மரம் வளர்ப்போம்! மழை பெறுவோம்! மழை நீர் சேமிப்போம்! மண் வளம் காப்போம்!
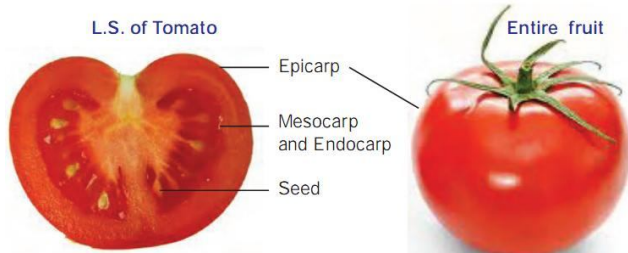
BIO - BOTONY

01. Classify the given fruit and give reasons with diagram.

Aim: To classify the given fruit and give reasons with diagram.

Materials required: Fruit, knife

Identification: The given fruit / L.S. of fruit was identified as Simple fleshy fruit – Berry – Tomato.

Reasons: (1) Fruit is developed from the single flower, multicarpellary, syncarpous and superior ovary.

(2) The succulent pericarp is differentiated into outer epicarp and inner fleshy pulp. (3) The mesocarp and endocarp are fused to form the fleshy pulp where the seeds are embedded. (4) The entire fruit is edible.

Result: The given fruit / L.S. of fruit was identified as Simple fleshy fruit – Berry – Tomato.

Aim: To classify the given fruit and give reasons with diagram.

Materials required: Fruit, knife

Identification: The given fruit / L.S. of fruit was identified as – aggregate fruit – Polyalthia.

Reasons: (1) Polyalthia develops from the single the single flower with multicarpellary apocarpous ovary.

(2) During fruit formation each free carpel develops into fruitlet.

(3) There are many fruitlets seen attached to a common stalk.

Result: The given fruit / L.S. of fruit was identified as – aggregate fruit – Polyalthia.

Aim: To classify the given fruit and give reasons with diagram.

Materials required: Fruit, knife

Identification: The given fruit / L.S. of fruit was identified as – Multiple fruit – Jack fruit
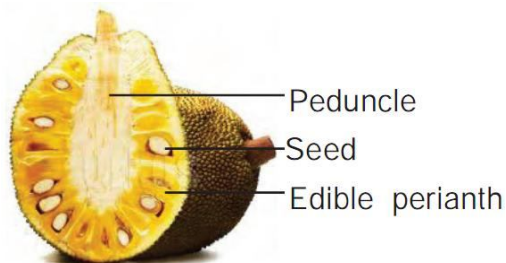
Reasons: (1) The entire female inflorescence develops into a single fruit. (2) The fertilized flowers develop into fleshy fruitlets. (3) The perianth develops into fleshy edible part. (4) The membranous bag around the seed is the pericarp.

Result: The given fruit / L.S. of fruit was identified as – Multiple fruit – Jack fruit

மரம் வளர்ப்போம்!   மழை பெறுவோம்!   மழை நீர் சேமிப்போம்!   மண் வளம் காப்போம்!

02. Dissect and display the floral parts like Calyx, Corolla, Androecium and Gynoecium of any locally available flower.

Aim: To Dissect and display the floral parts like Calyx, Corolla, Androecium and Gynoecium of any locally available flower.

Required materials: Hibiscus rosa-sinensis or Datura innoxia, knife

Procedure: Separate Androecium and Gynoecium of a given flower and paste in a separate sheet. Calyx, Corolla are accessory organs. Androecium is male part of the flower. Gynoecium is female part of the flower.

Figure:

Result: The floral parts like Calyx, Corolla,
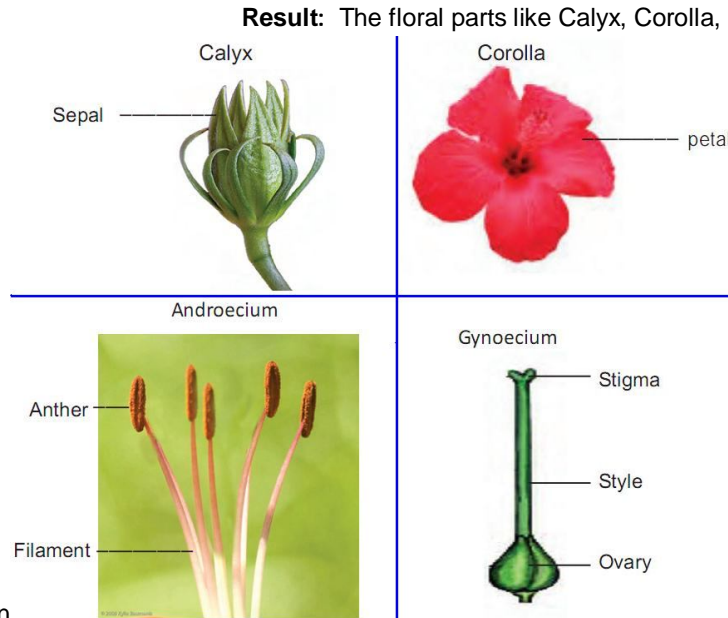
Androecium an d Gynoecium of the given flower is dissected and displayed.

03. Identify the given slide with help of microscope.

Aim: To identify the given slide with help of microscope.

Required materials: Microscope, Slide

Given slide: T.S. of Anther
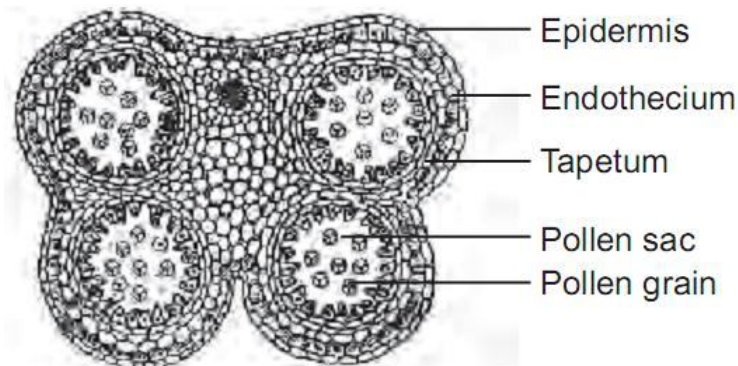
(1) Each anther lobe is covered by 4 layered wall.

(2) The inner most layer of the wall is called tapetum.

(3) Inner to the anther wall pollen sac (microspore) with pollen mother cell (microspore cell) is present.

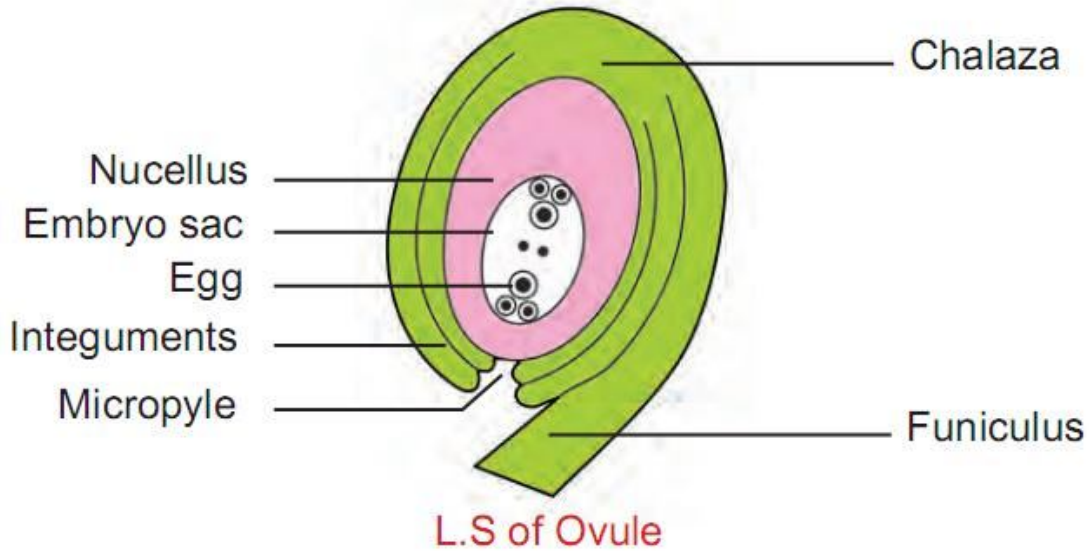(4) The pollen mother cell divides meiotically to produce pollen grains.

Result: The given slide was identified as T.S. of Anther.

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Aim: To identify the given slide with help of microscope.

Required materials: Microscope, Slide

Given slide: L.S. of mature ovule

L.S of Ovule

(1) The ovule consists of central nucleus surrounded by two protective coats called Integuments.

(2) The integuments leave a small opening at the apex of the ovule called micropyle.

(3) The empryosac is found inside the nucleus.

(4) Empryosac contains eight nuclei.

Result: The given slide was identified as L.S. of mature ovule.

04. Fermentation experiment (Anaerobic Respiration)

Aim: To prove the anaerobic respiration (Fermentation).

Materials required: Sugar solution, baker's yeast, conical flask (250 ml), beaker and lime water
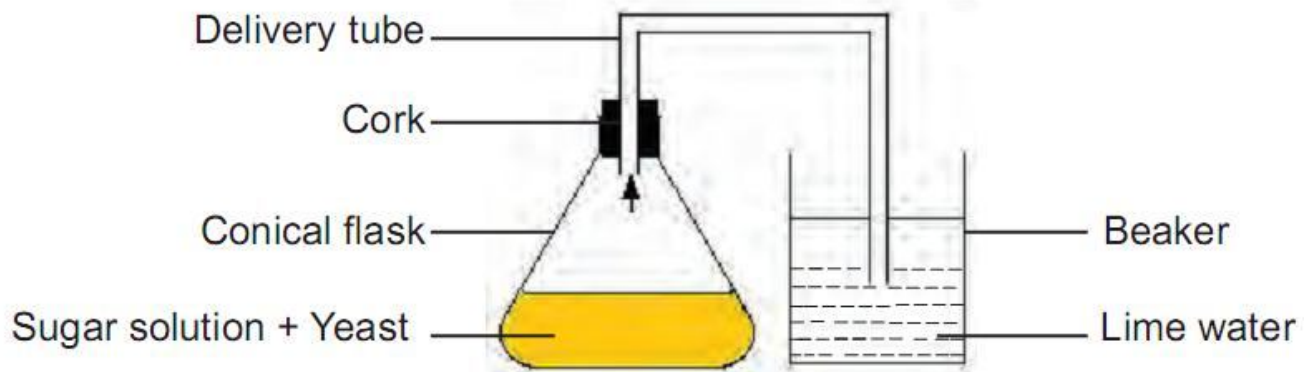
Procedure: (1) Sugar solution in a test tube is taken.
(2) A little quantity of yeast is added.
(3) The mouth of the conical flask closed with one holed rubber cork and a delivery tube was inserted in the cork.
(4) The other end of the delivery tube was immersed in a beaker containing lime water
(5) The apparatus was kept in sunlight for 2 hours.

Inference:

Observation	Inference
Effervescence appeared.	Alcohol smell inferred.
The lime water turned milky.	CO_2 released.

Result: The alcohol smell indicates that the sugar is converted into alcohol in the fermentation process.

மரம் வளர்ப்போம்! மழை பெறுவோம்! மழை நீர் சேமிப்போம்! மண் வளம் காப்போம்!

Bio - Zoology

05. Identification of given model   (a) Human heart (b) Human brain (c) Human kidney
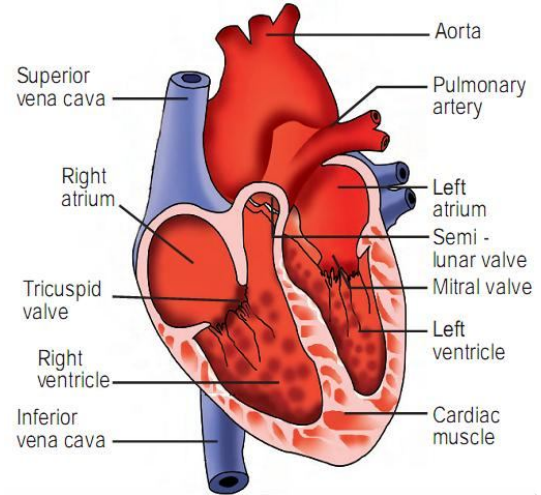
Aim: To identify the given model

Identification: Given model is identified as L.S. of Human Heart.

Diagram:

Notes:

(1) Heart is a hollow fibro muscular organ, which is conical in shape.

(2) Heart is covered by a protective double walled sac called pericardium.

(3) Heart is made up of a special type of muscle called cardiac muscle.

(4) It has four chambers namely two auricles and two ventricies.

(5) Heart is a pumping organ which pumps blood to all parts of the body.

Result: Given model is identified as L.S. of Human Heart.
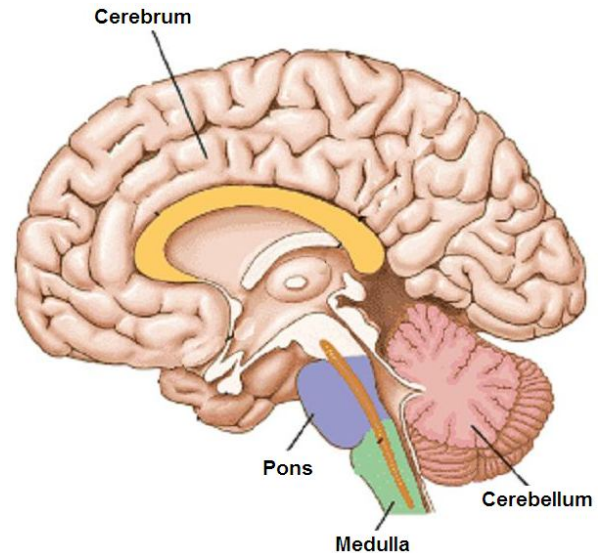
Aim: To identify the given model

Identification: Given model is identified as L.S. of Human Brain.

Diagram:

Notes:

(1) Human brain is placed inside the cranial cavity..

(2) It is covered by three protective coverings called meninges.

(3) Human brain is divided into three major parts namely forebrain, mid brain and hind brain.

(4) Human brain contains millions of neurons.

(5) Brain acts as a command and coordinating system of human body.

Result: Given model is identified as L.S. of Human Brain.

Aim: To identify the given model

Identification: Given model is identified as L.S. of Human Kidney.

Diagram:

Notes: (1) Kidney is the principle excretory organ of our body.

(2) Kidney is bean shaped paired structure and located in the upper abdominal region.

(3) A transparent membrane called capsule covers the kidney.

(4) The outer portion of the kidney is renal cortex and the inner portion is renal medulla.

(5) A kidney has about 1.0 millions of functional units called nephrons.

Result: Given model is identified as L.S. of Human Kidney.
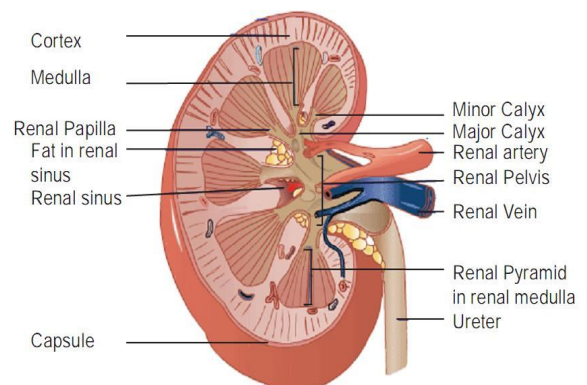
மரம் வளர்ப்போம்!   மழை பெறுவோம்!   மழை நீர் சேமிப்போம்!   மண் வளம் காப்போம்!

06. Identify the flag labeled endocrine gland and write its location, hormones secreted and any two of its functions. [No need to draw diagram]

Endocrine glands: (a) Thyroid gland (b) Pancreas – Islets of longerhans (c) Adrenal gland

Aim: To identify the flag labeled endocrine gland in a given model / chart / a neat diagram and write its location, hormones secreted and any two of its functions.

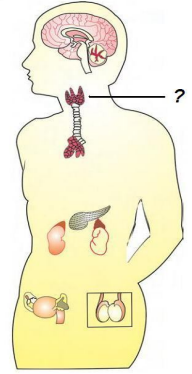**Identification:** The marked endocrine gland is identified as thyroid gland.

Location: Thyroid gland is a bilobed gland located in the neck region on either side of the Trachea.

Hormones secreted: Thyroxine

Functions of Hormones:

    (1) Thyroxine is a personality hormone.

    (2) It increases the basal metabolic rate [BMR].

    (3) It increases the body temperature.

    (4) It regulates Iodine and sugar level in the blood.

    (5) Deficiency of thyroxine results in Simple goiter, Myxoedema and cretinism. Excess secretion causes Grave's diseases.

Result: The marked endocrine gland is identified as thyroid gland. Its location, hormones secreted and its functions were explained.

Aim: To identify the flag labeled endocrine gland in a given model / chart / a neat diagram and write its location, hormones secreted and any two of its functions.

Identification: The marked endocrine gland is identified as Pancreas – Islets of longerhans.

Location: Pancreas – Islets of longerhans are seen embedded in Pancreas which is located in the abdominal region.

Hormones secreted: (1) Alpha cells secret glucagons
                         (2) Bets cells secret Insulin and amylin.

Functions of Hormones:

    (1) Insulin converts glucose into glycogen in liver and muscles.

    (2) Glucagon converts glycogen into glucose.

    (3) Insulin and glucagon together controls the blood sugar level

       (80 – 120 mg/100 ml) by their antagonistic function.

    (4) Decrease in insulin level causes Diabetes mellitus.

Result: The marked endocrine gland is identified as Pancreas – Islets of longerhans. Its location, hormones secreted and its functions were explained.
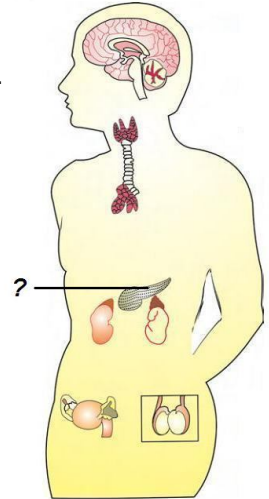
Aim: To identify the flag labeled endocrine gland in a given model / chart / a neat diagram and write its location, hormones secreted and any two of its functions.

Identification: The marked endocrine gland is identified as Adrenal gland.

Location: Adrenal glands are located above each kidney in the abdominal region.

Hormones secreted: (a) Adrenal cortex – Adolsterone and Cortisone
                         (b) Adrenal medulla – Adrenaline and nor – adrenaline

Functions of Hormones:

    (1) Adolsterone – regulates mineral metabolism.

    (2) Cortisone – regulates carbohydrate metabolism.

    (3) Adrenaline and nor – adrenaline – prepare the body to face the stress and emergency conditions.

    (4) Adrenaline and nor – adrenaline are called Emergency hormones and they increase the heart beat rate and respiratory rate.

Result: The marked endocrine gland is identified as Adrenal gland. Its location, hormones secreted and its functions were explained.
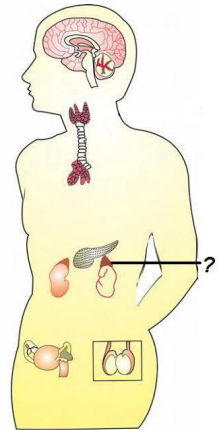
மரம் வளர்ப்போம்!   மழை பெறுவோம்!   மழை நீர் சேமிப்போம்!   மண் வளம் காப்போம்!

07. Test for Starch (Iodine Test)

Aim: To find out the presence of starch in the given food samples A and B by Iodine test.

Materials and apparatus required: Food samples A and B, Iodine solution, test tubes, test tube holder, test tube stand

Procedure: (1) One ml of food samples A and B were taken in two different test tubes.

(2) One drop of Iodine solution was added into each of the test tubes.

(3) They were mixed well.

(4) The changes occurring in colour were noted and tabulated.

Table:

Sample	Observation	Inference
A	Appearance of dark blue colour	Presence of starch
B	No colour change	Absence of starch

Result: Appearance of dark blue colour in the sample A indicaes the presence of Starch in it.
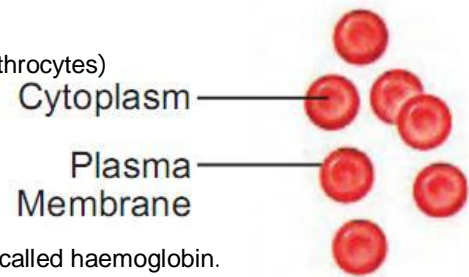
08. Identify the given slide, draw neat labeled diagram and write a note on it

Aim: To identify the given slide, draw neat labeled diagram and write a note on it.

Materials required: Microscope, slide

Identification: The given slide is identified as Red blood Corpuscles (Erythrocytes)

Notes: (1) RBCs are circular, biconcave and disc shaped.

(2) The young RBCs have nuclei but .

(3) The mature RBCs do not have nuclei.

(4) RBCs are red due to the presence of a respiratory pigment called haemoglobin.

(5) RBCs are concerned with carriage of oxygen.

(6) Decrease in RBCs causes Anaemia.

(7) Increase in RBCs causes Polycythemia.

Result: The given slide was identified and explained.

Aim: To identify the given slide, draw neat labeled diagram and write a note on it.

Materials required: Microscope, slide

Identification: The given slide is identified as White blood Corpuscles (Leauocytes).

Notes: (1) WBCa are amoeboid in shape.

(2) WBCs have a prominent nuclei.

(3) WBCs are concerned with phagocytosis of foreign germs and production of antibodies which provides immunity against infection.

(4) There are five different types of WBC.

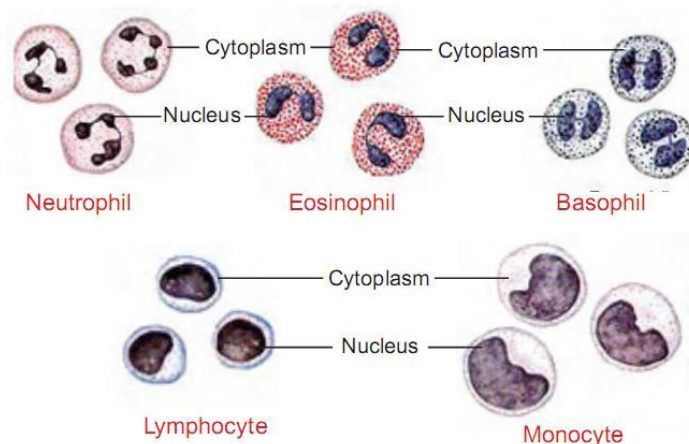(5) Increase in WBCs causes Leukemia, decrease in number causes Leukopenia.

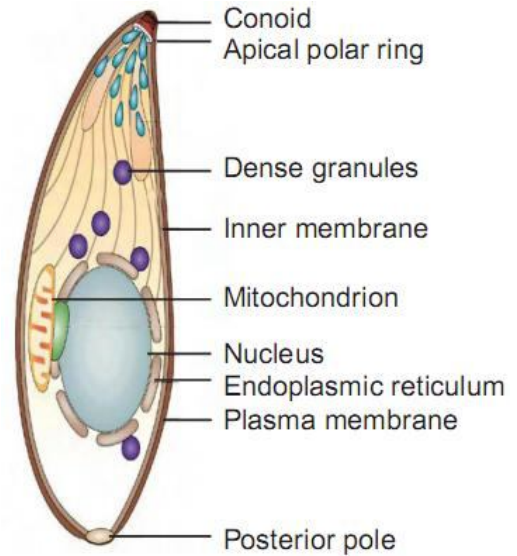**Result:** The given slide was identified and explained.

Aim: To identify the given slide, draw neat labeled diagram and write a note on it.

Materials required: Microscope, slide

Identification: The given slide is identified as Palsmodium.

Notes:
(1) Plasmodium is a protozoan organism.

(2) Plasmodium parasite causes Malaria.

(3) Plasmodium is transmitted to man through female Anopheles mosquito.

(4) Life cycle of Plasmodium requires two hosts namely and female Anopheles mosquito.

(5) The infective stage of Plasmodium is Sporozoite.

Result: The given slide was identified and explained.

Labels: Conoid, Apical polar ring, Dense granules, Inner membrane, Mitochondrion, Nucleus, Endoplasmic reticulum, Plasma membrane, Posterior pole

CHEMISTRY

09. Prepare a solution from the solid sample and identify the type of solution based on filtration

Aim: To prepare a solution from the solid sample and identify the type of solution based on filtration.

Materials required: Beaker, water, filter papers, test tube, test tube stand, glass rod, funnel, given sample

Theory: True solution → Homogeneous and transparent. Solute particles do not remain in the filter paper.

Suspension → Heterogeneous mixture. Solute particles remain in the filter paper.

Procedure:

Experiment	Observation	Inference
50 ml of water was taken in a beaker. The given sample was added to it. It was stirred well with the help of glass rod. By using filter paper the solution was filtered.	Solute particles do not remain in the filter paper.	True solution

Result: the given solid sample forms true solution.

Aim: To prepare a solution from the solid sample and identify the type of solution based on filtration.

Materials required: Beaker, water, filter papers, test tube, test tube stand, glass rod, funnel, given sample

Theory: True solution → Homogeneous and transparent. Solute particles do not remain in the filter paper.

Suspension → Heterogeneous mixture. Solute particles remain in the filter paper.

Procedure:

Experiment	Observation	Inference
50 ml of water was taken in a beaker. The given sample was added to it. It was stirred well with the help of glass rod. By using filter paper the solution was filtered.	Solute particles remain in the filter paper.	Suspension

Result: the given solid sample forms suspension.

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10. To identify the whether the given sample is an acid or a base

Aim: To identify the whether the given sample is an acid or a base.

Materials required: Test tubes, test tube stand, glass rod, phenolphthalein, methyl orange, sodium carbonate salt, zinc granules, given sample

Theory:

S. No.	Material used	Acid	Base
1	Phenolphthalein	Colourless	Turns pink colour
2	Methyl orange	Turns pink colour	Turns yellow colour
3	Sodium carbonate salt	Brisk effervescence occurs	No reaction
4	Zinc granules	Bubbles (H_2) come out	Bubbles (H_2) do not come out

Procedure: 5 ml of the given solution was taken in 4 test tubes. Phenolphthalein, methyl orange, sodium carbonate salt, zinc granules were added to the test tubes. Observations were noted in the table.

S. No.	Material used	Observation	Inference
1	Phenolphthalein	Colourless	Presence of acid
2	Methyl orange	Turns pink colour	Presence of acid
3	Sodium carbonate salt	Brisk effervescence occurs	Presence of acid
4	Zinc granules	Bubbles (H_2) come out	Presence of acid

Result: The given test solution contains acid.

Aim: To identify the whether the given sample is an acid or a base.

Materials required: Test tubes, test tube stand, glass rod, phenolphthalein, methyl orange, sodium carbonate salt, zinc granules, given sample

Theory:

S. No.	Material used	Acid	Base
1	Phenolphthalein	Colourless	Turns pink colour
2	Methyl orange	Turns pink colour	Turns yellow colour
3	Sodium carbonate salt	Brisk effervescence occurs	No reaction
4	Zinc granules	Bubbles (H_2) come out	Bubbles (H_2) do not come out

Procedure: 5 ml of the given solution was taken in 4 test tubes. Phenolphthalein, methyl orange, sodium carbonate salt, zinc granules were added to the test tubes. Observations were noted in the table.

S. No.	Material used	Observation	Inference
1	Phenolphthalein	Turns pink colour	Presence of base
2	Methyl orange	Turns yellow colour	Presence of base
3	Sodium carbonate salt	No reaction	Presence of base
4	Zinc granules	Bubbles (H_2) do not come out	Presence of base

Result: The given test solution contains base.

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11. Find the nature of sample (A & B) as acids / bases / neutral by using pH paper

Aim: To identify the nature of the given solution by using pH paper.

Materials required: Samples A & B, pH paper, watch glass, glass rod

Principle: pH = 7 → Neutral, pH < 7 → Acidic, pH > 7 → Basic

Procedure: pH paper was placed on a watch glass. By using glass rod a drop of each sample was dipped on the pH paper. Observations were tabulated.

Sample	Observation		Inference
	Colour produced	Approximate pH Value	
A	Blue	12	Basic
B	Red	2	Acidic

Result:
1. The given sample A is BASIC.
2. The given sample B is acidic.

PHYSICS

12. Screw gauge – Find out he thickness of the given one rupee coin

Aim: To find out the thickness of the given one rupee coin.

Materials required: Screw gauge, one rupee coin

Formula:

Least count = Pitch / Number of HSD = 1 mm / 100 = 0.01 m
Thickness = PSR + (HSC x LC) ± ZC (mm)

Procedure:
1. The least count of the screw gauge [LC = 0.01 m]
2. Zero error of the screw gauge is found. [ZC = 0]
3. The given one rupee coin is placed between two studs
4. The head is rotated until the wire is held firmly.
5. Pitch Scale Reading [PSR] and Head Scale Reading [HSC] are noted.
6. Again they are noted by repeating the experiment.
7. They are tabulated.
8. The experiment was repeated for different positions of the coin.

Table:

S. No.	PSR	HSC	HSC x LC	Thickness of the coin = PSR + [HSC x LC] ± ZC
1	1	29	0.29	1.29
2	1	31	0.31	1.31
			Average	1.30

Result: The thickness of the given coin = 1.30 mm

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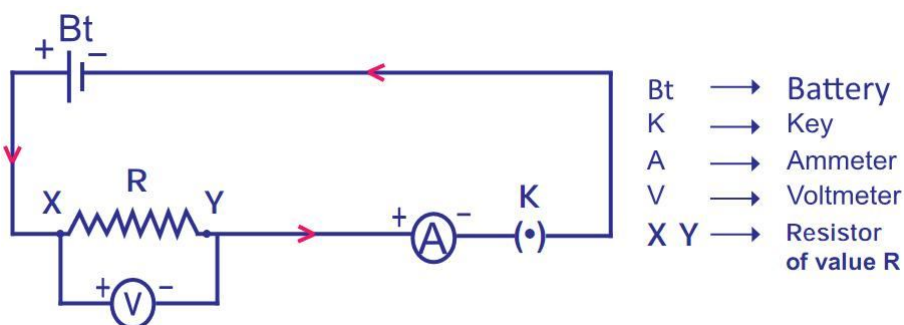
13. Ohm's Law verification

Aim: To determine resistor's resistance and to verify the Ohm's law.

Materials required: Resistor, an ammeter (0-3 A), voltmeter (0-10 V), a battery eliminator, plug keys, connecting wires

Formula: Resistance (R) = V / I ohm

                Potential difference in volt (V), current in ampere (I)

Circuit diagram:

Procedure: The battery eliminator, ammeter, the given wire, rheostat and key are connected in series.

The volt meter is connected in parallel across the given wire.

Keeping the rate of the eliminator at the minimum (2 V) the readings of ammeter and volt meter are tabulated.

Increasing the rate of the eliminator (4 V and 6 V) the readings of ammeter and volt meter are tabulated.

"I" is noted from the ammeter.

"V" is noted from the voltmeter.

Table:

S. No.	Voltage applied in the circuit (Volt)	Current through the Register (Ampere)	Resistance of resistor R = V / I (Ohm)
1	2	0.4	5
2	4	0.8	5
3	6	1.2	5

Graph:

Choosing appropriate scale for the values of I and V along the x and y axes respectively on the graph paper.

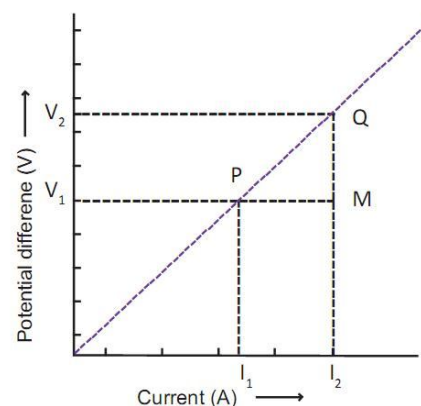The points were marked on the graph paper.

The points were joined.

The slope of the straight line was found.

The slope is the resistance of the resistor.

Result:

1. Resistance of the resistor (Calculations method) = 5 Ohm
2. Resistance of the resistor (Graphical method) = 5 Ohm
3. The graph between V and I is a straight line and passes through the origin. Thus Ohm's law verified.

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14. Mapping of magnetic field

Aim: To map the magnetic field due to a Bar Magnet placed in a Magnetic Meridian with its North-pole towards North.

Apparatus required: Drawing Board, Board pins and cello taps, Compass Needle, Sheets of white paper, Bar Magnet

Procedure: A white sheet of paper is fastened to the drawing board using board pins or cello tape. A small plotting compass needle is placed near the edge of the paper. The board is rotated until the edge of the paper is parallel to the Magnetic needle. A bar magnet is placed on the white paper.
Outline of magnet is drawn and its poles are noted. The magnetic needle is placed near the north pole of the magnet. Its north pole is marked. The magnetic needle is again placed so that the south-pole touched the dot mark. Its north pole is marked. The procedure is repeated. The dots are joined. This curve is a magnetic line of force. In the same way several magnetic lines are drawn.
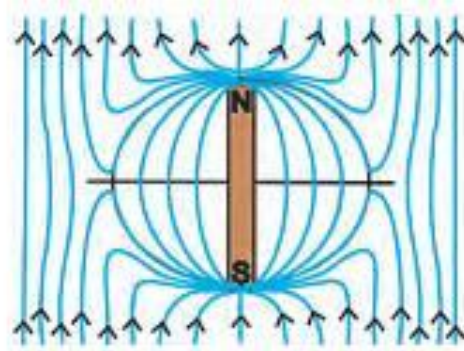
Result: The magnetic lines of force are mapped when the bar magnet is placed with its north pole facing geographic north. The mapped sheet is attached.

15. Focal length of convex lens – (a) distance object method (b) u-v method

**Aim:** To determine the focal length of the given convex lens by (a) distance method (b) u-v method.

Materials required: Convex lens, lens stand, white screen, meter scale, illuminated wire gauze

Formula: Focal length of the convex lens by u–v method, f = $f = uv / u + v$

Procedure:

(a) Distance method:

(1) The convex lens is mounted on the stand and is kept facing a distant object (may be a tree or a building).

(2) The white screen is placed behind the convex lens and its position is adjusted to get a clear, diminished and inverted image of the object.

(3) The distance between the convex lens and the screen is measured.

(4) This is an approximate value of the focal length of the convex lens.
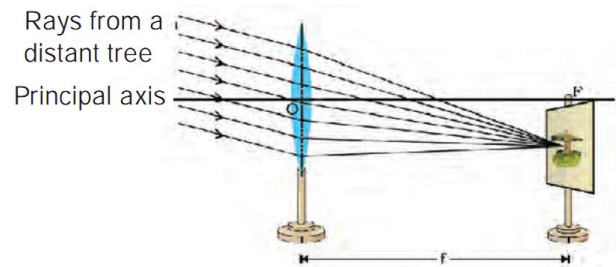
Distant object method

(b) u–v Method:

(1) The convex lens is mounted on the stand..

(2) It was placed in front of the illuminated wire gauze at a certain distance 'u' from the wire gauze.

(3) A screen is placed on the other side of lens and its from the lens is adjusted to get a clear image.

(4) The distance between the lens and the screen is taken as 'v'.
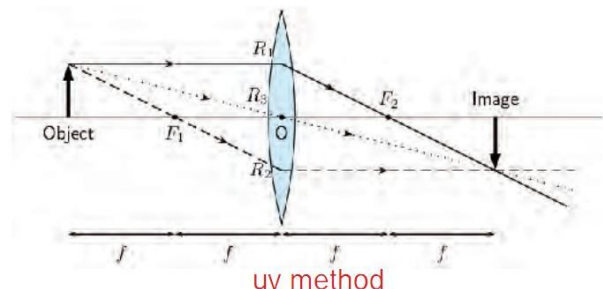
uv method

Table:

S. No.	Nature of image	Object distance u cm	Image distance v cm	Focal length $f = uv / u + v$ cm
1	u < 2f	15	31	10.1
2	Magnified	17	25	10.1
3	u > 2f	25	17	10.1
4	Diminished	31	15	10.1
			Average	10.1

Result: The focal length of the given convex lens by

(a) Distance object method = 10.1 cm (b) u–v method = 10.1 cm

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