size of solute is 1 nm-1000 nm. (10^{-9} - 10^{-6} m)
3. The components scatter light and shows Tyndall effect.
4. The particles can be separated only by centrifugation.
5. The solution is stable.

6. The solution is translucent.



Properties of Suspension

1. It is a heterogeneous mixture.
2. Particle size is more than 1000 nm (10^{-6} m) and can be seen with naked eyes.
3. The particles of suspension, in its suspended form scatter a beam of light, i.e., shows Tyndall effect.
4. It is unstable.
5. The particles can be separated by filtration.
6. It is opaque.



Properties	True Solution	Suspension	Colloid
Stability	Stable	Unstable	Stable
Size of particle	Less than 1 nm	More than 1000 nm	10^{-7} cm to 10^{-4} cm in diameter
Scattering of light	No	Yes	Yes
Separation of particles by filtration	No	Yes	No

Materials Required

1. Beakers (250 mL), an iron stand, a glass rod, bunsen burner, test tube stand, three funnels, three tripod stands, filter papers, a small torch and China dish.

Chemicals Required

1. Common salt, sugar crystals, alum powder, chalk powder, fine sand, raw egg, fine soil from garden and distilled water.

Procedure

1. **To prepare a true solution of common salt, sugar and alum in water.**

○ **True solution of common salt:**

Take a clean and dry beaker, pour 100 mL of distilled water in it and add dry common salt in it.

Stir the content with a glass rod. Common salt dissolves completely to form a true solution.

○ **True solution of sugar:**

Take a clean and dry beaker and add 100 mL of distilled water in it, pour few sugar crystals in it and stir the content with a glass rod. The sugar dissolves in water to form true solution.

○ **True solution of alum:**

Take a clean and dry beaker, add 100 mL of distilled water in it and add a pinch of alum powder, stir with a glass rod. The alum dissolves in water to form a true solution.

2. **To prepare a suspension of soil, chalk powder and fine sand in water.**

○ **Suspension of sand in water:**

Take 100 mL of distilled water in a beaker, add 10 g of fine sand in it. Stir well using a glass rod. Allow it to stand for some time and record your observation.
(It does not dissolve in water)

○ **Suspension of chalk powder in water:**

Take 100 mL of distilled water in a beaker, add 10 g of chalk powder in it. Stir well and record your observation,
(chalk + water forms a suspension)

○ **Suspension of soil in water:**

Take 100 mL of distilled water in a beaker and 10 g of garden soil to it. Stir the mixture with a glass rod. Allow it to stand for sometime record your observation.
(Soil does not dissolve in water but forms a suspension)

3. **To prepare colloidal solutions of starch and egg albumin in water.**

○ **Colloidal solution of starch in water:**

Take about 1 g of starch in a china dish, pour 10 mL of distilled water in the dish and stir the mixture. Now take 90 mL of hot, boiling water.

(Heat the water in beaker using Bunsen burner)

Stir the contents of the china dish continuously and pour the contents in the boiling water. Allow the contents to cool. Record your observation.

(The starch + water solution is colloidal in nature.)

○ **Colloidal solution of egg albumin in water:**

Take 10 ml of water in a beaker. Break an egg and discard the egg shells. Separate the white portion of egg from the yellow part. Add a very small quantity of egg albumin to it. Stir the contents thoroughly with the help of a glass rod. Then add 90 mL of distilled water with continuous stirring and few drops of dil. acid (dil. HCL, dil. H₂SO₄). Record your observation.

(Egg albumin + water solution is colloidal in nature.)

4. **To distinguish the above formed solutions on the basis of transparency, filtration criterion and stability:**

Take one true solution → salt + water

Take one suspension → chalk + water

Take one colloidal solution → egg albumin + water

○ **Transparency:**

Take 3 test tubes with a colloid, suspension and true solution in each respectively.

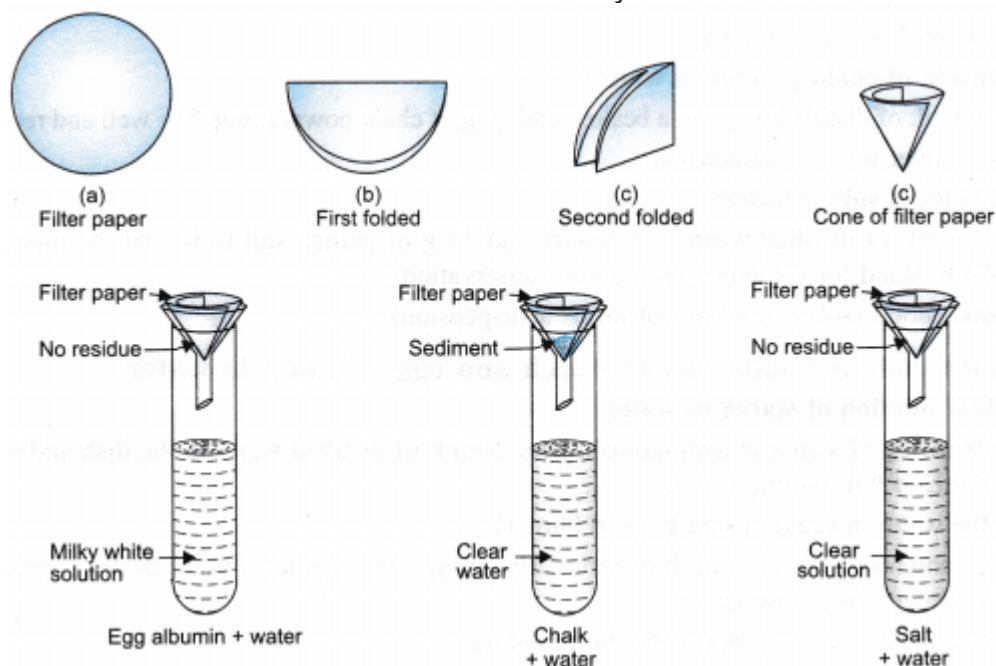
Paste a white paper with tick mark on one side of each test tube. Look at the tick mark through the contents of the three test tubes from the other side. Check for the transparency of tick mark.

Record your observations.

○ **Filtration Criterion:**

Take 3 tripod stands, place a funnel over each stand. Fix the filter paper in the funnel

and check for the filtration criterion. Record your observations.



○ **Stability Criterion:**

Take 3 test tubes with a colloid, suspension and true solution in each respectively. Shake all the test tubes and keep them in the test tube stand, allow it to stand for 5 minutes.

Record your observations.

Observation Table

S.No.	Property	True Solution	Colloidal Solution	Suspension
1.	Size of Particles	Less than 10^{-9} m	Between range of 10^{-9} m – 10^{-6} m	More than 10^{-6} m
2.	Nature	Homogeneous	Appears homogeneous but is heterogeneous.	Heterogeneous
3.	Visibility	The solute particles are invisible to naked eye and also under the microscope.	The solute particles are invisible to naked eye but can be viewed under powerful microscope.	The solute particles are visible to naked eye.
4.	Stability	The solute particles do not settle down and are stable.	The solute particles do not settle down and are stable. (On centrifugation the particles can settle)	The solute particles settle down and are unstable.
5.	Filtration	The solute particles can pass through filter paper and no residue is seen on filter paper.	The solute particles pass through filter paper and no residue is left. (But the particles cannot pass through parchment membrane)	The solute particles can not pass through filter paper and residue is collected on filter paper.
6.	Transparency	Transparent	Translucent	Opaque

Precautions

1. Use test tube holder for heating/boiling of water.
2. Do not waste the chemicals and distilled water. Use it wisely.
3. Always stir the contents in the test tube nicely and gently.
4. Use only distilled water to make solutions.

Experiment - 2

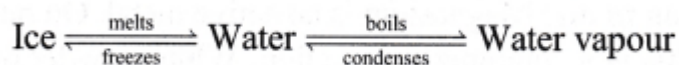
Aim

To carry out the following chemical reactions and classify them as physical or chemical changes.

1. Iron with copper sulphate solution in water.
2. Burning of magnesium ribbon in air.
3. Zinc with dilute sulphuric acid.
4. Heating of copper sulphate.
5. Sodium sulphate with barium chloride in the form of their solutions in water

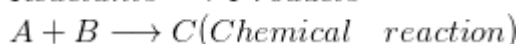
Theory

1. **Physical Change:** When there is no change in the composition of a substance and no change in chemical nature of the substance, such change is called as physical change.
2. In physical change, the interconversion of state takes place. For example,



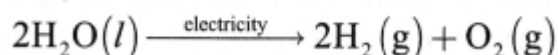
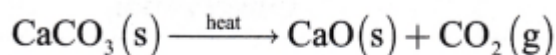
3. **Chemical Change:** It is a change which brings change in the chemical properties of matter and a new substance is obtained. For example, burning of oil, fuel.
4. In a chemical change – heat is evolved or taken in, formation of bubbles, gas, fumes takes place, there is a change in colour of the reactants when they form a product.

Reactants \longrightarrow *Products*

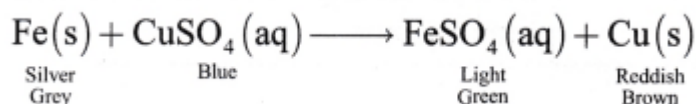


The chemical reactions are of four types:

1. Combination reaction: Two elements/compounds combine to form a single product.
2. Decomposition reaction: When a compound decomposes/breaks due to energy, heat, light or electricity to form simpler substance.



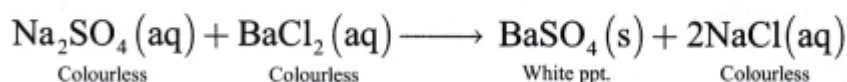
3. Displacement reaction: It takes place when more reactive metal reacts with the salt of less reactive metal and displaces it to form a new compound.



4. Double displacement reaction: In this reaction when two salts are mixed together in solution form then exchange of ions takes place and a new product is obtained.

E.g.

Sodium sulphate + Barium chloride \longrightarrow Barium sulphate + Sodium chloride



Materials Required

Test tubes, test tube stand, test tube holder, a pair of tongs, Bunsen burner.

Chemicals Required

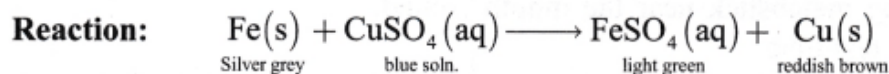
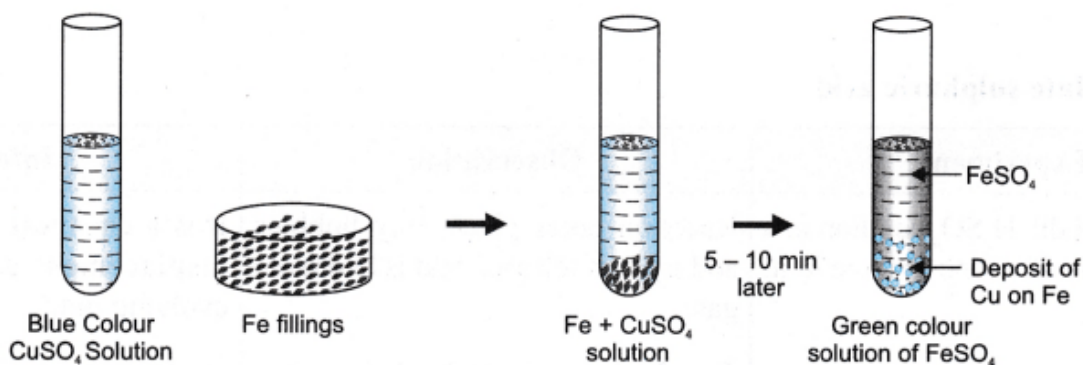
Iron filings, copper sulphate solution, magnesium ribbon, zinc granules, dilute sulphuric acid, sodium sulphate and barium chloride solutions and copper sulphate crystals.

Procedure

Iron with copper sulphate solution in water

Experiment	Observation	Inference
Take CuSO_4 solution in a test tube, add pinch of iron filings in it.	After 5–10 minutes the blue colour CuSO_4 solution changes into green colour. Iron filings gets coating of reddish brown copper metal.	Chemical change takes place, shows displacement reaction. Iron is more reactive than copper and it displaces Cu from CuSO_4 solution.

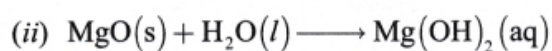
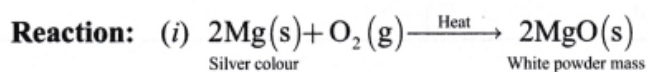
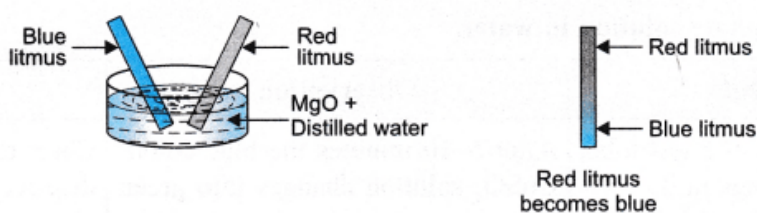
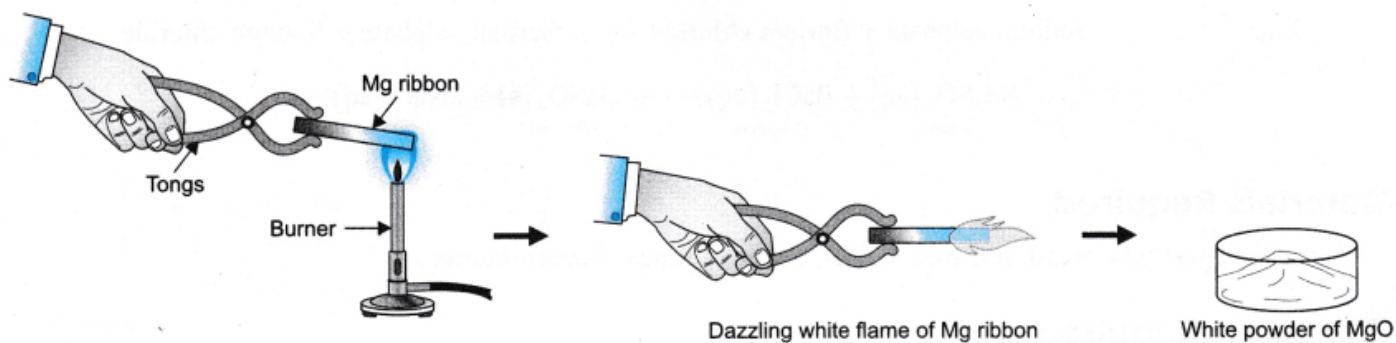
Reactions of $\text{Fe} + \text{CuSO}_4$



Burning of magnesium ribbon in air

Experiment	Observation	Inference
Hold a small piece of magnesium ribbon with a pair of tongs and burn it on Bunsen burner.	It burns with dazzling white flame and forms white powdery mass of magnesium oxide. Add MgO (white powder) to a test tube containing water and test it with litmus paper.	It is a chemical change, shows combination reaction. Red litmus turns blue. Mg(OH)_2 is basic in nature.

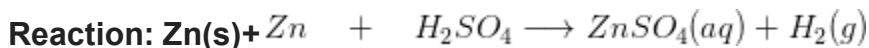
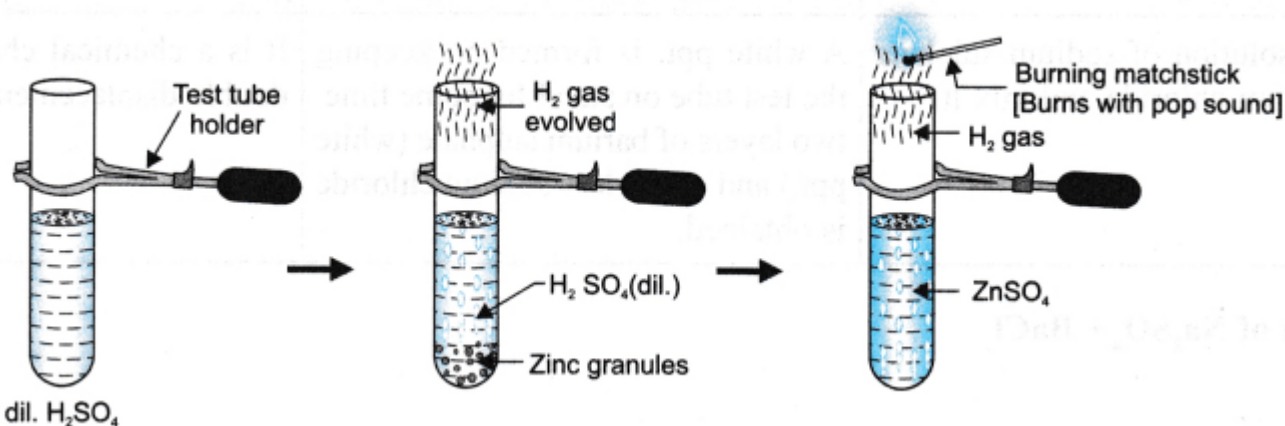
Reaction of $Mg + O_2$



Zinc with dilute sulphuric acid.

Experiment	Observation	Inference
Take 5 mL of dil. H_2SO_4 solution in a test tube and add a zinc granule in it.	Reaction takes place, tiny bubbles and a gas is released that is hydrogen gas. Test hydrogen gas by bringing a burning matchstick near the mouth of the test tube.	It is a chemical change and shows displacement reaction with heat evolving out. Hydrogen gas burns with a pop sound.

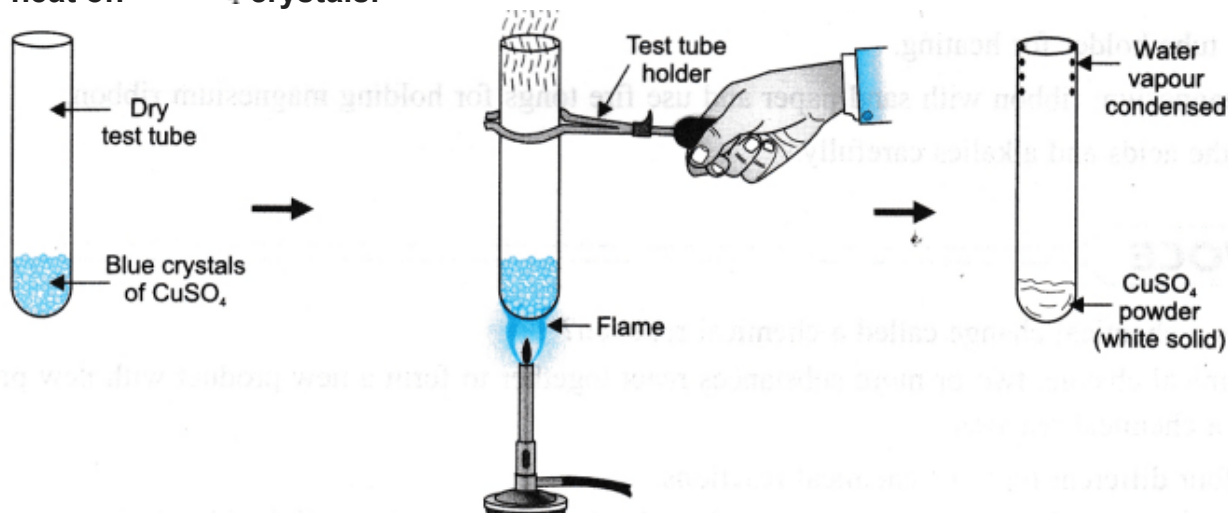
Reactions of $Zn + H_2SO_4$



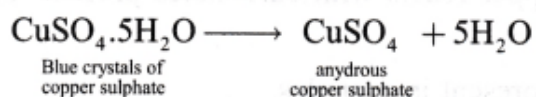
Heating of copper sulphate salt

Experiment	Observation	Inference
Heat copper sulphate crystals in a dry test tube	Water vapour comes out and condenses near the mouth of the test tube. Blue colour of crystals fades and turns into white powder.	$CuSO_4 \cdot 5H_2O$ loses water of crystallisation.
Take small portion of white powder obtained in above reaction. Add water to it.	White solid powder will turn blue.	Copper sulphate is hydrated.

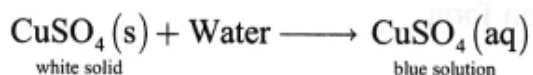
Reaction of heat on $CuSO_4$ crystals.



Reaction: On heating $CuSO_4 \cdot 5H_2O$ crystals



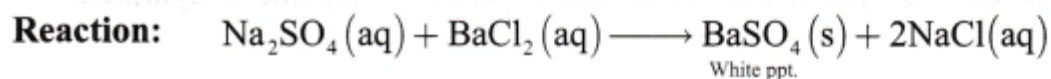
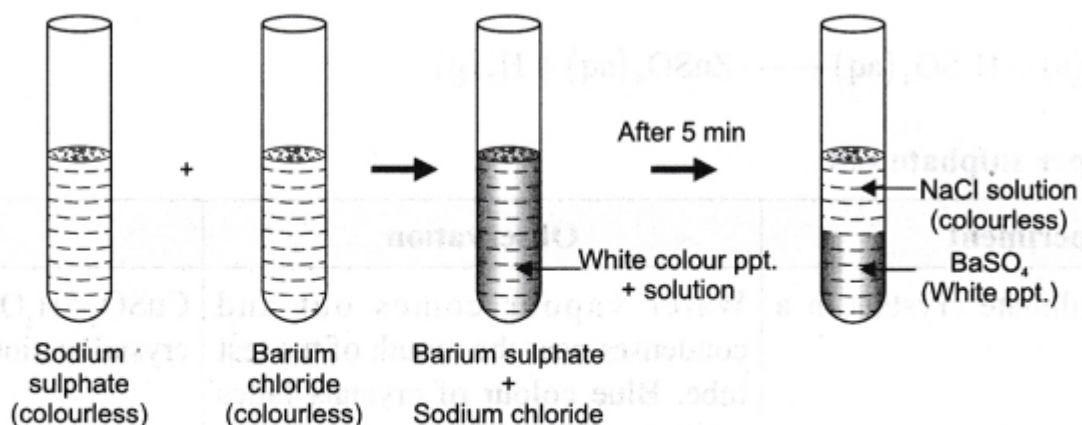
On adding water to white powder of anhydrous copper sulphate



Reaction of sodium sulphate and barium sulphate solutions.

Experiment	Observation	Inference
Take a solution of sodium sulphate and barium chloride and mix it.	A white ppt. is formed on keeping the test tube on stand for some time, two layers of barium sulphate (white ppt.) and colourless sodium chloride is obtained.	It is a chemical change and shows double displacement reaction.

Reaction of $Na_2SO_4 + BaCl_2$



Precautions

1. Use all the chemicals in very less quantity.
2. Use test tube holder for heating.
3. Clean magnesium ribbon with sand paper and use fire tongs for holding magnesium ribbon.
4. Handle the acids and alkalies carefully.

Experiment - 3

Preparation of stained temporary mounts of (a) onion peel, (b) human cheek cells & to record observations and draw their labeled diagrams.

observations and draw their labeled diagrams

Objective:

To prepare a stained temporary mount of an onion peel and to record observations and draw labeled diagrams.

Apparatus and materials required:

An onion, glass slide, watch glass, coverslip, forceps, needles, brush, blade, filter paper, safranin, glycerine, dropper, water, and a compound microscope.

Theory:

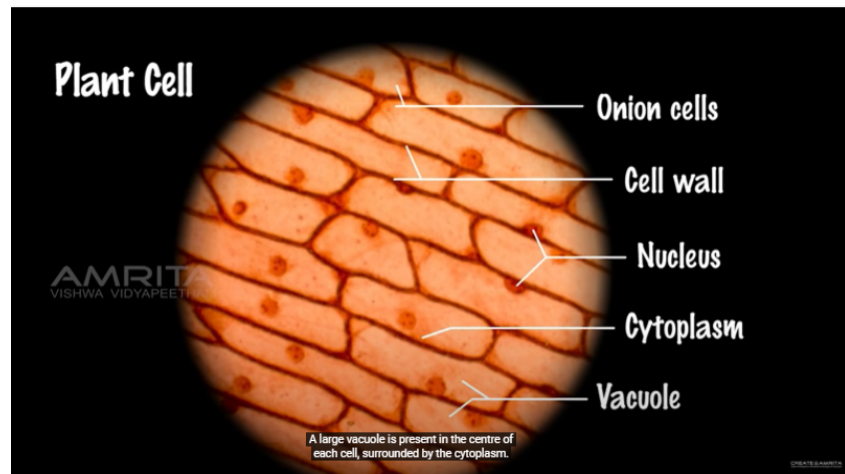
All living organisms are made up of cells. The shape, size and the number of these units vary in organisms. The three major components of a cell are the cell membrane, cytoplasm and nucleus. In a plant cell, a cell wall surrounds the cell membrane.

Procedure:

1. Take an onion and remove its outermost peel.
2. Now cut a small part from an inner scale leaf with the help of a blade.
3. Separate a thin, transparent peel from the convex surface of the scale leaf with the help of forceps.
4. Keep this peel in a watch glass containing water?
5. Add two drops of safranin stain in the watch glass to stain the peel.
6. Take a clean slide and put a drop of glycerine in the centre of the slide.
7. With the help of a brush and needle transfer the peel on the slide. Glycerine prevents the peel from drying up.
8. Carefully cover it with a coverslip and avoid any air bubble from entering interring the coverslip.
9. Remove any excessive glycerine with a filter paper.
10. Observe the prepared mount of the peel under the low and high magnification of a compound microscope.

Observations:

A large number of rectangular cells are visible. These cells lie close to each other with intercellular spaces between them. These cells are surrounded by distinct cell walls. These cells have a dark stained nucleus and a large vacuole in the centre.



Precautions:

1. Overstaining and understaining should be avoided.
2. Folding of the peel should be avoided.
3. Clean and dry glass slide and coverslip should be used.
4. Coverslip should be put carefully avoiding any air bubbles.

Experiment 1.2:

Objective:

To prepare a stained temporary mount of human cheek cells and to record observations and draw labelled diagrams

Apparatus and materials required:

Toothpick, slide, coverslip, filter paper, needles, brush, watch glass, methylene blue, dropper, glycerin, water and a compound microscope

Theory:

Animal cells are usually irregular in shape. They do not have a cell wall. They are surrounded by a cell membrane and contain cytoplasm and nucleus.

Procedure:

1. With the help of the flat end of a washed toothpick gently scrape the inside of your cheek.

Place the scrapings in the centre of a clean glass slide.

3. Add a drop of water and a drop of methylene blue.

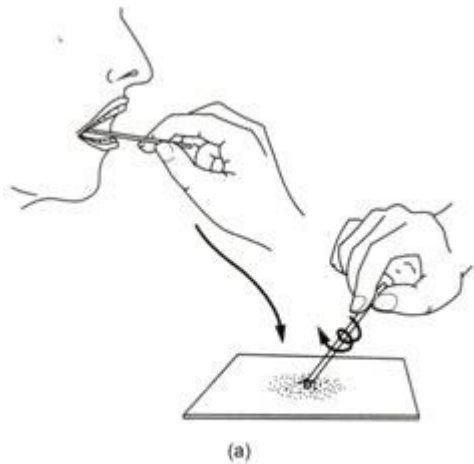
4. After one minute remove the extra water mixed with methylene blue by slightly tilting the slide.

5. Put a drop of glycerine over the stained scrapings and cover it gently with a coverslip.

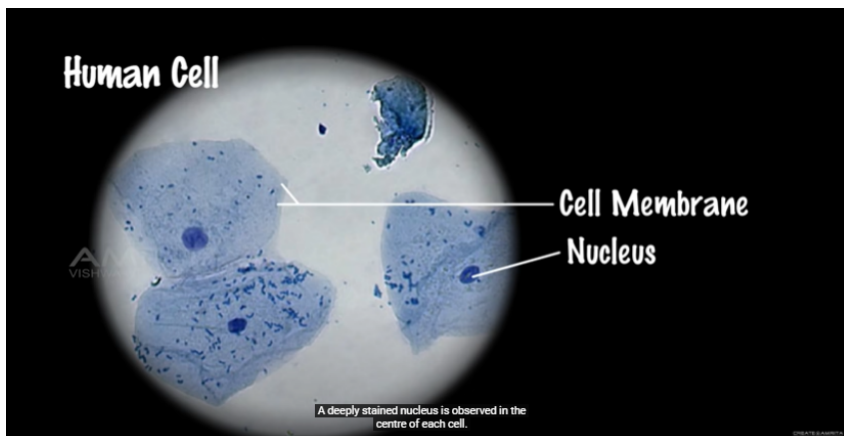
Remove the excessive glycerine using filter paper.

7. Observe the scrapings under the low and high magnifications of a microscope.

Observations:



(a) Removing epithelial cells from the buccal cavity using a toothpick



Many flat, oval or irregular cells are seen. The cell membrane encloses hyaline cytoplasm and an oval, dense nucleus. The cell wall is absent as in all animal cells.

Precautions:

1. The cheeks should be scraped gently avoiding any injury.

2. Over-staining and under-staining of the cells should be avoided

3. Coverslip should be placed carefully avoiding the entry of air bubbles.
4. A dry and clean glass slide and coverslip should be used.
5. The cheek cells should be spread properly to avoid their folding.

<https://youtu.be/wMgXsrpVrJg>

Experiment - 4

Aim : Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants, striped, smooth and cardiac muscle fibers and nerve cells in animals, from prepared slides. Draw their labeled diagrams.

Apparatus and materials required:

Permanent slides of parenchyma, sclerenchyma, and a compound microscope.

Theory:

A group of cells of the same size and shape, or of a mixed type, having a common origin and performing an identical function is called tissue. Plant tissues are of two types—meristematic and permanent. Meristematic tissue cells are capable of dividing, while permanent tissue cells are not. Parenchyma, collenchyma, and sclerenchyma are the three types of simple permanent tissues.

Procedure:

1. Take a permanent slide of parenchyma and study under the low magnification and then under the high magnification of microscope.
2. Similarly place and study the other permanent slides of sclerenchyma.

Observations:

The first slide of parenchymatous cells reveals the following features:

Characters of Parenchyma:

1. The cells are generally oval or spherical in shape.
2. These cells are large and are not packed closely, i.e., intercellular spaces are present.
3. Each cell has a large central vacuole and a peripheral cytoplasm with a prominent nucleus.
4. These living cells are found in the soft parts of the plants, i.e., root, stem, leaves, flowers, and fruits.
5. The important functions of these cells are storage of food, filling up spaces between

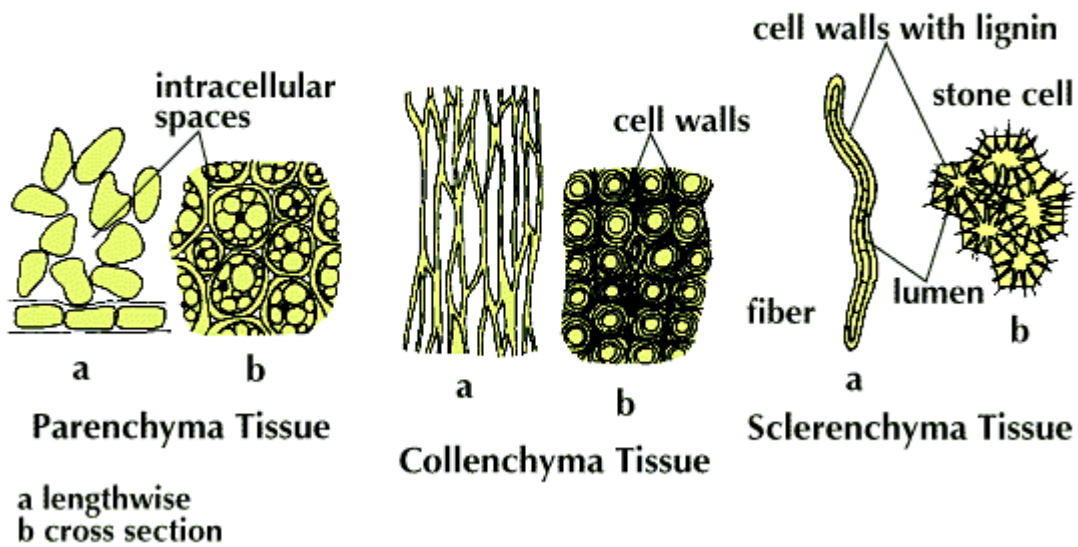
other tissues and providing support to the plant. When they contain chloroplasts as in leaves, they help in the synthesis of food.

The slides of sclerenchymatous cells show the following identifying features:

Characters of Sclerenchyma:

1. Cells are thick-walled, hard and contain little or no protoplasm.
2. The cells are oval, polygonal and are of different shapes.
3. The cells are dead and the nucleus is absent.
4. These cells are packed closely, i.e., intercellular spaces are absent.
5. The cell wall is evenly thickened with lignin and perforated with pits.
6. They provide strength and rigidity to the plant parts with hardness.

THE THREE BASIC TYPES OF PLANT TISSUE



Identification of parenchyma tissues in plants:

1. they are oval in shape
2. cells are not packed tightly
3. intercellular spaces dont exist
4. there is no lumen
5. nucleus exist

Identification of sclerenchyma tissues in plants:

1. they are polygonal in shape
2. tightly packed cells
3. intercellular spaces dont exist
4. lumen exist
5. nucleus dont exist

collenchyma tissues in plants:

1. they are elongated axially
2. thick and flexible cell wall
3. chloroplast mostly present
4. intercellular spaces dont exist

<https://youtu.be/l14PHbVXno4>

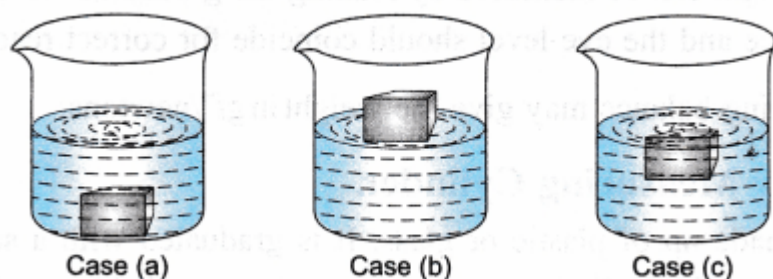
Experiment 5

Aim

To determine the density of solid (denser than water) by using a spring balance and a measuring cylinder.

Theory

1. **Density:** The density of a substance is defined as the mass per unit volume, $[D = \frac{M}{V}]$
Here, D = Density of the body
M = Mass of the body
V = Volume of the body.
2. S.I. unit of density = Kgm^{-3} or Kg/m^{-3}
c.g.s. unit of density = g/cm^{-3} or g cm^{-3}
3. **Floating bodies:** The density of water is 1 g/cm^3 (c.g.s. system) and 1000 kg/m^3 (S.I. system).
4. **Case (a)** If the density of a body is more than 1 g/cm^3 or 1000 kg/m^3 then the body will sink in water.
5. **Case (b)** If the density of a body is less than 1 g/cm^3 or 1000 kg/m^3 then the body will float on water.
6. **Case (c)** If the density of a body is same i.e. 1 g/cm^3 or 1000 kg/m^3 then the body will half float and half submerge in water.



Weight

1. The force due to the gravitational attraction of the earth that acts on a body is called weight.
2. (Weight) Force = mass x acceleration.
Force = mass x acceleration due to gravity (g)
Force = mass x g
i.e. Weight = m x g
3. Weight of a body = Force on the body.
4. S.I. unit = Newton = 1 kg m/s^2
N = 1 kgf = 1 kilogram force,
i.e. $g = 9.8 \text{ m/s}^2$
5. Weight is measured by spring balance.

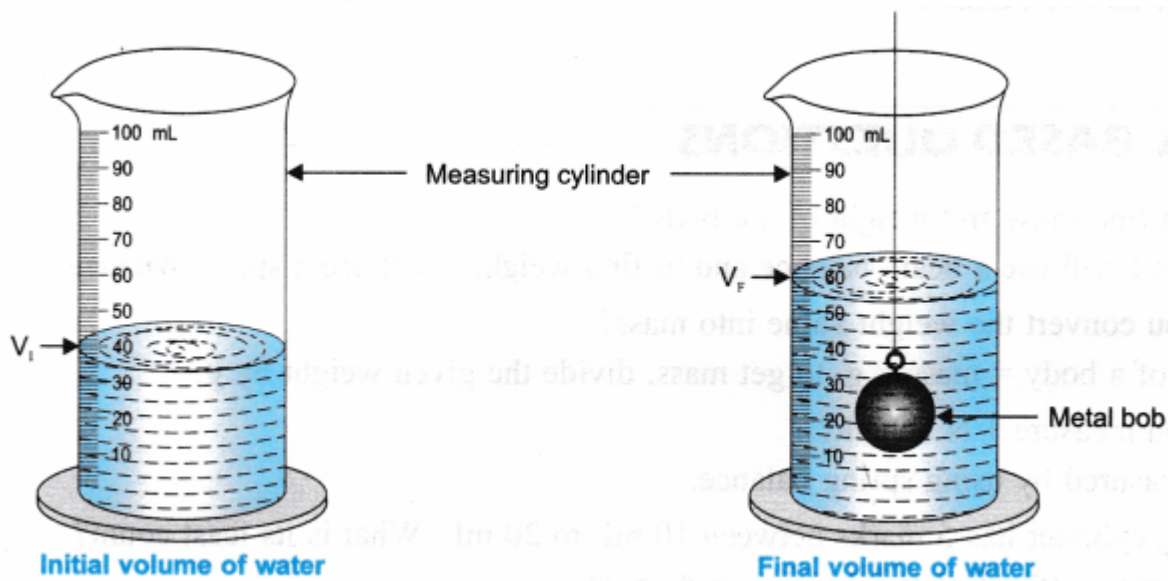
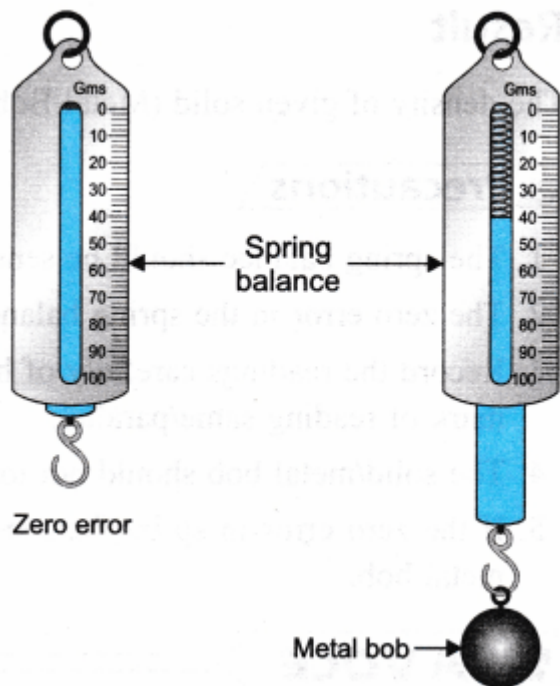
Materials Required

A spring balance, a measuring cylinder, a beaker with water, a metal bob (or any body that is heavier than water and does not dissolve in water), a cotton string, a stand (optional).

Procedure

1. Tie a metal bob (or any solid) with the string of cotton to the hook of the spring balance. The spring balance should be checked for any error. Let the zero error be 'x'.
2. Hold the spring balance (or tie it to the stand), suspended with the metal bob in air. Measure the weight of the bob. Let its weight be ' W_F '

- Pour the water in the measuring cylinder and record the initial volume of water, let it be ' V_1 '
- Suspend the metal bob into the measuring cylinder with water. The bob should not touch the base, nor the sides of the cylinder. The water level rises, measure the increased water level, let this volume be ' V_F '
- Record all your observations in the observation table and do the calculation to find the density of a given solid metal bob.



Observations

WEIGHT OF THE SOLID (METAL BOB) (M)

Initial Reading of Spring balance, x	Final Reading of spring balance with Metal Bob (W_F)	Weight of the Metal Bob $W = W_F - x$
0	400	400

- Weight of the given Metal Bob = 400N
- Mass of the Metal Bob = $400/9.8 = 40.8$ g

VOLUME OF THE SOLID (METAL BOB) (V)

Initial Volume of water in cylinder V_i (mL)	Final volume of water when Metal Bob is immersed V_f (mL)	Volume of the Metal Bob $V = V_f - V_i$
40	60	20

1. Volume of water displaced by solid (metal bob) = 20 mL.
2. Density of a solid (metal bob) = $\frac{40.8g}{20ml} = 2.04 \text{ g/cm}^3$
1 mL of water = 1 cm³

Result

The density of given solid (Metal Bob) is 2.04 g/cm³

Precautions

1. The spring balance should be sensitive.
2. The zero error in the spring balance should be recorded before it is used to find the weight of solid.
3. Record the readings carefully of both spring balance and measuring cylinder by keeping the level of eye and the mark of reading same/parallel.
4. The solid/metal bob should not touch the bottom, or sides of the measuring cylinder.
5. If the zero error in spring balance is 1 N then subtract this error from the final reading of the weight of solid/ metal bob.

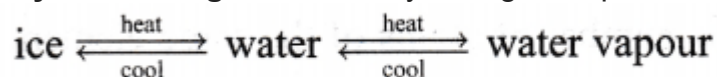
Experiment - 6

Aim

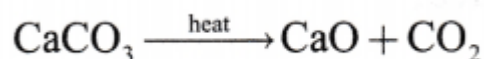
To verify the law of conservation of mass in a chemical reaction.

Theory

1. Matter can neither be created nor destroyed in a chemical change.
2. **Law of conservation of mass:** In a chemical reaction (except for nuclear reactions as matter can change to energy) mass can neither be created nor destroyed. The reactants \rightarrow atoms of one or more substances simply get rearranged to form product. Total mass of reactants before reaction = Total mass of the product after reaction. This law was proposed by **Antoine Lavoisier**.
3. Chemicals undergo several kind of changes, i.e. Physical, Chemical and nuclear.
4. **Physical change:** Matter only changes its phase from solid to liquid and from liquid to gas.



5. **Chemical change:** The atoms of reactants rearrange and form new compounds.



6. **Nuclear change:** The nucleus of an atom can be changed by adding/reducing the number of protons, in it/by splitting of nucleus. For example, Uranium can undergo fission to become Barium and Krypton.
7. In chemical reaction, when the reactants react they may take/give heat, gas may be released, bubbles may be formed, colour may change or precipitate may be formed.

Materials Required

Two watch glasses, beakers, weighing balance and glass rod.

Chemicals Required

Distilled water and one of the following sets of chemicals.

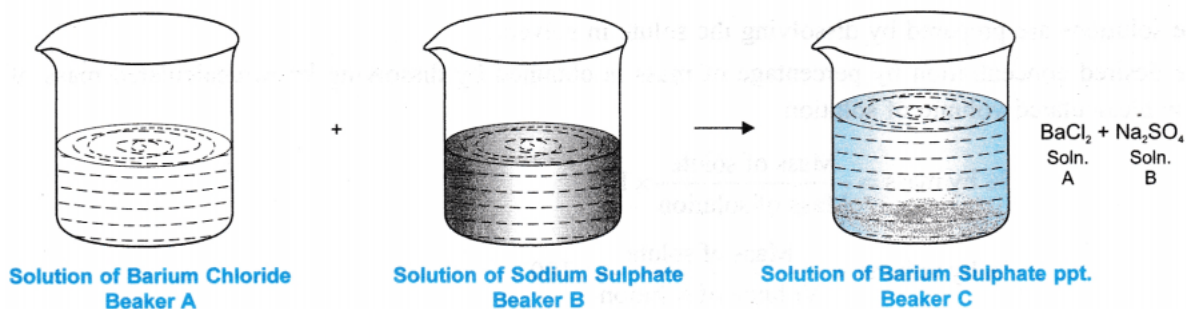
Set I	\rightarrow	Copper sulphate	and	Sodium carbonate
Set II	\rightarrow	Barium chloride	and	Sodium sulphate
Set III	\rightarrow	Lead Nitrate	and	Sodium chloride
		(X)		(Y)

METHOD A

Procedure

1. Take two watch glasses and weigh them using the physical balance and record their weight.
2. Weigh 3.6g of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ in a watch glass of known mass.

3. Take 100 ml beaker with 50 ml distilled water in it. Label it as Beaker 'A'.



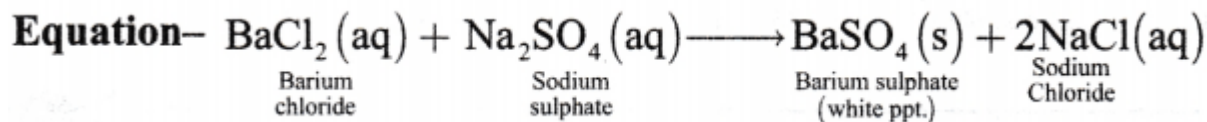
4. Dissolve the weighed $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ in the beaker 'A'.
5. Now weigh 8.05 g of $\text{Na}_2\text{SO}_4 \cdot \text{H}_2\text{O}$ in another watch glass of known mass and dissolve it in the other beaker containing 50 ml of distilled water. Label the beaker as 'B'.
6. Take another beaker. Weigh it and label it as 'C'
7. Mix the contents of beaker 'A' and 'B' in beaker 'C' Stir it with glass rod.
8. You will observe the white precipitate that is formed in beaker 'C', due to the formation of (BaSO_4) Barium Sulphate.
9. Weigh beaker 'C' again with the product obtained and record your observations.
10. To get the mass of the product formed, subtract the mass of beaker 'C' before adding the solutions and after adding the solutions from 'A' and 'B' beaker.

Observations

1. Mass of Reactants = 44 g
 2. Mass of Products = 44 g
 3. Mass of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ = 3.6 g
 4. Mass of BaCl_2 , solution = 53.6 g
 5. Mass of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ = 8.05 g
 6. Mass of Na_2SO_4 solution = 58.05 g
 7. Total mass of reactants is $53.6 \text{ g} + 58.05 \text{ g} = 111.65 \text{ g}$
 8. (BaCl_2 , soln.) (Na_2SO_4 soln.)
 9. Mass of beaker 'C' is $C_1 = 500 \text{ g}$
 10. Mass of reaction mixture on adding in beaker 'C' is $C_2 = 611.65 \text{ g}$
 11. Mass of the product formed = $C_2 - C_1 = 111.65 \text{ g}$
- Note:** Mass of 50 ml of distilled water = 50.0 g
(density of water = 1 g/mL)

Result

1. Within the reasonable experimental limits:-
2. Initial mass of reactant = Final mass of the product (reactant mixture)

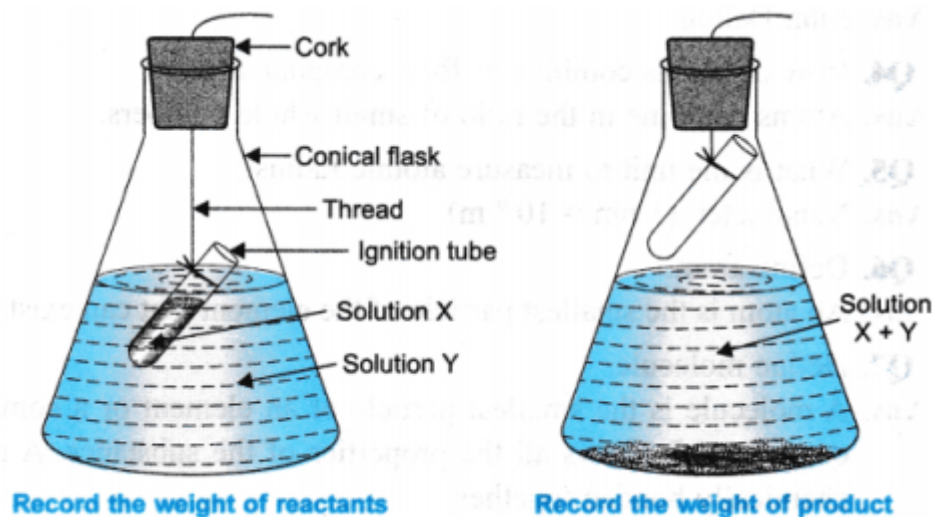


METHOD B

Procedure

1. Prepare a 5% solution of any one pair of substances X and Y given.
2. Take a little amount of solution of Y in a conical flask and some solution of X in an ignition tube.

3. Hang the ignition tube in the flask carefully as shown in the figure. The solution from the test tube should not spill in the flask.
4. Put a cork on the flask.
5. Weigh the flask with its contents carefully.
6. Now tilt and swirl the flask gently, so that the solutions X and Y get mixed.
7. Weigh the conical flask again.
8. Record your observation.
9. Note the mass of the conical flask before reacti



Observations

1. Initial weight of conical flask + ignition tube with the respective solution X and Y =g
2. Weight of conical flask + ignition tube when solution X and Y are mixed and reaction has taken place = g.
3. The weight of reactants = Weight of products.

Result

1. Mass of the reactants = Mass of the products
2. There is no loss of mass in a chemical reaction.

Precautions

1. Be careful while using the weighing machine.
2. Prepare the solution in distilled water only.
3. Do not taste any chemical.
4. Fix a cork when solution X and Y are mixed.
5. Subtract the mass of conical flask + cork to get the resultant mass of product.
6. Cork should be used when the chemicals (reactants) are mixed, so that the gas, vapours formed is not allowed to escape.
7. The law is verified only in closed system.
8. Do not allow the chemical to spill from the ignition tube while recording the initial mass.

Chemical Reactions

