SCIENCE PRACTICAL

STUDY MATERIAL FOR X TH STD

PHYSICS

EX. NO:1 **DATE:**

DETERMINATION OF WEIGHT OF AN OBJECT USING THE PRINCIPLE OF MOMENTS

Aim:

To determine the weight of an object using the principle of moments.

Apparatus required:

A metre scale, a knife edge, slotted weights, thread

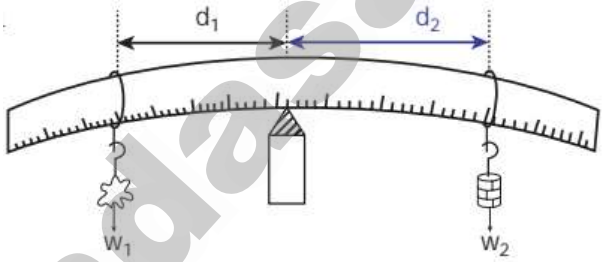
Formula:

According to the principle of moments = $W_1 \times d_1 = W_2 \times d_2$

$$W2 = \frac{W1 \times d1}{d2}$$

- W_1→Known weight (In grams)
- W_2→un known weight (in grams)
- d_1→distance of the known weight(in cm)
- d_2→ distance of the unknown weight(in cm)

Diagram:



Procedure:

- A meter scale is supported at its centre of gravity by a knife edge so that the scale is in the horizontal position.
- Ensure that he scale is in equilibrium position.
- A known weight W1 and an unknown weight W2 are suspended from either side of the scale using the weight hangers.
- Fix the position of one weight hanger and adjust the position of the second weight hanger such that the scale is in equilibrium.
- Measure the distance d1 and d2 of the two weight hangers from the centre of the scale.

- The experiment is repeated for different positions of the unknown weight. Measure the distances.
- The readings are tabulated as follows:

Observation:

S.NO	Known weight (W_1) in gram	Distance of the known weight(d_1) in cm	Distance of the unknown weight(d_2) in cm	Unknown weight $W2 = \frac{W1 \times d1}{d2}\ gm$
1	50	10	10	50
2	100	10	20	50
			average	50

Calculations:

Moment of a force can be calculated using the formula

Moment of the force = Force x distance

Clock wise moment by unknown weight = $W_1 \times d_1$

Anticlockwise moment by known weight = $W_2 \times d_2$

Unknown weight = $W_2 = [W_1 \times d_1] / d_2$

$$1.\ W2 = \frac{W1 \times d1}{d2} = \frac{50 \times 10}{10} = 50$$

$$2.\ W2 = \frac{W1 \times d1}{d2} = \frac{100 \times 10}{20} = 50$$

Result:

Using the principle of moments, the weight of the unknown body W_1 = 50gms

EX. NO: 2 **DATE:**

DETERMINATION OF FOCAL LENGTH OF A CONVEX LENS

Aim:

To determine the focal length of a convex lens by using

1. Distant object method
2. uv method

Apparatus required:

A convex lens, stand, wire gauze object, screen and measuring scale.

Formula:

$$f = \frac{u \times v}{u+v} \text{ cm}$$

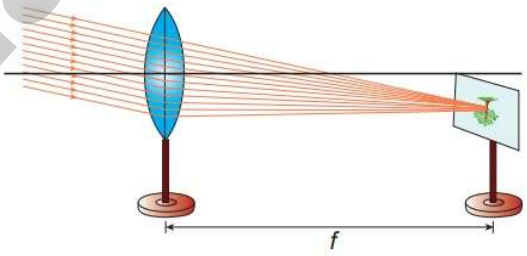
Here,

u → is the distance between the object (light source) and the convex lens

v → is the distance of the image (screen) from the convex lens

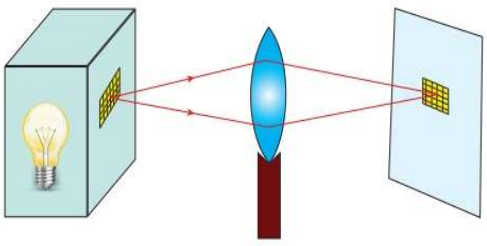
f → is the focal length of the convex lens

1. Distant Object Method:



- Fix the given convex lens on the stand and place it towards the distance object
- Place the screen behind the lens and adjust the position of the lens to get the sharp image
- Measure the distance between the lens and screen. This gives the focal length of the given lens

2. uv - Method:



- Fix the given convex lens on the stand and place it on the left side of the illuminated wire gauze say at distance less than 2f.
- Measure the distance between lens and object as u.
- Place the screen on the right side of the lens and adjust the position of the screen to get the sharp image.
- Measure the distance between lens and screen as v.

❖ Repeat the same procedure by changing the object distance and tabulate your observations.

Observation:

Focal length of the convex lens by distance object method (f) = 10.5 cm

2f = 21 cm

S.NO	Object distance (u) cm	Image distance (v)cm	Focal length $f = \frac{u \times v}{u+v}$ cm
1	16	32	10.6
2	24	19	10.6
		average	10.6

Calculation:

1. $f = \frac{u \times v}{u+v} = \frac{16 \times 32}{16+32} = \frac{512}{48} = 10.6$ cm

2. $f = \frac{u \times v}{u+v}$ $f = \frac{24 \times 19}{24+19} = \frac{456}{43} = 10.6$ cm

Result:

The focal length of the given convex lens

1. By distance object method f = 10. 5 cm
2. By 'uv' method f = 10.6 cm

EX. NO: 3 **DATE:**

DETERMINATION OF RESISTIVITY

Aim:

To determine the resistivity of the material of the given coil of wire.

Equipment required:

A coil of wire, screw gauge, a metre scale, battery, key, ammeter, voltmeter, rheostat and connecting Wires.

Formula:

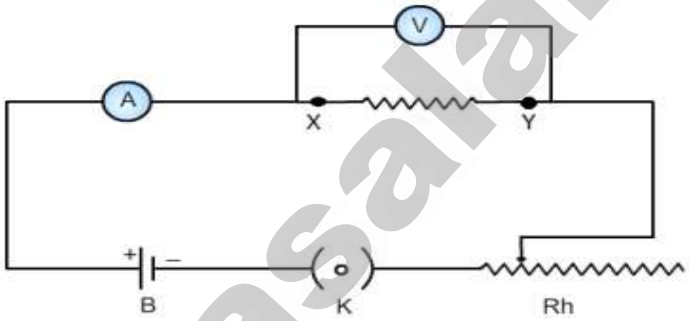
The resistivity of the given wire $\rho = \left(\frac{L}{A}\right) \times R\ \Omega\ m$

A→ Cross section of the wire

L → Length of the wire(m)

R→ Resistance of the wire (Ω)

Circuit Diagram:



Procedure:

- Connect the battery, ammeter, given wire, rheostat and key in series.
- Connect the voltmeter in parallel to the unknown resistor.
- Adjust the rheostat such that the ammeter reads a current of 0.5 ampere. Note down voltmeter reading.
- Adjust the rheostat and change the current of 0.75A Note down voltmeter reading.
- Tabulate the observations.

Observations:

(i) To find the resistance:

S.NO	Ammeter reading (ampere)	Voltmeter reading- V(volts)	Resistance R = V / I (ohm)
1.	0.5	2	4
2.	1.0	4	4
3.	1.5	6	4
		average	4

(ii) To find the diameter of the wire using screw gauge:

S. No	PSR (mm)	HSC	HSR=HSC×LC (mm)	TR =PSR + HSR (mm)
1	0	50	0.50	0.50
2	0	50	0.50	0.50
			Mean Diameter	0.50 mm

Calculations:

i) To find the resistance:

1. R= V/I = 2/0.5 = 4 ohm 2. R= V/I = 4/1.0 = 4 ohm 3. R= V/I = 6/1.5 = 8 ohm

ii) Resistivity of the coil:

Radius of the given wire (r) = $\frac{diameter}{2} = \frac{0.50}{2}$ = 0.25mm

$\Rightarrow$ r = 0.25mm = 0.25 x 10^{-3} m

Length of the given wire (l) = 100 cm =1 meter

Area of cross section of the given wire $A = \pi r^2$

$A = 3.14 \times (0.25 \times 10^{-3})^2$

$= 0.196 \times 10^{-6} m^2$

Resistance of the given wire R = 4 ohm

Resistivity of the given wire $\rho = \left(\frac{L}{A}\right) \times R\ \Omega\ m$

$\rho = \left(\frac{0.196 \times 10^{-6}}{1}\right) \times 4\ \Omega\ m \quad \rho = 0.784 \times 10^{-6}\ \Omega\ m$

Result:

The resistivity of the material of the wire, $\rho = 0.784 \times 10^{-6}\ \Omega\ m$

CHEMISTRY

EX. NO: 4 **DATE:**

IDENTIFY THE DISSOLUTION OF THE GIVEN SALT WHETHER IT IS EXOTHERMIC OR ENDOTHERMIC.

Aim:

To test the dissolution of given salt is exothermic or endothermic

Apparatus required:

Two beakers, Thermometer, stirrer, 5g amount of two samples

Principle:

- If the reaction liberates the heat, then it is called exothermic.
- If the reaction absorbs the heat, then it is called endothermic

Procedure:

- Take 50ml of water in two beakers and label them as A and B.
- Note the temperature ofthe water from the beaker A and B.
- Then, add 5g of sample A into the beaker A and stir well until it dissolves completely.
- Record final temperature of the solution.
- Now, repeat the same for the sample B. Record the observation

Observation:

S.NO	Sample	Temperature before addition of sample	Temperature after addition of sample	Inference
1	A	28^0C	32^0C	Temperature increases
2	B	28^0C	19^0C	Temperature decreases

Result: From the inferences made

i) The dissolution of sample A is Exothermic

ii) The dissolution of sample B is Endothermic

EX. NO: 5 **DATE:**

TESTING THE SOLUBILITY OF THE SALT

Aim:

To test the solubility of the given salt based on the saturation and un saturation of the solution at a given temperature.

Principle:

- A solution in which no more solute can be dissolved in the solvent -saturated solution
- If the solvent can dissolve more solute -unsaturated solution

Materials Required:

A 250 ml beaker, a stirrer, distilled water, 100 ml measuring jar, table salt weighing as 25g, 11g, and 1g.

Procedure:

- Take 100ml of water in a beaker. Add 25g of salt in it and stir it very well
- Now add 11 g of salt and stir and then add 1 g of salt and stir it
- Record your observations.

Observation:

S.NO	Amount of salt added	Observation (salt dissolved/ undissolved)	Inference (unsaturated/ saturated /supersaturated)
1	25g	dissolved	unsaturated
2	11g	dissolved	saturated
3	1g	un dissolved	supersaturated

Result:

From the above observation, it is inferred that the amount of salt required for saturation is 36g.

EX. NO: 6 **DATE:**

TESTING THE WATER OF HYDRATION OF SALT

Aim:

To veify whether the given sample of salt possesses 'Water of Hydration' or not.

Materials Required:

A pinch of given sample of salt ,test tube, tongs, spirit lamp.

Principle:

- Water of hydration is the phenomenon shown by certain salts in which water molecules are present inside the crystals
- e.g. Crystalline Copper sulphate $CuSO_4.5H_2O$

Procedure:

- A pinch of given salt is taken in a test tube and heated for some time.
- Water droplets are seen on the inner walls of the test tube.
- This shows that the given salt contains water of crystallization.
- If the above observation is not noticed for the given salt, the water of hydration is absent.

Result:

In the given sample of salt, Water of crystallization / hydration is **Present.**

EX. NO: 7A **DATE:**

TEST THE GIVEN SAMPLE FOR THE PRESENCE OF ACID

Aim:

To identify the presence of an acid or a base in a given sample.

Materials Required:

Test tubes, test tube stand, glass rod, phenolphthalein, methyl orange, sodium carbonate salt and the given sample.

Principle:

In acid medium	In Base medium,
(a) Phenolphthalein is colourless	(a) Phenolphthalein is pink in colour
(b) Methyl orange is pink in colour	(b) Methyl orange is yellow in colour
(c) Sodium carbonate gives brisk effervescence.	(c) Sodium carbonate does not give brisk effervescence.

Procedure:

S.NO	EXPERIMENT	OBSERVATION	INFERENCE
1	Take 5 ml of test solution in a test tube and add few drops of phenolphthalein in it	No change in colour	Presence of acid
2	Take 5 ml of test solution in a test tube and add few drops of methyol orange in it	Solution turns in pink in colour	Presence of acid
3	Take 5 ml of test solution in a test tube and add a pinch of sodium carbonate in it	Brisk effervescence occurs	Presence of acid

Result :

The given test solution contains acid

EX. NO: 7B **DATE:**

TEST THE GIVEN SAMPLE FOR THE PRESENCE OF BASE

Aim:

To identify the presence of an acid or a base in a given sample.

Materials Required:

Test tubes, test tube stand, glass rod, phenolphthalein, methyl orange, sodium carbonate salt and the given sample.

Principle:

In acid medium	In Base medium,
(a) Phenolphthalein is colourless	(a) Phenolphthalein is pink in colour
(b) Methyl orange is pink in colour	(b) Methyl orange is *yellow* in colour
(c) Sodium carbonate gives brisk effervescence.	(c) Sodium carbonate does not give brisk effervescence.

Procedure:

S.NO	EXPERIMENT	OBSERVATION	INFERENCE
1	Take 5 ml of test solution in a test tube and add few drops of phenolphthalein in it	Solutions turns pink in colour	Presence of base
2	Take 5 ml of test solution in a test tube and add few drops of methyol orange in it	Solution turns in yellow in colour	Presence of base
3	Take 5 ml of test solution in a test tube and add a pinch of sodium carbonate in it	No Brisk effervescence occurs	Presence of base

Result :

The given test solution contains base.

EX. NO: 8 **DATE:**

PHOTOSYNTHESIS-TEST TUBE AND FUNNEL EXPERIMENT

Aim:

To prove that oxygen is evolved during photosynthesis.

Materials required:

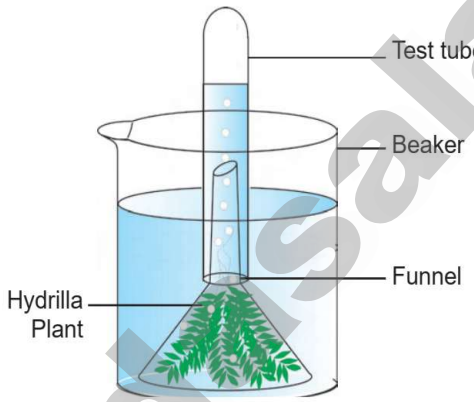
Test tube, funnel, beaker, pond water and Hydrilla plant.

Procedure:

- Take a few twigs of Hydrilla plant in a beaker containing pond water.
- Place an inverted funnel over the plant.
- Invert a test tube filled with water over the stem of the funnel.
- Keep the apparatus in the sunlight for a few hours.

Observation:

- After one hour, it is noted that water gets displaced down from the test tube.



Inference:

- During photosynthesis, oxygen is evolved as a by-product.
- Gas bubbles liberated from the Hydrilla plant reach the top of the test tube and it displaces the water downwards.
- Take the test tube and keep the burning stick near the mouth of the test tube. Increased flame will appear.

Result:

- Hence, it is proved that oxygen is evolved during photosynthesis.

EX. NO: 9 **DATE:**

PARTS OF A FLOWER

Aim:

To dissect and display the parts of the given flower and observe the Calyx, Corolla, Androecium and Gynoecium. Draw labelled sketches.

Materials Required:

Flower, needle and paper

Procedure :

1.Calyx, Corolla, Androecium and Gynoecium of the flower of Hibiscus rosasinensis are separated and pasted on a white paper.

2. The parts of Androecium and Gynoecium such as anther, filament, ovary, style and stigma are labeled.

With the help of the needle dissect the different whorls of the flower

Floral Parts:

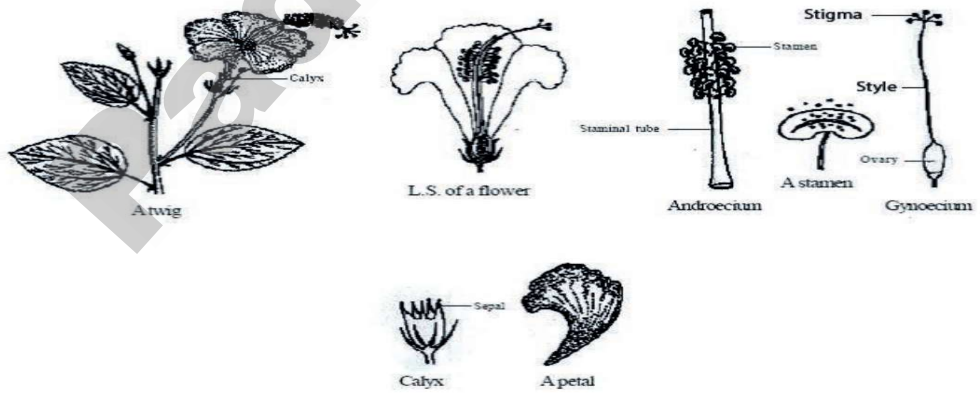
Calyx, Corolla } Accessory organ

Androecium - Male part of the flower

Gynoecium - Female part of the flower } Reproductive organ

Observation:

Draw and label the parts of the flower.



Result:

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

EX. NO: 10 **DATE:**

TO STUDY THE LAW OF DOMINANCE

Aim:

To study the law of dominance by using model / picture / photograph. To find out the genotypic ratio and phenotypic ratio in pea plant using checker board

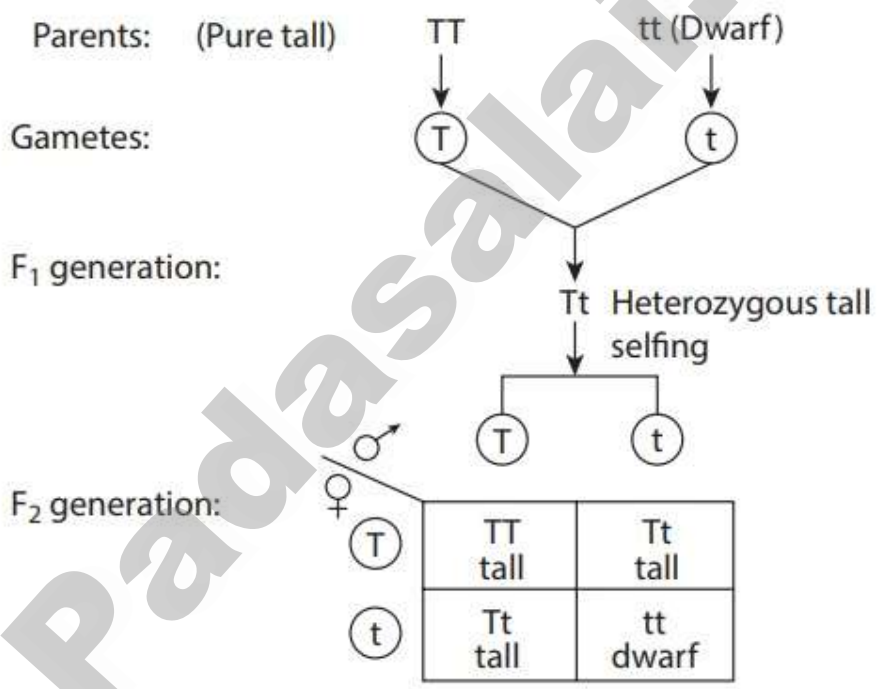
Definition:

Cross involving one pair of contrasting characters is called monohybrid cross.

Procedure:

1. Pure breeding tall plant is crossed with pure breeding dwarf plant.
2. All the F1 hybrid plants were tall (Tt)
3. Selfing the F1 hybrid plants resulted in tall and dwarf plants in F2 generation.

Depict parental generation and the gametes using colour chalk pieces



Result:

- Phenotypic ratio 3:1
- Genotypic ratio 1:2:1
- A cross between two forms of a single trait like a cross between tall and dwarf pea plant.

EX. NO: 11 A **DATE:**

OBSERVATION OF TRANSVERSE SECTION OF DICOT STEM

Aim:

To observe transverse section (T.S) of Dicot Stem and Dicot Root from permanent slides.

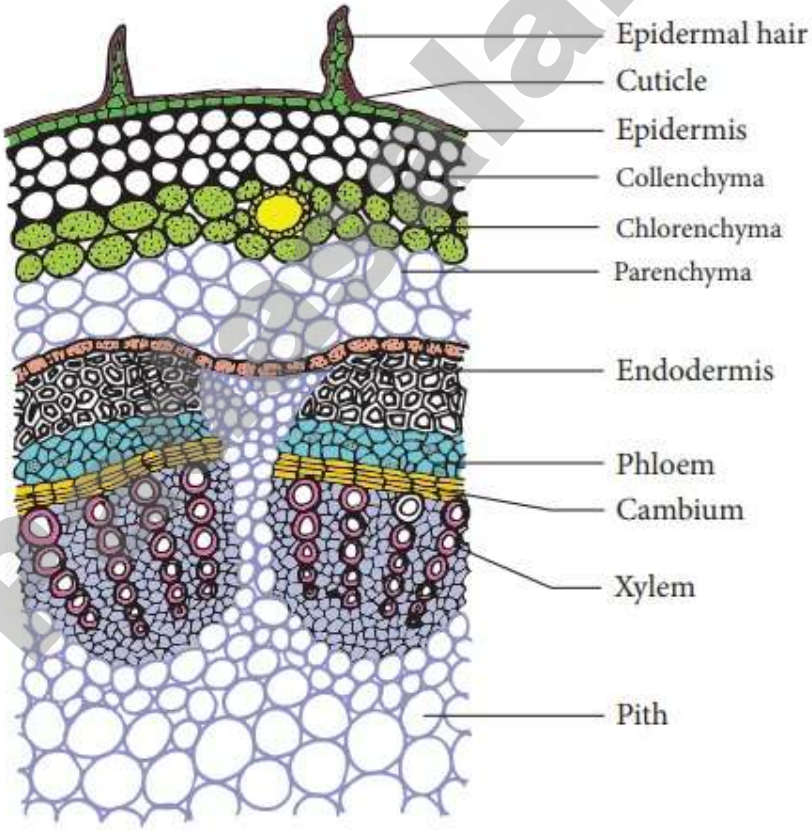
Identification:

The given slide is identified as T.S of Dicot Stem

Reason:

T.S of Dicot Stem

- Vascular bundles are arranged in a ring.
- Conjoint, collateral, endarch and open vascular bundle.
- Ground tissued differentiated into cortex, endodermis, pericycle and pith.
- 3 to 6 layer of collenchymas tissues present in hypodermis.



Result :

A. The given slide is identified as T.S of Dicot Stem.

EX. NO: 11B **DATE:**

OBSERVATION OF TRANSVERSE SECTION OF DICOT ROOT

Aim:

To observe transverse section (T.S) of Dicot Root from permanent slides.

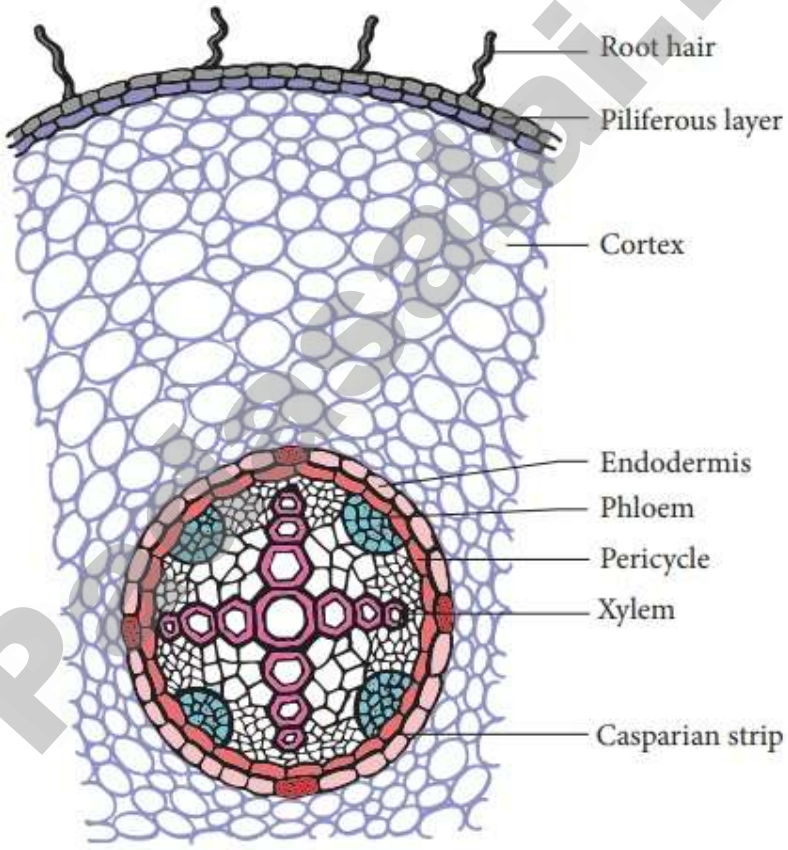
Identification:

The given slide is identified as T.S of Dicot Root

Reason:

T.S of Dicot Root

- Radial vascular bundle.
- 2 to 4 xylem present.
- Cambium present.
- Cortex is made up of parenchymatous cells



Result :

B. The given slide is identified as T.S of Dicot Root.

EX. NO: 12 A **DATE:**

IDENTIFICATION OF LONGITUDINAL SECTION (L.S) OF THE HUMAN HEART.

Aim:

To observe and draw a labelled sketch of L.S of human heart and write the structure.

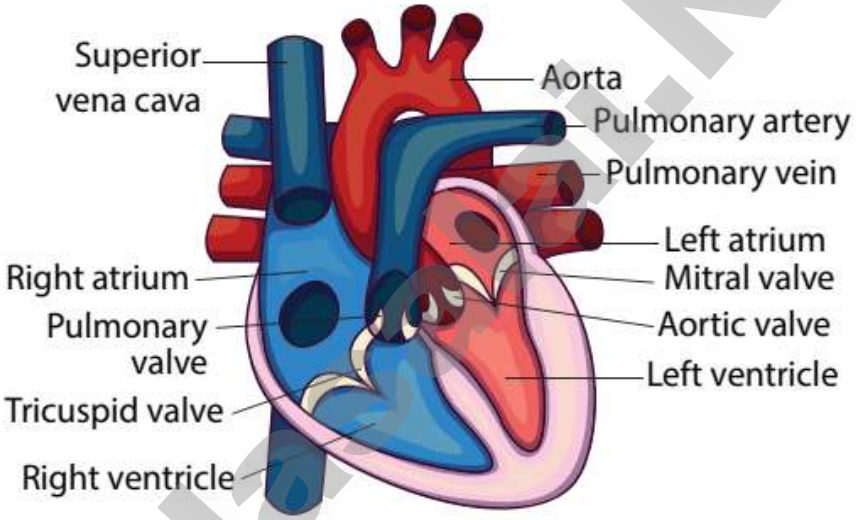
Materials Required:

Model showing the L.S of human heart

Identification:

The given model is identified as L.S. of human heart

Diagram:



Observation:

- The human heart has four chambers. It is made up of two auricles and two ventricles.
- The chambers are separated by interauricular and interventricular septum.
- It prevents the mixing of oxygenated and deoxygenated blood.
- Tricuspid valve - It is located between the right auricle and the right ventricle
- Bicuspid valve - It is located between the left auricle and the left ventricle.
- The heart is covered by a protective double walled membrane called pericardium.

Result :

The given model is identified as L.S. of human heart.

EX. NO: 12 B **DATE:**

IDENTIFICATION OF LONGITUDINAL SECTION (L.S) OF THE HUMAN BRAIN

Aim:

To observe and draw a labelled sketch of L.S of human brain and indicate the different regions of the brain.

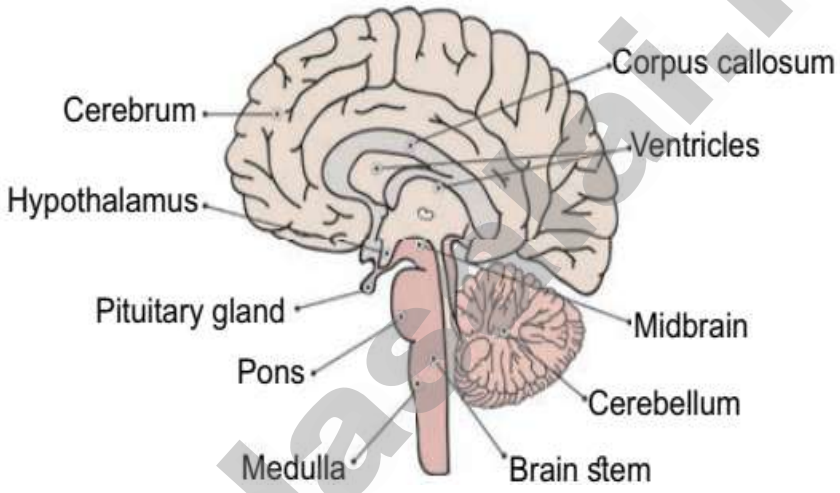
Materials Required:

Model showing the L.S of human brain

Identification:

The given model is identified as L.S. of human brain.

Diagram:



Observation:

- The brain is enclosed in the cranial cavity.
- It is the controlling centre of all the body activities.
- It is covered by three connective tissue membrane or meninges: Duramater Arachnoid membrane and Piamater.
- The human brain is divided into three parts namely forebrain, midbrain and hindbrain.

Result:

The given model is identified as L.S. of human Brain

EX. NO: 13 A **DATE:**

IDENTIFICATION OF BLOOD CELLS

Aim:

- Identification of blood cells (Red blood cells and white blood cells).
- To draw a neat labelled diagram and write a note on the blood cells identified.

Materials Required:

Microscope, Permanent prepared slides of blood cells.

Identification:

The given slide is identified as Red blood cells.

Diagram:

Notes:

- They are biconcave and disc shaped.
- They are also known as erythrocytes.
- Mature mammalian RBC's do not have nucleus.
- Haemoglobin is a respiratory pigment which gives red colour.
- It transports oxygen from lungs to tissues and carbon- dioxide from tissues to lungs

Result:

The given slide is identified as Red blood cells.

EX. NO: 13 B **DATE:**

IDENTIFICATION OF BLOOD CELLS

Aim:

- Identification of blood cells (Red blood cells and white blood cells).
- To draw a neat labelled diagram and write a note on the blood cells identified.

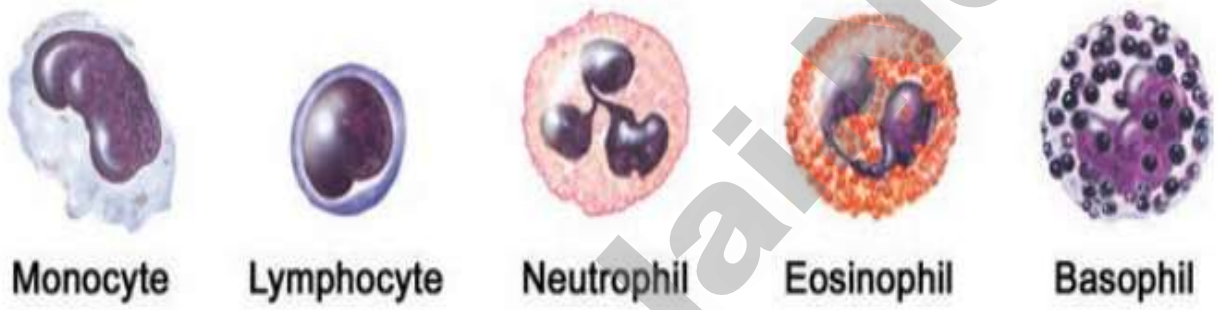
Materials Required:

Microscope, Permanent prepared slides of blood cells.

Identification:

The given slide is identified as White blood cells.

Diagram:



Notes:

- WBC's are colourless and they have nucleus.
- They are also known as Leucocytes
- They show amoeboid movements.
- They fight against germs and other foreign bodies and thus protect the body from microbial infections and diseases.
- There are five different types of WBC named as Neutrophils, Eosinophils, Basophils, Lymphocytes and Monocytes.

Result:

The given slide is identified as White blood cells.

EX. NO: 14 **DATE:**

IDENTIFICATION OF ENDOCRINE GLANDS

Aim:

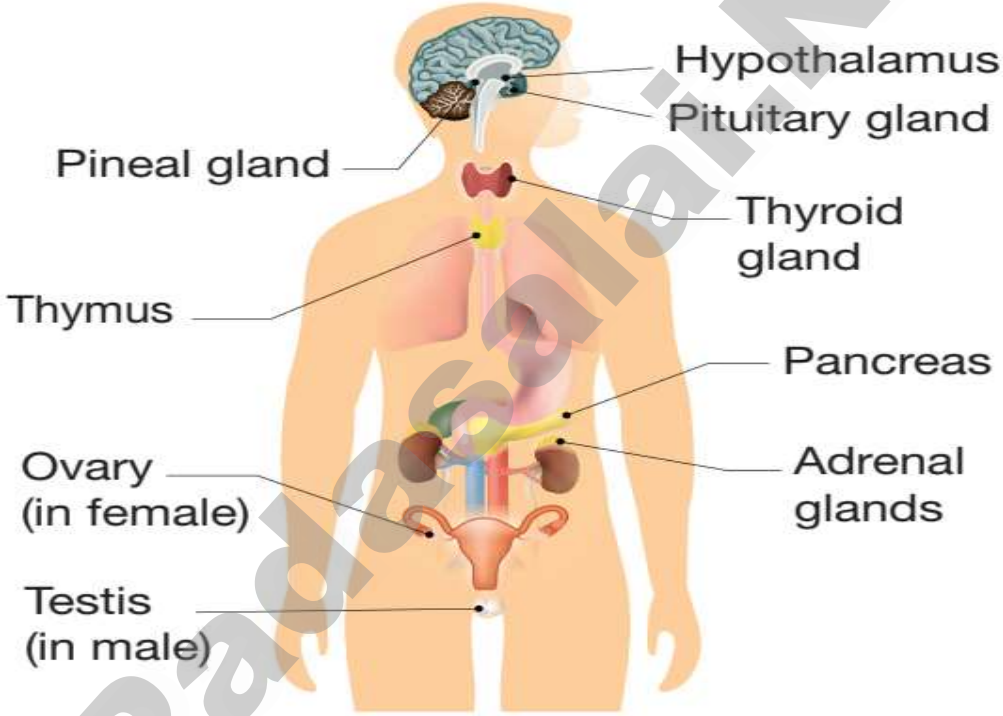
To identify the endocrine gland, its location, hormone secreted and functions - Thyroid gland.

Materials Required:

- Endocrine gland – (a) Thyroid gland
- For the purpose of flag labelling a model / a chart / photograph showing all endocrine glands should be used.

(A) THYROID GLAND

Identification: The flag labelled 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:

Triiodothyronine (T3) and Thyroxine (T4)

Functions of Hormones:

- Thyroid hormones increases the basal metabolic rate (BMR).
- It increases the body temperature.

- It regulates metabolism.
- It is required for normal growth and development.
- It is also known as personality hormone..
- Deficiency of thyroxine results in simple goiter, myxoedema (in adults) and cretinism (in children).
- Excess secretion causes Grave's diseases.

Result:

The flag labelled endocrine gland is identified as Thyroid gland

(B) PANCREAS – ISLETS OF LANGERHANS

Identification:

The flag labelled endocrine gland is identified as Islets of Langerhans in the Pancreas.

Location:

Islets of Langerhans are seen embedded in the pancreas which is located in the abdominal region.

Hormones secreted:

- α cells secrete glucagon
- β cells secrete insulin

Functions of Hormones:

- Insulin converts glucose into glycogen and stores it in liver and muscles.
- Glucagon converts glycogen into glucose.
- Insulin and glucagon maintain the blood sugar level (80 – 120 mg/dl) by their antagonistic function.
- Decrease in insulin secretion causes diabetes mellitus.

Result:

The flag labelled endocrine gland is identified as Islets of Langerhans in the Pancreas.

PREPARED BY

D.VIGNESH. M.Sc.M.Ed