AIM

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

APPARATUS REQUIRED

A metallic object (any shape), iron stand, a spring balance, a measuring cylinder (preferably 0–250 mL)

THEORY

Mass per unit volume of a substance is called the density of a given substance.

Let M be the mass of a given substance/object and V be its volume. Its density ρ is given by

$$\rho = \frac{M}{V} = \frac{\text{Mass of object}}{\text{Volume of object}}$$

Its S.I. unit is kg m^{-3}.

Let the weight of object measured by the spring balance in air = W g-wt.

Initial volume of water in measuring cylinder = V_1 mL.

Final volume of water in measuring cylinder when object is fully immersed in water = V_2 mL.

$\therefore$ Volume of object = Volume of displaced water = $(V_2 - V_1)$ mL

Therefore, density of object $(\rho) = \frac{W}{V_2 - V_1}$ g cm^{-3}

PROCEDURE

1. Hang the spring balance vertically with the help of iron stand as shown in Fig. 2.2.
2. Find its least count by using the given formula:

$$\text{Least count} = \frac{\text{Range of given spring balance}}{\text{Total number of divisions}}$$

3. Check the zero error (if any) and record it with proper sign.
   This is the reading of spring balance when no weight is suspended from its lower hook.

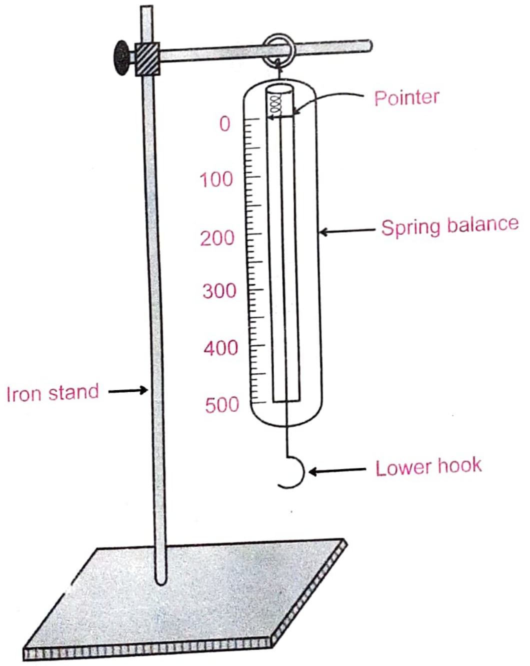


Fig. 9.2. Vertical position of spring balance

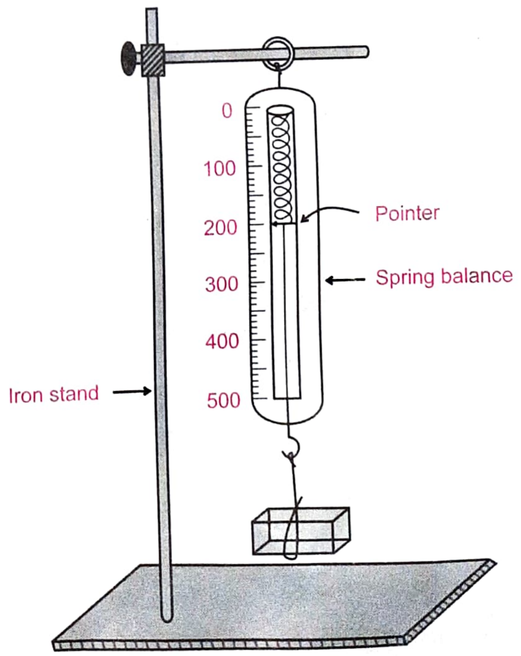


Fig. 9.3. Measurement of weight of a solid object in air

Measurement of weight of a given metallic object:

4. Hang the metallic object with the lower hook of the spring balance as shown in Fig. 9.3.
5. Take the reading of spring balance when the metallic object becomes static.
6. Obtain the true weight of the given metallic object by subtracting the zero error (if any) from the observe weight.
7. Repeat the experiment thrice and find its mean weight.

Measurement of the volume of a given metallic object:

8. Pour some water into the measuring cylinder and record the initial level of water (lower position of meniscus) as shown in Fig. 9.4. Let the initial volume be V_1 (mL).
9. Remove the metallic object from the spring balance and tie it by a thin strong thread and immerse it fully in the water in measuring cylinder.
10. Note down the new position of meniscus V_2 (mL) in the measuring cylinder as shown in Fig. 9.5. The level of water rises up because the immersed object displaces water from its initial level.
11. Obtain the volume of the immersed metallic object by subtracting the two position of meniscus (water level) *i.e.* $v_2 - v_1$.
12. Repeat the experiment thrice and find its mean volume.

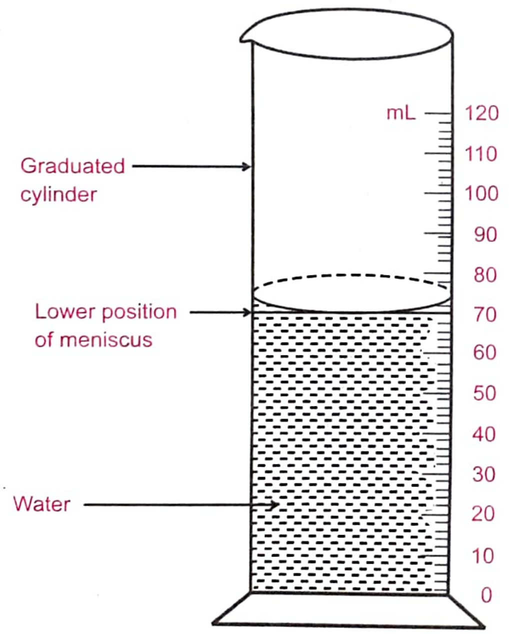


Fig. 9.4. Measuring cylinder

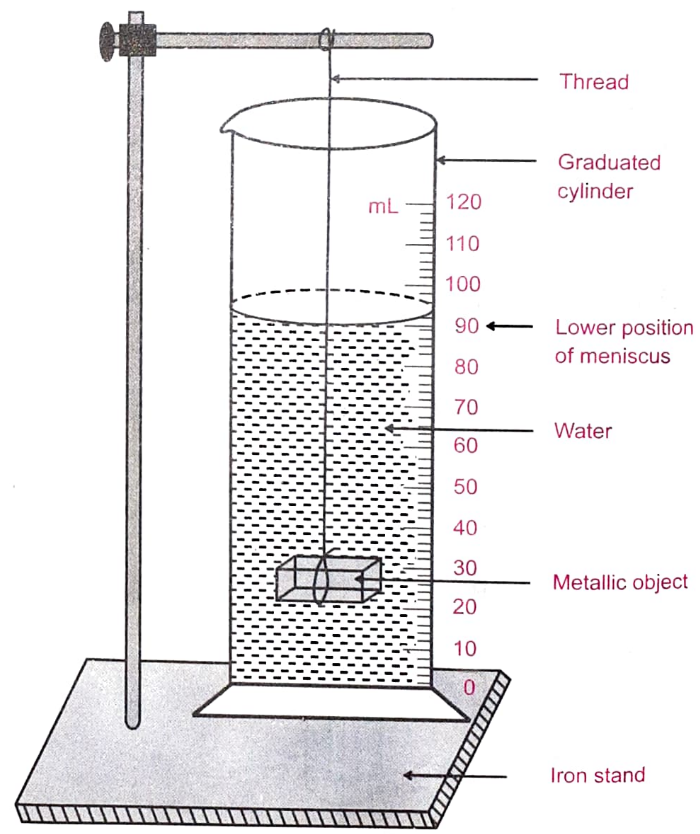


Fig. 9.5. Measurement of a volume of given solid

OBSERVATIONS

Least count of spring balance : .... g wt.

Zero error of the spring balance : .... g wt.

Least count of measuring cylinder : .... mL.

Table: Measurement of weight of a given metallic object.

S. No.	Reading of spring balance		Weight of metallic object	
	(without object) W_1 (g wt.)	(with object) W_2 (g wt.)	Weight of object observed $W_2 - W_1$ (g wt.)	True weight of object $W = (W_2 - W_1) -$ (Zero error) (g wt.)
1.				W'_1 = ...

Mean weight of given metallic object = g wt.

∴ Mass of the given metallic object by spring balance, (M) = ... g.

CALCULATIONS

True mass of given object = ... g

Volume of given object = ... mL

∴ Density of a given metallic object = $\frac{\text{Mass of object}}{\text{Volume of object}} = \frac{M}{V}$ g/mL

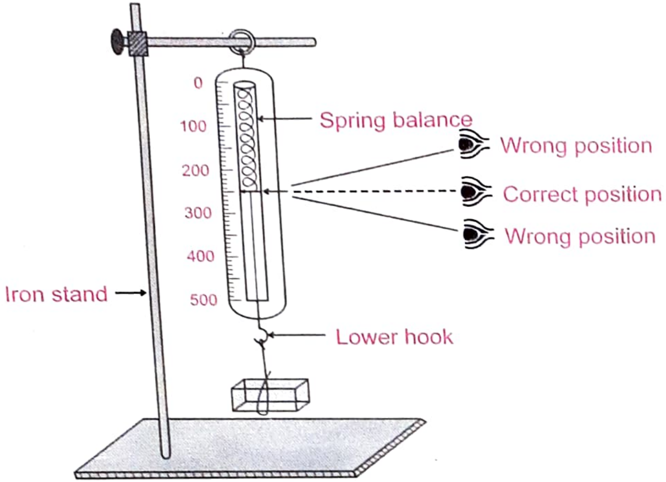
= .... g/mL = ... kg m^{-3} (∵ 1000 kg m^{-3} = 1 g mL^{-1})

RESULT

The density of the given solid (heavier than water) = ... kg m^{-3}.

PRECAUTIONS

1. Spring balance should be sensitive, stable and error free.
2. The horizontal pointer should move freely along the scale of spring balance.
3. Spring balance must be suspended vertically from fixed support of iron stand.
4. Reading should be taken only when oscillation of hanging object dies completely.
5. Eye should be kept in line (exactly horizontal) while taking the reading of spring balance as well as measuring cylinder as shown in figs. 2.6 and 2.7.
6. Solid object should be dried completely before measuring mass in air and when allowed to immersed in water.
7. While measuring the volume of object, the object should not touch sides and bottom of a measuring cylinder.
8. The water of the measuring cylinder should not fall out during immersing of solid object.



· **Fig. 9.6.** Reading of spring balance

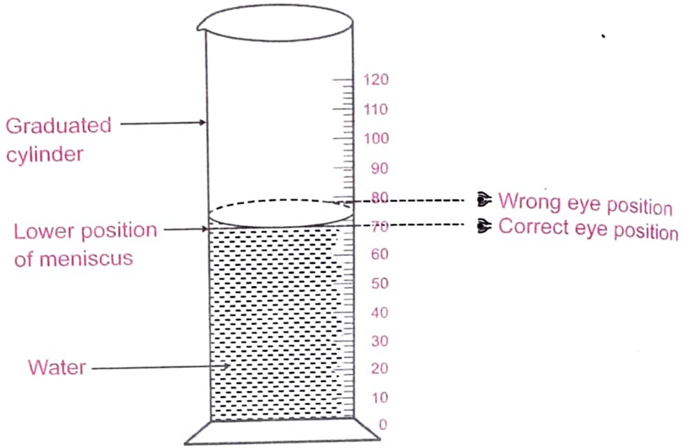


Fig. 9.7. Reading of lower meniscus of water level

SOURCE OF ERROR

1. Least count of spring balance may be higher.
2. Spring of spring balance may be permanently stretched.
3. Solid object may not be completely dried.
4. The eye may not be in the proper level of meniscus while measuring the volume of solid object.

EXPERIMENT 11

BASIC BUILDING CONCEPTS

PULSE

A quick sudden single disturbance created in a medium which lasts for a short-while is called pulse.

When pulse travels in a medium, the particles of that medium oscillate for a short-while and then come back to their mean positions.

When the pulse moves in a medium in the specified direction, only energy is transferred from one end to the other end. The particles of the medium do not move but only oscillate about their equilibrium position, *i.e.* the particles of the medium move up and down or in a back and forth manner.

Fig. 11.1. Pulse on string

PULSE VELOCITY

The distance travelled by the pulse from free end to another end in a unit time is called pulse velocity, *i.e.*

$$\text{Pulse velocity } (v) = \frac{\text{Distance travelled by pulse in a specified direction } (s)}{\text{Time taken } (t)} = \frac{s}{t}$$

Its unit is m/s or m s^{-1}.

Pulse velocity is also called wave velocity. The relation between wave velocity, wave frequency and wavelength is given by

Wave velocity = Wave frequency × Wavelength

Example of pulse:

1. Plucking of a string of guitar or sitar.
2. During explosion, sudden and loud sound produce.
3. Sound produced by clapping of hands.
4. Disturbance created on the surface of water by dropping a stone.

SLINKY/SPRING

A long flexible string which can be compressed or stretched very easily is called a slinky or spring. When slinky is stretched, the coils assume an equilibrium or rest position.

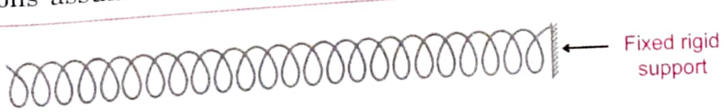


Fig. 11.2. When a slinky is stretched, the individual coils assume an equilibrium or rest position

Both transverse and longitudinal waves can be produced on a slinky.

Transverse waves can easily be produced along a string or slinky by providing sudden sharp uniform jerks at right angles to its length at one free end of the string.

Longitudinal waves can be produced by giving a forward and backward motion to the free end of a spring. When the turns of the spring are closer, 'compression' is formed. If the turns are farther, 'rarefaction' is formed.

Both compression and rarefaction continue to advance in the direction of the length of the spring.

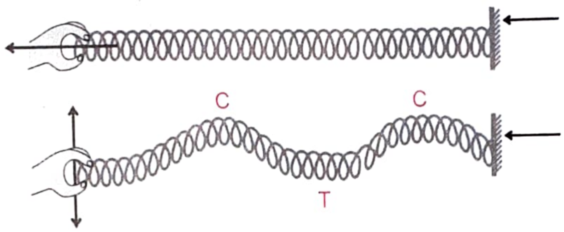


Fig. 11.3. Transverse waves can be produced on a slinky by vibrating the first coil in a vertical direction

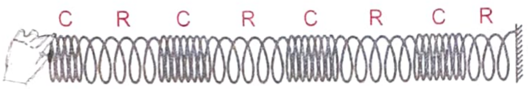


Fig. 11.4. When the first coil of the slinky is repeatedly vibrated back and forth longitudinal wave can be produced

TRANSFORMATION OF ENERGY

When a person is doing some work upon the free end of a slinky/spring, he imparts energy to the first coil. It receives a large amount of energy which subsequently transfers to the second turn of the coil. When first turn comes back to its mean position, it acquires the same amount of energy as it had before it was displaced. The same process adopted by the second, third and subsequent number of turns of the spring. In this manner, energy is transferred from one end of the slinky to the other.

Note: *It is advisable to the students to go through the basic concept of experiment No. 8 before performing this experiment.*

AIM

Determination the speed of a pulse propagated through a stretched string/slinky.

APPARATUS REQUIRED

A stopwatch, a slinky (helical spring/string) and a metre scale.

THEORY

A pulse is a single disturbance, suddenly created, moving through a medium from free end to other end (which may be free or fixed) for a while. The distance travelled by the pulse in a unit time is called pulse velocity.

Therefore,

$$\text{Pulse speed} \quad (v) = \frac{\text{Distance travelled by a pulse } (s)}{\text{Time taken } (t)} \quad \text{or} \quad v = \frac{s}{t} \text{ m/s}$$

PROCEDURE

1. Tie one end of a spring/string with a rigid support and measure its length. Let it be s.
2. Hold the free end of the string/slinky and create a disturbance up and down vertically, in case of transverse wave [Figure 11.3] or vibrate in a back and forth manner in case of longitudinal wave [Figure 11.4].
3. A pulse will be formed and it will travel towards the fixed end.
4. Introduce a wave into the slinky by creating a large number of pulse at regular intervals.
5. Start the stopwatch at the instant when you create the single disturbance to the first coil and stop the stopwatch when last pulse reaches the fixed support.
6. Record the time (t) taken by the pulse to travel along the slinky of length s.
7. Repeat your experiment for 4-5 times, note the time taken 't' by varying the number of pulse and record your observations.

OBSERVATIONS

(*a*) Length of slinky = ... cm

= ...... m

(*b*) Least count of stopwatch = ... s

S.No.	Number of pulse (N)	Time taken (T)	Time taken by one pulse $t = \frac{N}{T}$	Pulse velocity $v = \frac{s}{t}$ (m/s)
1.	10			
2.	15			
3.	20			
4.	25			

Mean = ... m s^{-1}

RESULT

The velocity of a pulse propagated through a stretched string/slinky = ... m s^{-1}.

PRECAUTIONS

1. One end of the string/slinky should be fixed properly with the rigid support.
2. The string/slinky should be massless, flexible and of proper length.
3. Special attention should be paid while recording the time because variations of time may vary the velocity of pulse to a higher level.
4. Interval between the successive pulse should be maintained.

SPEED OF SOUND

The speed of sound depends on the nature of the medium through which the waves pass. It is proportional to the square root of the

(i) ratio of the elasticity of the medium to its density

(ii) temperature of the medium

Presence of moisture increases the velocity of sound in air because the density of dry air is greater than the density of moist air.

At 20 °C temperature, the speed of sound in air is approximately 343 m/s, in water, it is 1482 m/s and in steel, it is 5960 m/s. The speed of sound in air at 0 °C is 332 m/s.

BEHAVIOUR OF SOUND WAVE

At the interface of the two media, sound waves show four possible behaviours:

1. Reflection(back into the same medium but in the different direction when it falls obliquely and obey the law of reflection same as in light).
2. Refraction(moves into the second medium).
3. Diffraction(bending around the obstacle without crossing the interface).
4. Transmission(crossing the interface into the new material or obstacle).

REFLECTION OF SOUND

Whenever a sound wave gets reflected from an open end, there will not be any change in the disturbance propagated in a medium, *i.e.* compression/rarefaction will reflect and return as a compression/rarefaction. If the waves get reflected from a fixed or rigid support end, there will be a change in the disturbance, *i.e.* compression will reflect and return as a rarefaction while rarefaction will reflect and return as a compression.

Thus, the disturbance which returns in the same medium but in a different direction after striking an extended surface is known as reflection of sound wave. The incident angle and reflected angle are equal. Since the wavelength of sound wave is very large as compared to the wavelength of light wave. Therefore, for reflection of sound waves:

(i) Extended surface is needed.

(ii) Size of obstacle should be large.

(iii) Surface need not necessarily be smooth or polished.

(iv) Surface may or may not be curved.

PRACTICAL APPLICATIONS OF REFLECTION OF SOUND WAVE

The following instruments work on the principle of reflection of sound:

(i) Megaphones or loudspeakers have horn-shaped openings.

(ii) Ear trumpet or hearing aid devices.

(iii) Concave reflecting soundboards.

(iv) Stethoscopes used by doctors.

The reflection of sound also becomes important to the design of concert halls, cinema halls and auditoriums. The walls of such building is built from materials that reflect the sound towards audience.

AIM

Verification of the laws of reflection of sound.

APPARATUS REQUIRED

One clock or watch with a quiet tick, two similar cylindrical hollow cardboard tubes of 30–50 cm length, rough or smooth sound reflecting surface, drawing board, white paper sheet, cardboard.

THEORY

When a sound wave falls on an extended surface or obstacle of large size, it gets bounced back into the same medium but in different direction. This phenomenon is known as reflection of sound.

The laws of reflection for the sound waves are:

(*i*) The angle of incidence made by the sound waves with the normal to the reflecting surface is equal to the angle of reflection in which sound waves get reflected, *i.e.* $\angle i = \angle r$.

(*ii*) The incident sound wave, reflected wave and the normal at the point of incidence, all lie in the same plane.

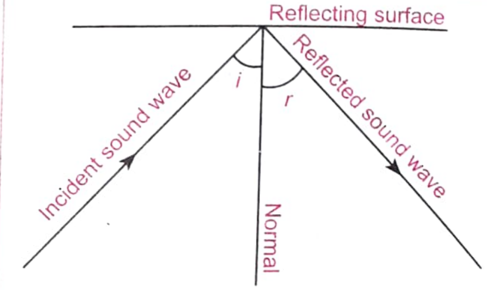


Fig. 8.2. Laws of reflection of sound

PROCEDURE

1. Fix a white plane paper on drawing board with the help of drawing pin at the four corners of white paper.
2. Draw a line XY along one edge of the paper. At any point P on this line, draw a normal PN.
3. Using protractor, make an incident angle of 30° with the normal PN and mark it as ∠APN.
4. Place a reflecting surface, such as stiff cardboard/plywood/glass slab/mirror on a line XY in upright position with the help of stand/modeling clay.
5. Place another cardboard along normal act as a screen. This does not allow the direct hearing of the ticking sound of the clock.
6. Arrange two cylindrical hollow cardboard tube in such a way that their open ends come close together as shown in the figure.
7. Keep a clock near the open end of the tube placed on the line AP.
8. Try to listen the clear and distinct ticking sound of the clock through the other tube placed on the other side of the screen by adjusting the position of the tube. Mark this position as B. Distinct sound can be heard because sound waves get reflected from the reflecting surface.
9. Lift the end B of pipe PB, vertically upward to a small height. Try to hear the sound of the table-clock now through the pipe PB.
10. Lift the tubes, reflecting surface and screen. Join the points B and P and measure the angle of reflection of sound wave.
11. Repeat the experiment by taking different values of angle of incidence and tabulate your observations.

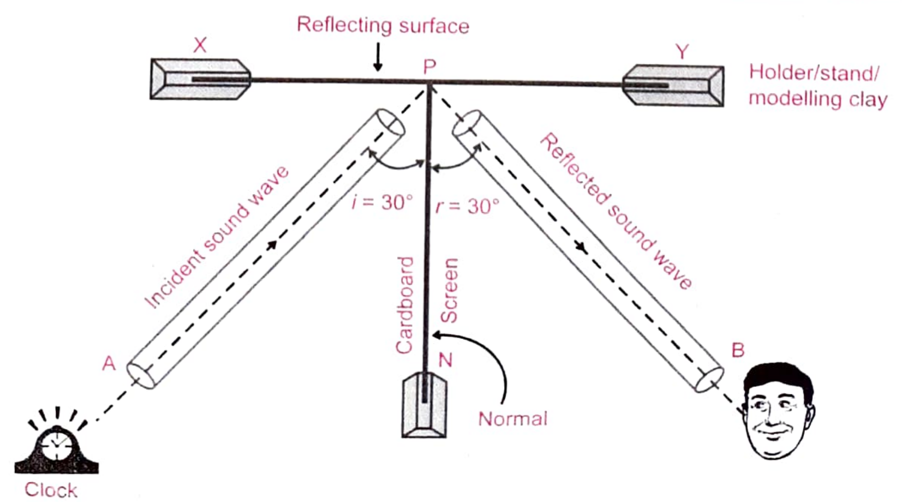


Fig. 8.3. Reflection of sound

OBSERVATIONS

(i)

S.No.	Angle of incidence of sound wave $\angle i$	Angle of reflection of sound wave $\angle r$	Error $\angle i \sim \angle r$
1.	30°		
2.	45°		
3.	60°		
4.	75°		

(ii) When the end B of the pipe PB is lifted vertically upward to a small height, the sound of the table-clock is either weakened or diminished completely.

RESULT

From the observations, we conclude that

(i) within experimental error limit, angle of incidence is always/approximately equal to the angle of reflection.

(ii) the incident sound wave, reflected wave and the normal at the point of incidence all lie in the same plane.

Hence the law of reflection of sound is verified.

PRECAUTIONS

1. Reflecting surface and screen should be held vertically on the sheet of paper.
2. Position of the ticking clock should be along the axis of the hollow cylindrical tube placed along AP.
3. Mark the position of the second tube only when heard sound intensity of the ticking clock is maximum.
4. Ear, ticking clock and reflecting surface should be in the same plane.
5. Utmost care should be taken while taking the measurement of angle. The measurement of angle, either it is incident or reflection must be taken between the axis of the tube and the normal.

INTERACTIVE SESSION

Examiner – What is the aim of the experiment given to you?

Examinee – The aim of my experiment is to verify the laws of reflection of sound.

Examiner – How can you explain the reflection phenomenon in sound?

Examinee – When a sound wave falls on a hard surface having a large size like wood, stiff cardboard, it bounces back into the same medium but in different direction. This phenomenon is called reflection of sound wave.

Examiner – Suppose when you shout inside an empty hall, you hear your own sound after a short time. Why is it happen?

Examinee – It happens because our sound is reflected from the walls of empty hall.

Examiner – Can you choose any hard and plane wooden surface which serve as a reflector of sound?

Examinee – Yes, any hard and plane wooden surface can serve as a reflector of sound waves.

Examiner – Why?

Examinee – The wavelength of sound wave is very large as compared to the wavelength of light wave.

Examiner – What is the use of wooden screen placed between the two tubes?

Examinee – It cuts off the direct sound from watch to ear.

AIM

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 in water and distinguish between these on the basis of

(*i*) transparency (*ii*) filtration (*iii*) stability.

MATERIALS REQUIRED

Test tubes, beakers, water, common salt, sugar, alum, soil, chalk powder, fine sand, egg albumin, starch, funnel, glass rod, filter paper.

THEORY

A true solution has particle size $< 10^{-9}$ m. It is a homogeneous mixture which is clear and transparent. It passes through the filter paper easily and is stable.

Colloid has particle size 10^{-9} m–10^{-6} m. It is heterogeneous and is translucent. It passes through filter paper and is stable.

The particle size of Suspension is $> 10^{-6}$ m. It is heterogeneous and opaque. Its particles do not pass through filter paper and settle under gravity when left undisturbed for sometime.

PROCEDURE

Preparation of solutions/mixtures

1. Take 8 beakers and label them as A, B, C, D, E, F, G and H and add 50 ml of water to each of these beakers.
2. Add samples of salt, sugar and alum to beakers A, B and C. Stir to make clear solution.
3. Add soil, chalk powder and fine sand to beaker D, E and F. Stir for sometime.
4. Add a small amount of starch to the water and boil the content in beaker G.
   In beaker H, add egg albumin and stir vigorously.
5. Observe the mixture and record them in the table given below.

OBSERVATION TABLE

Comparison of Solution, Suspension and Colloid				
Test Samples	**Transparency**	**Stability**	**Filtration**	**Types of Mixture**
	Observe the mixtures and note down its trans-parency.	Keep the mixtures undisturbed for sometime and observe.	Filter the mixtures through a filter paper and note.	Based on these properties classify A, B ... H as true solution, colloid and suspension
A B C (Fig. 1.1)	Solutions are clear and transparent (as the labels are clearly seen from the opposite side) and particles are not visible.	The particles do not settle down as sediments. The solution is therefore stable.	Salt solutions can easily pass through filter paper and no residue is seen on the filter paper.	Mixture A is a _____ Mixture B is a _____ Mixture C is a _____
D E F (Fig. 1.2)	The particles are visible to naked eye, and the labels are not visible, indicating D, E, F are opaque.	The particles settle down on standing undisturbed and the mixture is therefore unstable.	The particles do not pass through filter paper and residue is seen on the filter paper.	Mixture D is a _____ Mixture E is a _____ Mixture F is a _____
G H (Fig. 1.3)	The solution is turbid, but the particles are not visible. The labels are dimly visible and the mixtures are tran-sluscent.	The particles do not settle down as sediments. The solution is therefore stable.	The particles pass through filter paper and no residue is seen on the filter paper.	Mixture G is a _____ Mixture H is a _____

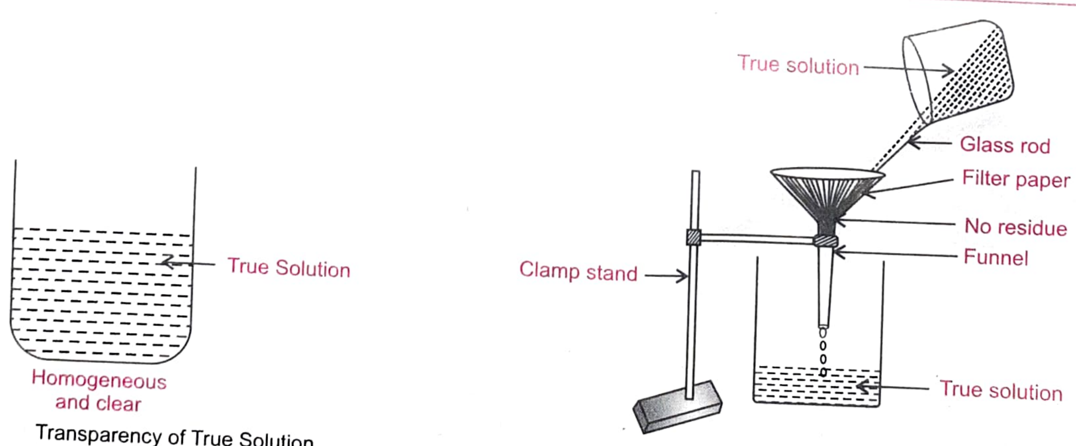


Fig. 1.1.

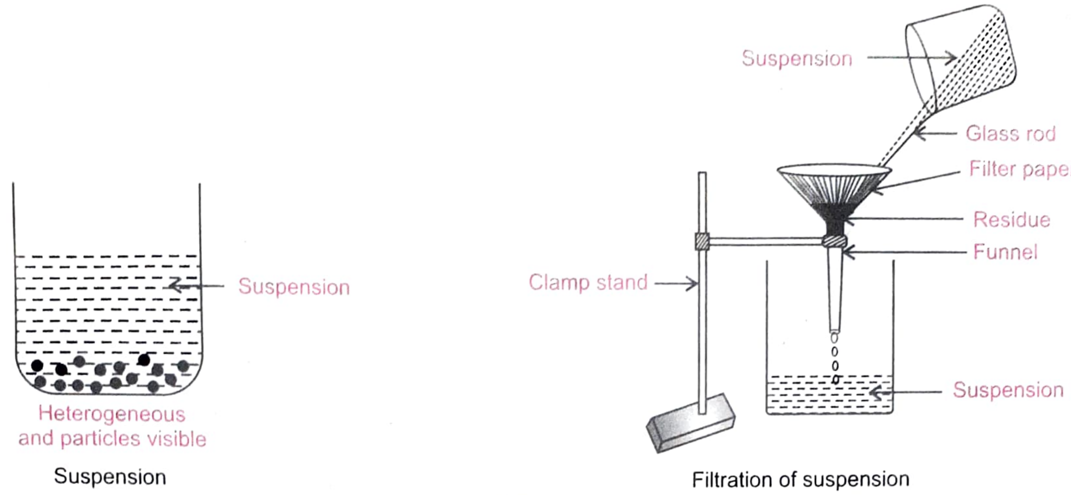


Fig. 1.2.

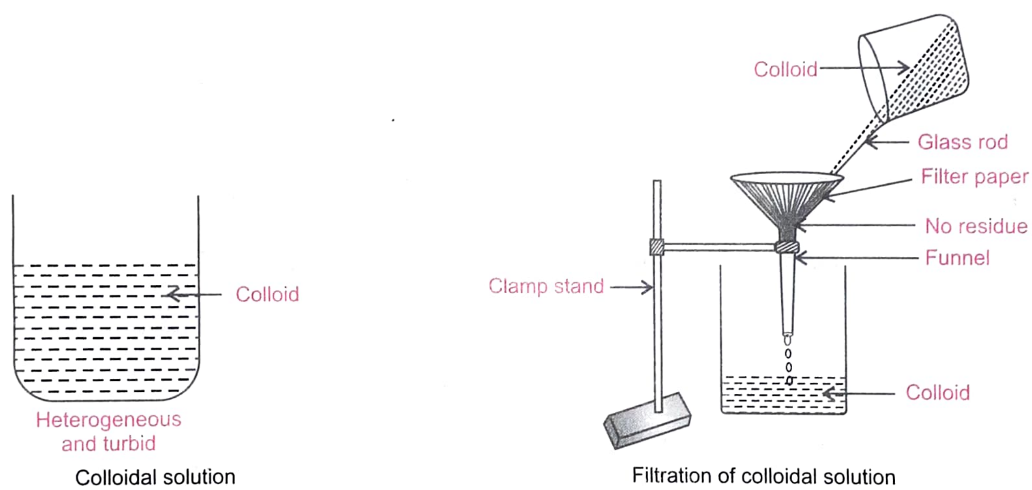


Fig. 1.3.

RESULTS

1. Beaker A – Common salt forms a true solution in water.
2. Beaker B – Sugar forms a .... in water.
3. Beaker C – Alum forms a .... in water.
4. Beaker D – Soil forms a .... in water.
5. Beaker E – Chalk Powder forms a .... in water.
6. Beaker F – Fine sand forms a .... in water.
7. Beaker G – Starch forms a .... in water.
8. Beaker H – Egg albumin forms a .... in water.

PRECAUTIONS

1. Distilled water should be used.
2. The components should be mixed in small amounts.
3. Fold the filter paper properly and moisten it before use.
4. Glass rod should be clean.
5. Wash your hands properly with soap after experiment.

EXPERIMENT 3

BASIC BUILDING CONCEPTS

Mixtures are combination of various substances in which the individual ingredients retain their properties. In separation of ingredients from a mixture, the difference in physical properties of the ingredients serve as the means of separating them.

Soluble substances can be separated from insoluble substances. Volatile substances can be separated from less volatile substances.

Sublimation is the transition of a substance directly from solid to gas phase without passing through the liquid phase.

AIM

Separation of the components of a mixture of sand, common salt and ammonium chloride (or camphor).

MATERIALS REQUIRED

Sand, common salt (NaCl), ammonium chloride (NH_4Cl) or camphor, filter paper, funnel, china dish, tripod stand, wire gauze, beaker, glass rod, burner, cotton plug.

THEORY

In a mixture, the components retain their properties and can therefore, be separated by physical methods based upon their properties.

1. Camphor and ammonium chloride on heating directly convert into vapour. This is called sublimation. In contrast to this, sand and common salt do not sublime. So from a mixture, containing ammonium chloride (or camphor), common salt and sand, ammonium chloride (or camphor) can be easily separated by the process of sublimation. On heating ammonium chloride (or camphor) converts into vapour leaving behind the non-volatile components. On cooling the vapour of ammonium chloride (or camphor) changes into solid.

$$\underset{\text{Ammonium chloride}}{NH_4Cl(\text{solid})} \xrightarrow{\text{Heat}} \underset{\text{Ammonium chloride}}{NH_4Cl(\text{vapour})} \xrightarrow{\text{Cool}} \underset{\text{Ammonium chloride}}{NH_4Cl(\text{solid})}$$

2. Common salt is soluble in water but sand is not soluble in water.
3. When a mixture of common salt and sand in water is passed through filter paper, sand particle remain on the filter paper but other components of mixture i.e., common salt and water pass through filter paper.
4. From a solution of common salt in water, common salt can be obtained by evaporation.
5. For separation of different components of a mixture of ammonium chloride (or camphor) common salt and sand, methods of sublimation, filteration and evaporation are applied.

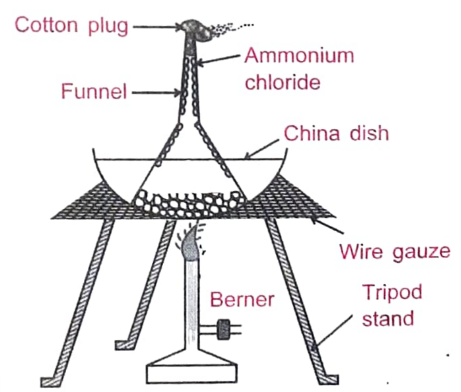


Fig. 3.1. Sublimation

PROCEDURE

A. Steps for separation of ammonium chloride:

1. Take the mixture of sand, ammonium chloride and common salt in a china dish and cover it with an inverted funnel.
2. Plug the end of stero funnel with cotton.
3. Place the china dish over a tripod stand and heat it gently.
4. Observe the changes. It is observed that ammonium chloride undergoes sublimation, *i.e.* vapours of NH_4Cl are formed which get condensed on the cooler sides of the funnel.

5. Scrap the condensed ammonium chloride from the inner walls of the funnel (see figure). The non-sublimed mixture contains sand and common salt which remain behind in the china dish.

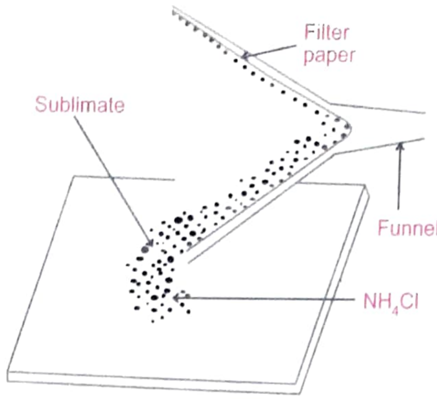


Fig. 3.2. Removal of sublimed NH_4Cl

B. Steps for separation of Sand:

1. To the non-sublimate mixture add water.
2. Stir the mixture with a clean glass rod.
3. Filter the solution as shown in figure. Common salt solution is obtained as the filtrate, whereas sand is obtained as the residue on the filter paper.

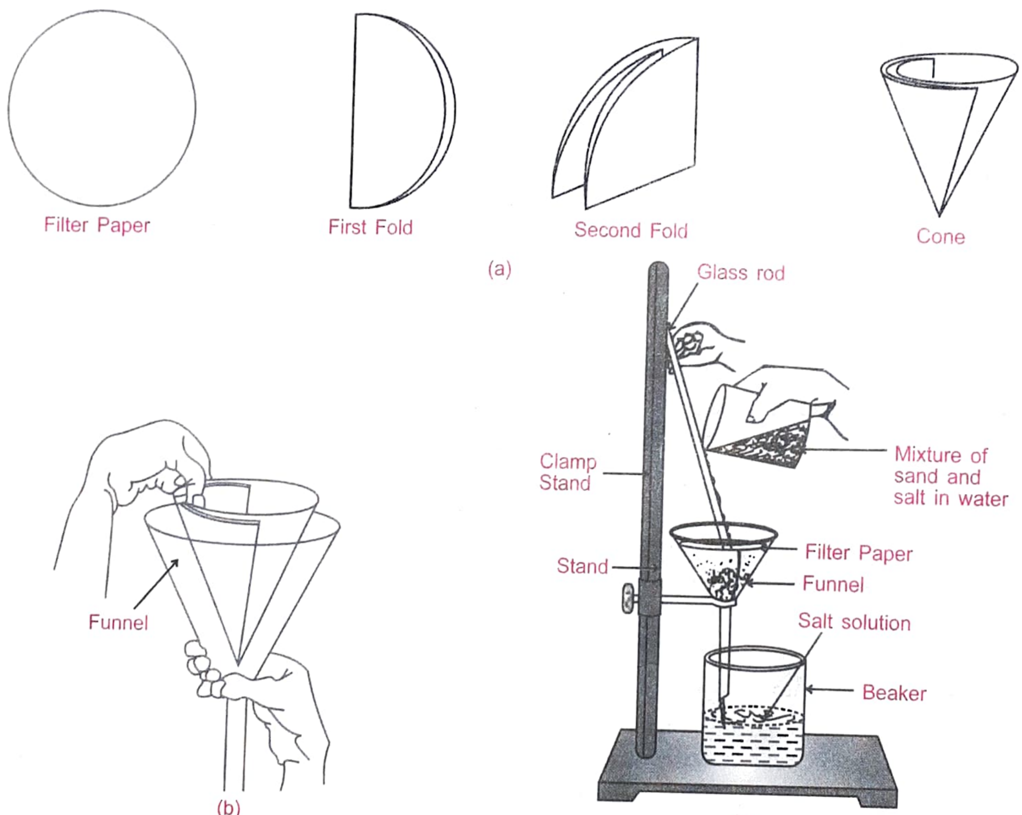


Fig. 3.3. (*a*) Folding of filter paper (*b*) Fitting the folded filter paper in a funnel (*c*) Filtration

C. Steps for separation of common salt (sodium chloride):

1. Take the filterate in a china dish.
2. Evaporate the filtrate to dryness, where water evaporates leaving behind sodium chloride (common salt) in the china dish (see figure).

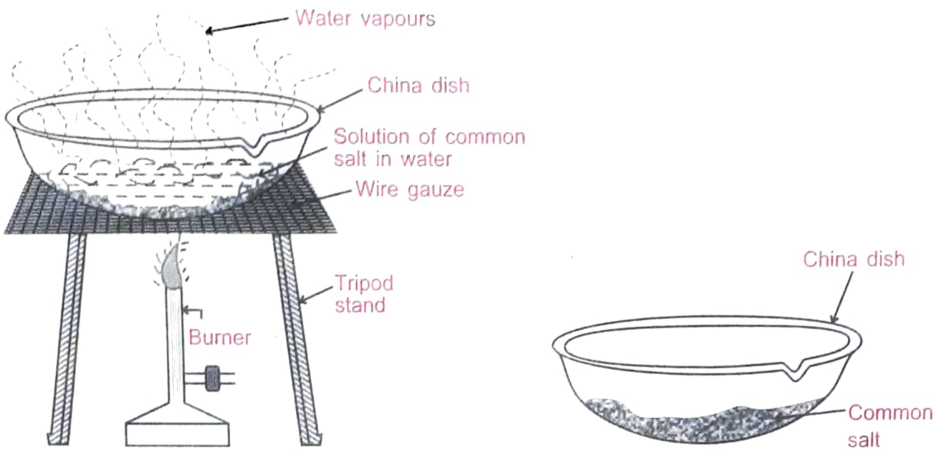


Fig. 3.4. Separation of common salt from water

RESULT

Sand, common salt and ammonium chloride mixture is separated by sublimation, filteration and evaporation.

PRECAUTIONS

1. Heat ammonium chloride carefully as it is volatile.
2. Fix a cotton plug at the end of the funnel so that vapours of ammonium chloride do not escape.
3. Moisten the filter paper before filtering.
4. Wash your hands with soap after completing the experiment.

EXPERIMENT 5

EXPERIMENT 5(*a*)

BASIC BUILDING CONCEPTS

Body of all organisms consists of cell. If we observe a stained cell under a microscope three zones–plasma membrane, cytoplasm and nucleus are clearly visible. Plasma membrane is the outermost covering of the cell which separates the content of the cell from its external environment. In plant cells, outside the plasma membrane an additional covering called cell wall is also present.

Inside the plasma membrane jelly-like content of the cell is present. This is called cytoplasm. In the cytoplasm different cell organelles such as mitochondria, endoplasmic reticulum, golgi apparatus etc, are present. In plants, cytoplasm contains specialised cell organelles called plastids. Chloroplast is one of the plastid which is the site of photosynthesis. Plastids are not found in animal cells.

Cytoplasm also contains some storage sacs. These sacs are called vacuoles. In plant cells vacuoles are large sized but animal cells have small sized vacuoles.

In the cell, cytoplasm surrounds a darkly stained dot-like structure. This is nucleus. It carries the genetic material.

AIM

Preparation of stained temporary mount of onion peel cells and to record observations and draw their labelled diagrams.

MATERIALS REQUIRED

Onion, plain slides, coverslip, watch glass, needles, forceps, brush, blade, safranin, blotting paper, glycerine and compound microscope.

THEORY

Onion is a multicellular plant. Like other plant cells, the cell of onion peel consists of a cell wall, cell membrane, cytoplasm, a large vacuole and a nucleus. The nucleus lies at the periphery of cytoplasm and vacuole is located in the centre. Presence of large vacuoles and cell wall confirms that cells of onion peel are plant cells.

PROCEDURE

1. Take a piece of onion and bend it to remove the transparent membranous structure called **onion epidermal peel**. With help of forcep remove the peel from its inner side.
2. Place the peel in water in a watch glass.
3. Add a few drops of stain safranin, to the watch glass containing the peel for staining.
4. Now, wash the leaf peel with water and transfer it on to a clean slide with the help of brush.
5. Remove extra water from the slide surrounding the peel with the help of blotting paper.
6. To this slide, add a drop of glycerine over the peel and place the coverslip in a manner to avoid entry of air bubbles.
7. Soak away the extra glycerine with blotting paper.
8. Examine slide under the microscope.

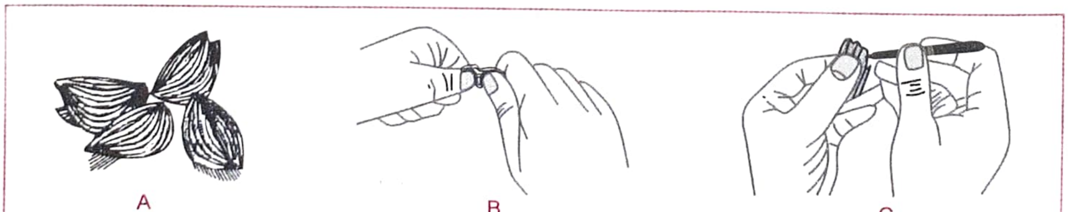


Fig. 5.1 (*a*): Method of taking out peel from onion

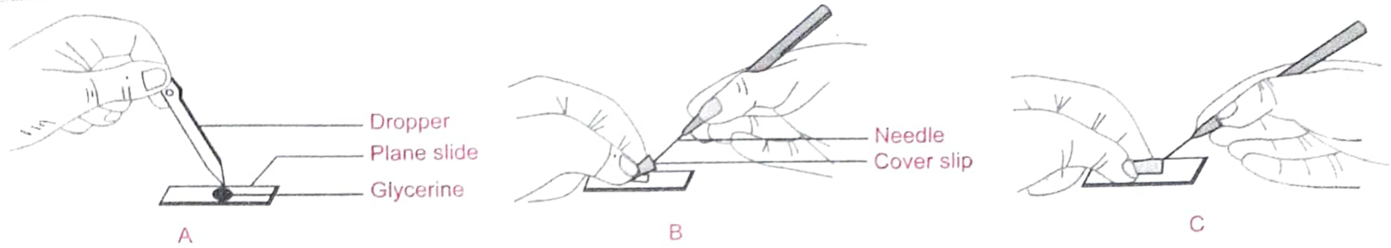


Fig. 5.1 (*b*): Stages to show the mounting procedure of a slide

OBSERVATIONS

1. (*i*) A large number of rectangular cells with distinct cell wall can be observed.
   (*ii*) Cytoplasm is seen as thin layer of deep coloured substance on inner surface of cell wall.
   (*iii*) A big central vacuole is present in the cell.
   (*iv*) A deeply stained round body called nucleus is seen in each cell.

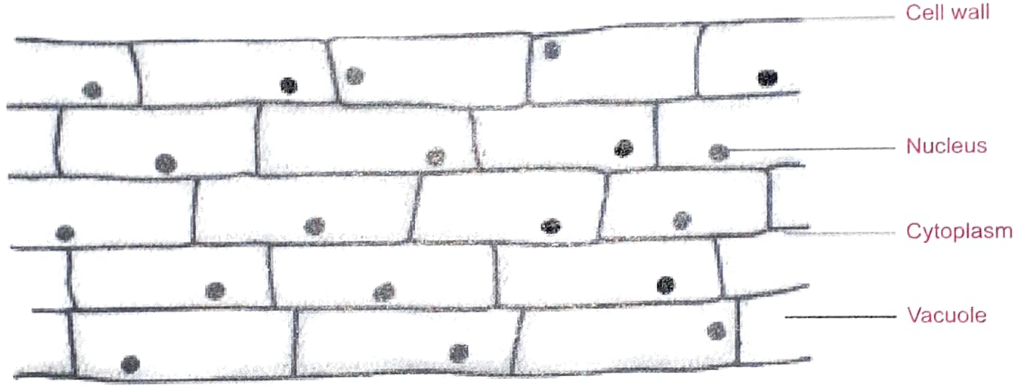


Fig. 5.2. Structure of an onion peel

RESULT

The epidermal peel of onion comprises of rectangular shaped cells. Each cell comprises of a nucleus, a central vacuole, thin layer of cytoplasm and cell wall.

As cell walls and large prominent vacuole are present in each cell, the cells placed under observation are plant cells.

PRECAUTIONS

1. Always take a clean slide and hold it by its edges to avoid making the slide dirty.
2. Peel should be properly stain. Avoid under-staining or excessive staining of the peel.
3. Always transfer the peel with the help of brush.
4. Mounting of the peel should be done in centre of slide.
5. Avoid folding of the leaf peel.
6. Remove extra glycerine with the help of blotting paper.
7. Avoid entry of air bubbles while placing the coverslip.

EXPERIMENT 5(*b*)

response to external environment.

AIM

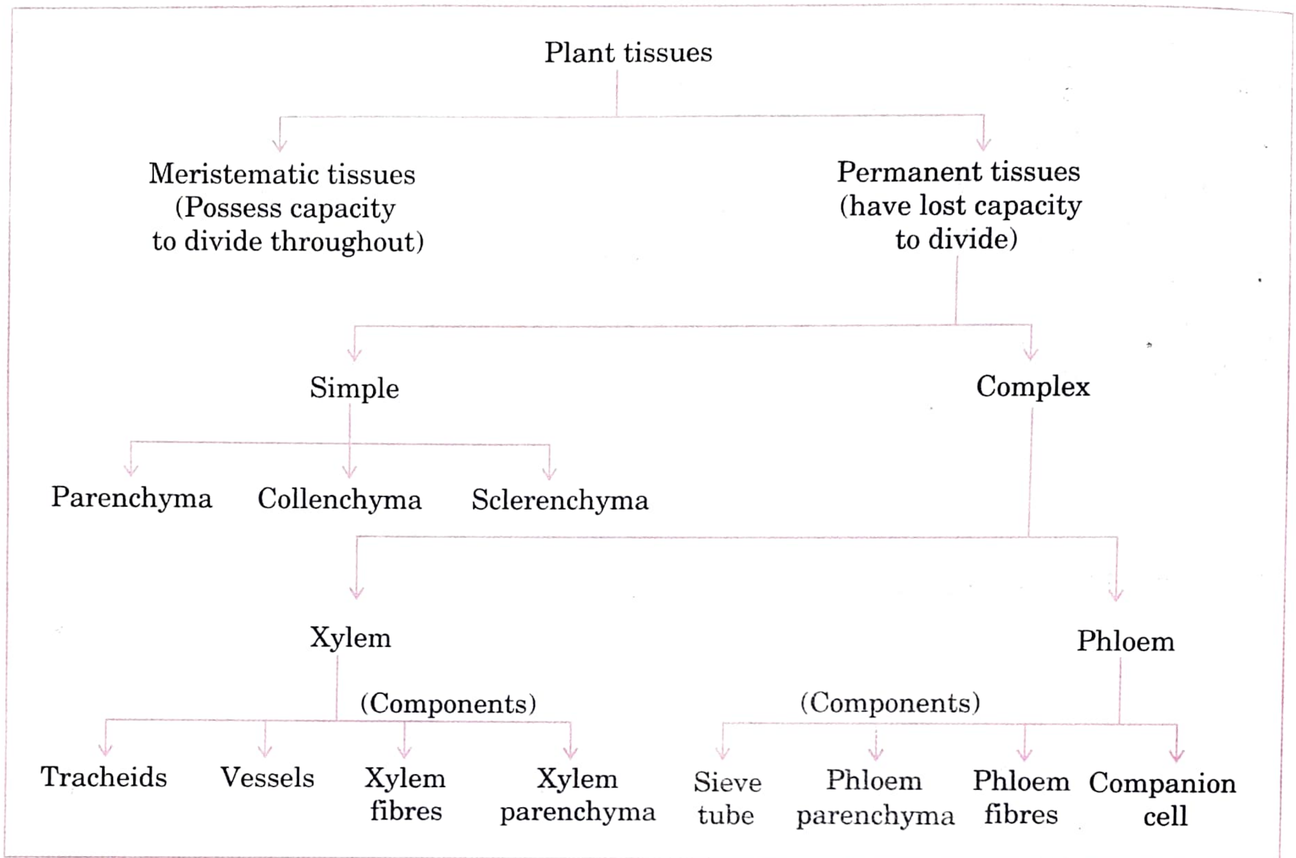
Identification of parenchyma, collenchyma and sclerenchyma tissues in plants, from prepared slides. Drawing of their labelled diagrams.

MATERIALS REQUIRED

Prepared slides of parenchyma, collenchyma and sclerenchyma, compound microscope.

THEORY

A group of cells that are similar in structure and work together to achieve a particular function forms a tissue. The main types of plant tissues include–



PROCEDURE

1. Observe the prepared slides of all the plant tissues one by one.
2. First focus the slide at low power and then observe it at high power.
3. Study the characters and draw the diagrams in your notebook.

OBSERVATIONS

IDENTIFYING FEATURES

I. Parenchyma

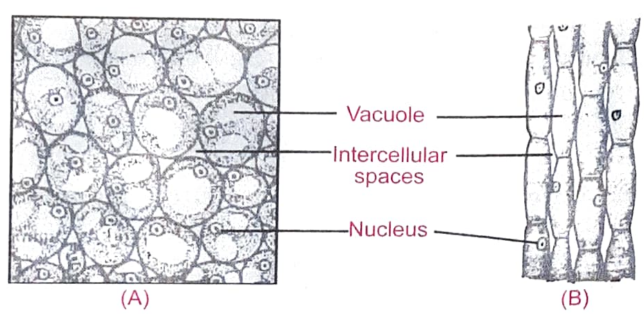
(*i*) Cells of Parenchyma tissue are isodiametric.

(*ii*) Intercellular spaces are present in between the cells.

(*iii*) Parenchymatous cells possess large central vacuole and peripheral cytoplasm with a nucleus.

(*iv*) These are generally present in the soft parts of plants like leaves, roots, flowers, etc.

(*v*) The important functions of parenchymatous cells are storage, photosynthesis, etc.

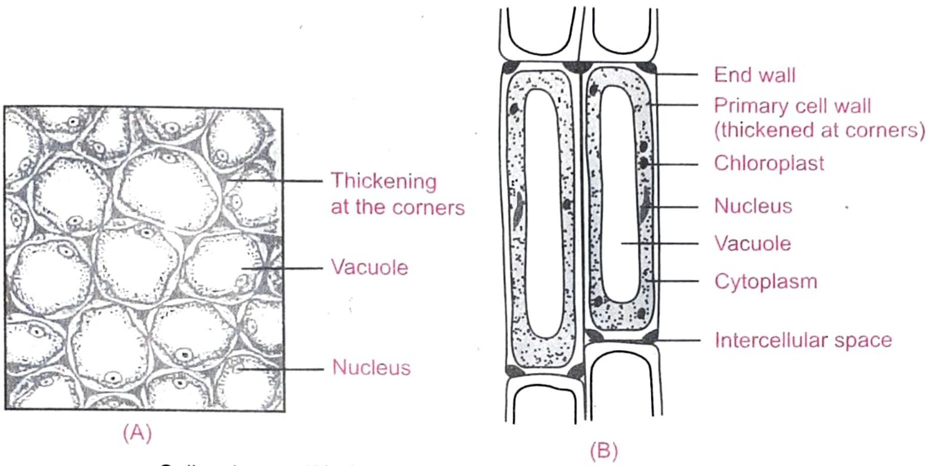


Parenchyma: (A) Transverse section and (B) Longitudinal section

Fig. 6.1.

II. Collenchyma

(*i*) Collenchymatous cells are somewhat oval to elongated.
(*ii*) Each cell possesses large central vacuole and peripheral cytoplasm with prominent nucleus.
(*iii*) Thickenings are present at corners of cells. Thickening comprise of cellulose and pectin.
(*iv*) Intercellular spaces are absent.
(*v*) Collenchymatous cells are commonly present below the epidermis in petiole, leaves and stems.
(*vi*) Its main function is to provide mechanical strength.

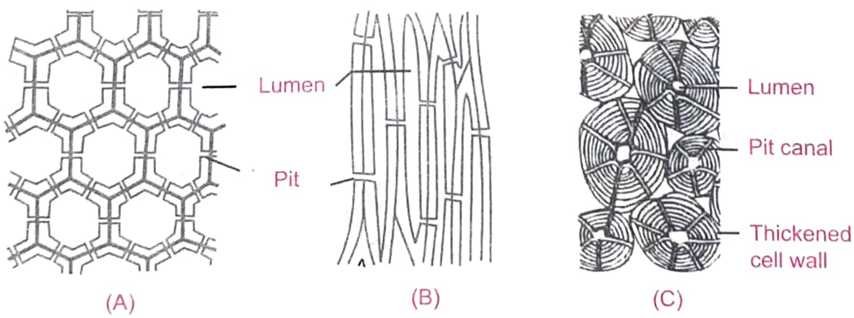


Collenchyma: (A) Transverse section and (B) Longitudinal section

Fig. 6.2.

III. Sclerenchyma

(*i*) Cells of sclerenchyma tissue are dead with highly thickened walls.
(*ii*) Thickenings consist of lignin.
(*iii*) There are two types of sclerenchyma cells:
  (*a*) fibres which are elongated cells with tapering ends and
  (*b*) sclereids (also called stone cells), which are roughly isodiametric cells with narrow cavities.
(*iv*) Sclerenchymatous cells have pits which act as connections with adjacent cells.
(*v*) The main function of sclerenchyma is to provide support and mechanical strength to the plant.



Sclerenchyma: (A) Transverse section, (B) Longitudinal section and (C) Sclereids (Stone cells)

Fig. 6.3.

PRECAUTIONS

1. Handle the microscope carefully.
2. Always focus the slide first at low power (10x) and then at high power (40x).

Class 9^{th} Sub- Maths Holiday home work.

Q. 1 Define following.

(a) Complementary angles.

(b) Supplementary angles.

(c) Adjacent angles.

(d) Vertically Opposite Angles.

(e) Co- Interior angles.

Q.2 An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

Q.3 A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer surface area of the bowl.

Q.4 The value of π upto 50 decimal places is given below:

3.14159265358979323846264338327950288419716939937510.

(i) Make a frequency distribution of the digits from 0 to 9 after the decimal point.

(ii) What are the most and the least frequently occurring digits?

Q.5 The following number of goals were scored by a team in a series of 10 matches:

14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

Find the mean , median and mode of these scores.

Class-IX

Subject-Social Science

<u>Holiday Home Work</u>

Subject-History

On Outline of Political Map of France , locate the following –

1-Bordeause

2-Nantes

3-Paris

4-Marseilles

Subject-Geography

On Outline of Map of India locate the following –

1-The Zasker 2-The Shivalik 3-The Aravali 4-K2

5-Anai Mudi 6-Deccan pleateu 7-Malwa pleateu

8-Evergreen forest 9-Montane forest

10-Corbett National Park 11-Sariska Wild Life Sancturies

12-The state having highest and lowest density of population.

Que2-Solve the Periodic Assessment II(PA-II) paper.

HOLIDAY HOMEWORK

CLASS-9th SUBJECT: INFORMATION TECHNOLOGY(402)

Make a project file in any one of the following topics-

1.Communication skills.

2.Self management skills.

3.Basic ICT skills.

4.Green Skills.

- Holiday Homework (Hindi)

प्रश्न 1- पिताजी को, पैसा मंगवाने के लिए 120शब्दो में पत्र लिखिए!

प्रश्नः2 - "जीवन में परिश्रम का महत्व" को आधार बनाकर निम्नलिखित संकेत बिंदु पर120 शब्दों में अनुच्छेद लिखिए!

संकेत बिंदु -*परिश्रम की आवश्यकता, *परिश्रम से ही विकास संभव, *शारीरिक और मानसिक परिश्रम, *सफलता का मंत्र- परिश्रम !

प्रश्न 3-एक ऐसी मौलिक कथा लिखिए, जिसके अंत में यह वाक्य लिखा हो- "और इस तरह मैंने अपना कार्य पूरा कर लिया" !

प्रश्न -4 त्योहारों का हमारे जीवन में महत्व व उसके संदेश पर बातचीत करते दादाजी और पोते के संवाद को लगभग 25 शब्दों में लिखिए!

नोट -लेख और अशुद्धियों का विशेष ध्यान रखिए!

Winter Vacation (Holiday Homework)

Sub: ENGLISH Class: IX

1. _Last winter vacation you went to your friend's village. His grandmother looked after you as if you were her grandchild. Describe her in your own words. (100-150 words)

2. You are Neha/Nitin. Today is your birthday and your father has gifted you a laptop. You are very happy to own it as you wanted to have for a long time. Before going to bed you intend to share your joy with your diary. Write a diary entry expressing your feelings. (100-150 words)

3. Learn **<u>100 forms of verb</u>** from the verb chart.

Name of Teachers

Mrs. Seema Joshi

Mrs. Artee Panwar