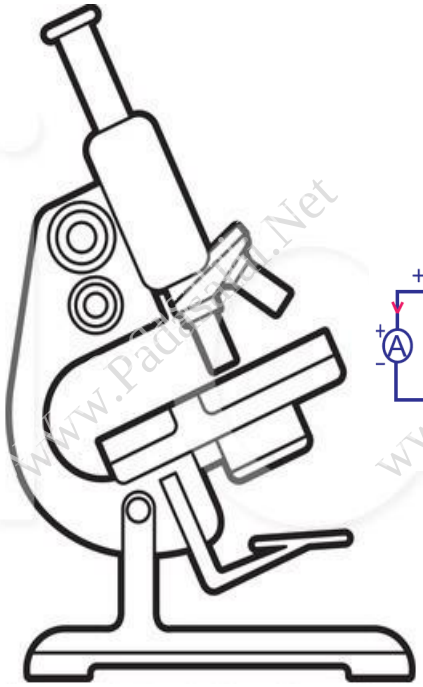
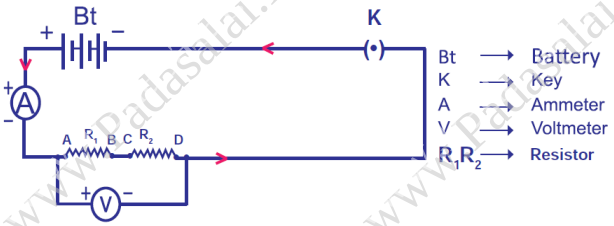
ST.PAUL'S MATRICULATION HIGHER SECONDARY SCHOOL, BLOCK -4, NEYVELI – 607801

SSLC

SCIENCE PRACTICAL MANUAL – 2017-18





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Note : 1.Exercise 1 to 19 must be written in the record note and observation note.
2. Exercise 1 to 19 will be asked in the Government Public Practical Examination.
3. Exercise 20 to 23 can be written only in the observation note.
4. Exercise 20 to 23 will not be asked in the Government Public Practical Examination.

I. FRUIT

Exercise No : 1 **Tomato**

Question : Classify the given fruit and give reasons with diagram.

Aim : To identify and classify the given fruit.

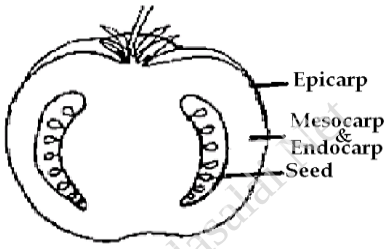
Identification : The given fruit is identified as **L.S. of Tomato.**

Classification : Simple fleshy fruit – Berry – L.S. of Tomato. (1 Mark)

Reasons :(2 Marks)

1.Fruit is developed from the single flower, multicarpellary, syncarpousand superior ovary.
2.The succulent pericarp is differentiated into outer epicarp and innerfleshy pulp.
3.The mesocarp and endocarp are fused to form the fleshy pulp wherethe seeds are embedded
4.The entire fruit is edible.

Diagram :(2 Marks)**L.S. of Tomato Entire fruit**



Exercise No : 2 **Polyalthia**

Question : Classify the given fruit and give reasons with diagram

Aim : To identify and classify the given fruit.

Identification : The given fruit is identified as**Polyalthia.**

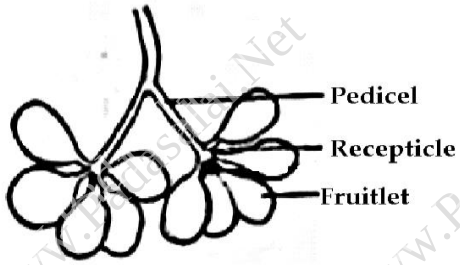
Classification : Aggregate fruit – (e.g.) Polyalthia (1 Mark)

Reasons:(2 Marks)

1.Polyalthia develops from the single flower with multicarpellaryapocarpous ovary.
2.During fruit formation each free carpel develops into fruitlet.
3.So, there are many fruitlets seen attached to a common stalk.

Diagram :(2 Marks)

Polyalthia



Exercise No : 3Jackfruit

Question : Classify the given fruit and give reasons with diagram

Aim : To identify and classify the given fruit.

Identification : The given fruit is identified asL.S. of **Jackfruit**

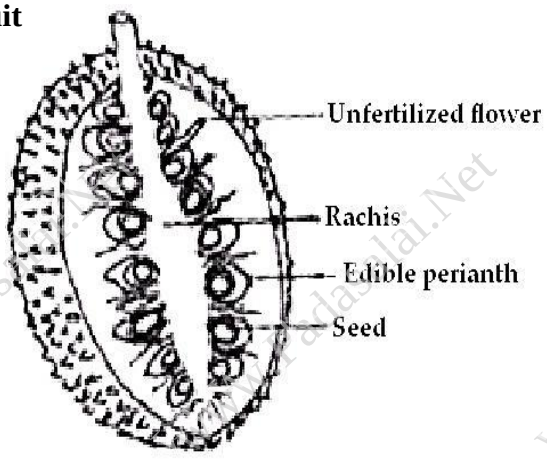
Classification : Multiple fruit - (e.g.) Jack fruit(1 Mark)

Reasons :(2 Marks)

1.The entire female inflorescence develops into a single fruit.
2.The fertilized flowers develop into fruitlets.
3.Theperianth develops into fleshy edible part.
4.The membranous bag around the seed is the pericarp.

Diagram :(2 Marks)

L.S. of Jack fruit



II. FLOWER

Exercise No : 4

Question : Dissect and display the floral parts like Calyx, Corolla, Androecium andGynoecium of any locally available flower

Aim : To dissect and display the floral parts like Calyx, Corolla, Androecium andGynoecium of any locally available flower

Materials Required: Dissection needle, Small knife, white paper, simple microscope, slide, forceps and Sellotape.

Flower taken for dissection : Hibiscus rosasinensis

Procedure :

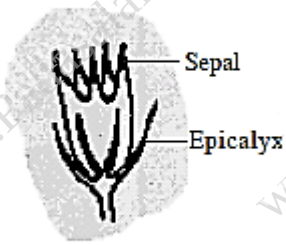
1.Calyx, Corolla, Androecium and Gynoecium of the flower of **Hibiscus rosasinensis** are separated and pasted on a white paper.

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

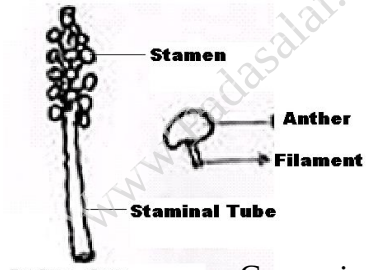
Dissection : 1 ½ Marks

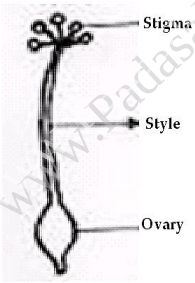
Display : 1 ½ Marks

Diagram:(2 Marks)



Calyx





Gynoecium

Exercise No : 5

Question : Dissect and display the floral parts like Calyx, Corolla, Androecium andGynoecium of any locally available flower

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

Materials Required :Dissection needle, Small knife, white paper, simple microscope, slide, forceps and Sellotape.

Flower taken for dissection :Datura metal

Procedure :

1.Calyx, Corolla, Androecium and Gynoecium of the flower of **Datura metal**are separated and pasted on a white paper.

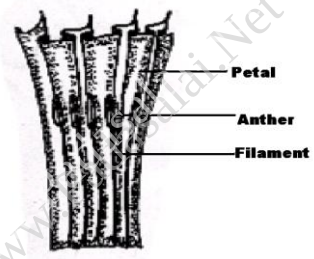
2. The parts of Androecium and Gynoecium such as anther, filament, ovary, style and stigma are labeled.

Dissection : 1 ½ Marks

Display : 1 ½ Marks

Diagram:(2 Marks)

calyx



Exercise No : 6

Question : Dissect and display the floral parts like Calyx, Corolla, Androecium andGynoecium of any locally available flower

Aim : To dissect and display the floral parts like Calyx, Corolla, Androecium andGynoecium of any locally available flower

Materials Required: Dissection needle, Small knife, white paper, simple microscope, slide, forceps and Sellotape.

Flower taken for dissection :***Clitoriaternatea***(Sangupoo)

Procedure :

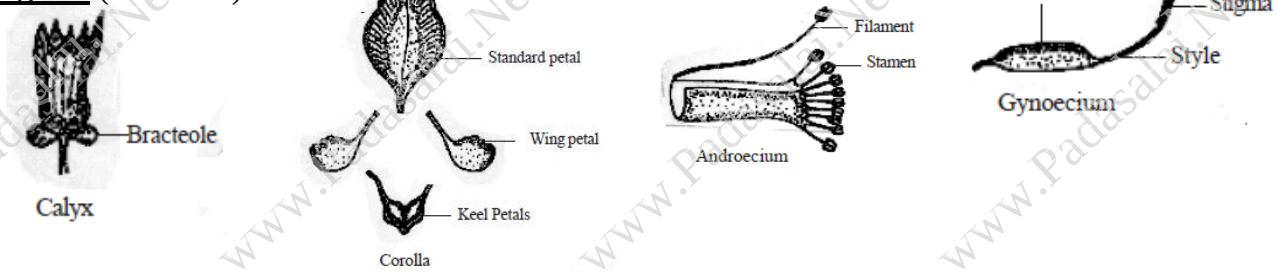
1.Calyx, Corolla, Androecium and Gynoecium of the flower of ***Clitoriaternatea***are separated and pasted on a white paper.

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

Dissection : 1 ½ Marks

Display : 1 ½ Marks

Diagram:(2 Marks)



III.MICROSLIDE

Exercise No : 7

Question : Identify the given slide with help of microscope and write the reasons with labeled diagram.

Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

Identification: The given microslide is identified as **T.S of Anther.**(1 Mark)

Reasons :(2 Marks)

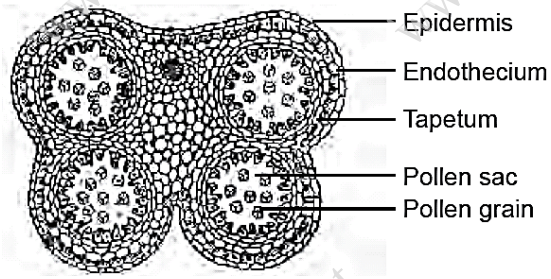
1.Each anther lobe is covered by 4 layered wall.

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

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

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

Diagram : (2 Marks)



Exercise No : 8

Question : Identify the given slide with help of microscope and write the reasons with labeled diagram.

Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.**Identification:**The given microslide is identified as **L.S of Mature Ovule**(1 Mark)

Reasons :(2 Marks)

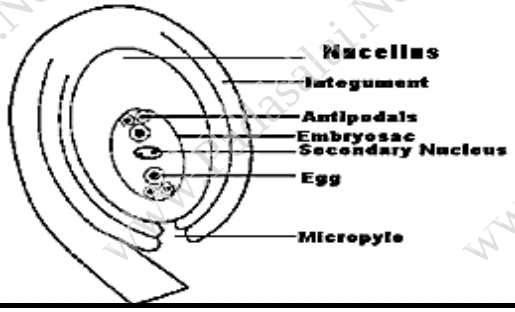
1.The ovule consists of central nucellus surrounded by two protective coatscalled integuments.

2.The integuments leave a small opening at the apex of the ovule calledmicropyle.

3.Theembryosac is found inside the nucellus.

4.Embryosac contains Eight nuclei.

Diagram : (2 Marks)



IV. PHYSIOLOGICAL EXPERIMENT

Exercise No : 9Fermentation Experiment (Anaerobic Respiration)

Question: Prove the fermentation process.

Aim : To prove the fermentation process.(1 Mark)

Materials and apparatus required:(1 Mark)

Sugar solution, Baker's yeast, conical flask (250ml), Beaker and Limewater.

Procedure:(1 Mark)

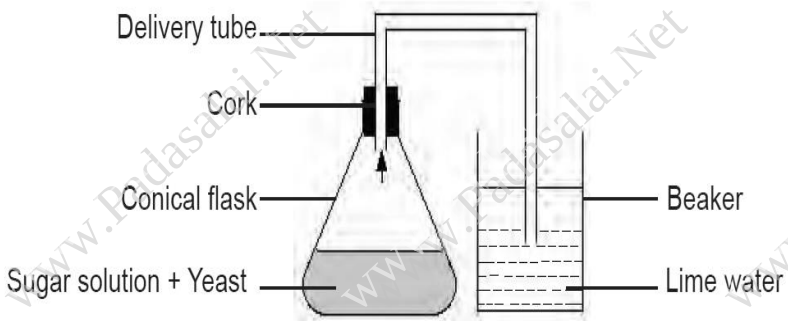
1.Take sugar solution with small quantity of baker's yeast in a (2/3) conicalflask.
2.Close the mouth of the conical flask with one holed rubber cork and insert a delivery tube in the cork.
3.Immerse the other end of the delivery tube in a beaker containing limewater.
4.Keep the apparatus in sunlight for 2 hours.

Observation:(1 Mark)

1.After 2 hours, it is observed that lime water in the beaker turns milky.
2.Remove the stopper of the flask and an alcoholic smell is observed.

Inference:(1 Mark)

1.Due to fermentation of sugar solution, CO_2 is released and ethanol isformed.
2.The CO_2 turns the lime water milky and the smell is due to the formationof ethanol.
3.Hence the process of fermentation is proved.



BIO – ZOOLOGY

V. MODEL -HUMAN ORGANS

Exercise No : 10L.S.of Human Heart

Question : Identify the given model and write the notes with labeled diagram.

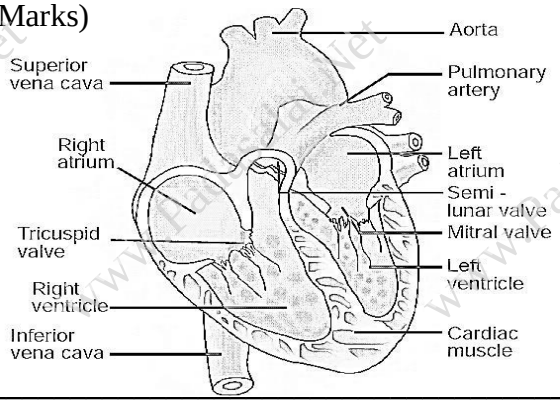
Aim : To identify the given model and to write the notes with labeled diagram.

Identification: The given model is identified as **L.S.of Human Heart**. (1 Mark)

Notes:(2 Marks)

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

Diagram : (2 Marks)



Exercise No : 11L.S. of Human brain

Question : Identify the given model and write the notes with labeled diagram.

Aim : To identify the given model and to write the notes with labeled diagram.

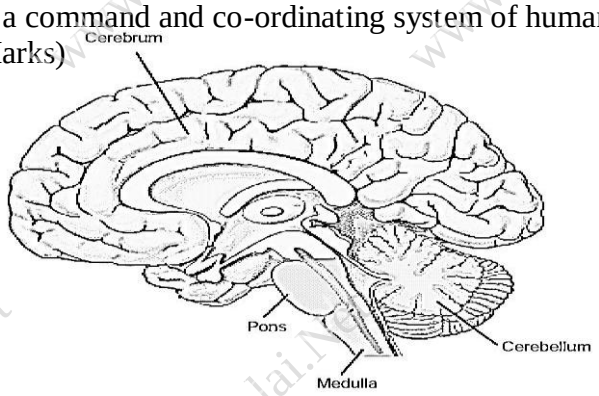
Identification:(1 Mark)

The given model is identified as **L.S.of Human Brain.**

Notes:(2 Marks)

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,midbrainand hind brain.
4. Human Brain contains millions of neurons.
5. Brain acts as a command and co-ordinating system of human body.

Diagram :(2 Marks)



Exercise No : 12L.S. of Human kidney

Question : Identify the given model and write the notes with labeled diagram.

Aim : To identify the given model and to write the notes with labeled diagram.

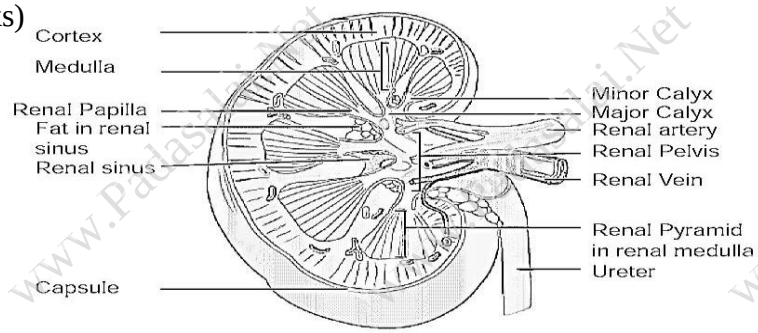
Identification:(1 Mark)

The given model is identified as **L.S. of Human Kidney**.

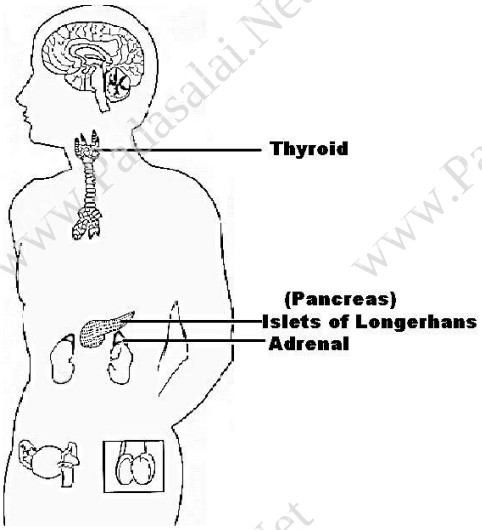
Notes:(2 Marks)

1.Kidney is the principal excretory organ of our body.
2.Kidney is bean shaped paired structure and located in the upper abdominalregion.
3.A thin transparent membrane called capsule covers the kidney.
4.The outer portion of the kidney is renal cortex and the inner portion isrenal medulla.
5.A kidney has about 1.0 millions of functional units called nephrons.

Diagram :(2 Marks)



VI. ENDOCRINE GLANDS –MODEL



Exercise No : 13Thyroid gland

Question : Identify the flag labeled endocrine gland and write the location, hormones secreted and their functions.

Aim : To identify the flag labeled endocrine gland and to write the location, hormones secreted and their functions.

Identification:(1 mark)

The marked endocrine gland is identified as **Thyroid gland**

Location :(1 mark)

Thyroid gland is a bilobed gland located in the neck region oneither side of the Trachea.

Hormones secreted: Thyroxine(1 Mark)

Functions of Hormones:(2 Marks)

1.Thyroxine increases the basal metabolic rate (BMR).
2. It increases the body temperature.
3. It is a personality hormone.
4. It regulates Iodine and sugar level in the blood.
5.Deficiency of thyroxine results in Simple goiter, Myxoedema andcretinism.
6.Excessive secretion causes Grave's diseases.

Exercise No : 14Pancreas – Islets of longerhans

Question : Identify the flag labeled endocrine gland and write the location, hormones secreted and their functions.

Aim : To identify the flag labeled endocrine gland and to write the location, hormones secreted and their functions.

Identification:(1 Mark)The marked endocrine gland is identified as Islets of Longerhans in thePancreas.

Location:(1 Mark)Islets of Longerhans are seen embedded in Pancreas which islocated in the abdominal region.

Hormones secreted:(1 Mark)

1. α cells secrete glucagon and
2. β cells secrete Insulin and amylin.

Functions of Hormones:(2 Marks)

1. Insulin converts glucose into glycogen and deposite in liver and muscles.
2. Glucagon converts glycogen into glucose.
3.Insulin and glucagon together controls the blood sugar level (80 – 120 mg/100ml)by their antagonistic function.
4. Decrease in Insulin level causes Diabetes mellitus.

Exercise No : 15Adrenal gland

Question : Identify the flag labeled endocrine gland and write the location, hormones secreted and their functions.

Aim : To identify the flag labeled endocrine gland and to write the location, hormones secreted and their functions.

Identification:(1 Mark)

The marked endocrine gland is Adrenal gland.

Location:(1 Mark)

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

Hormones secreted:(1 Mark)

Adrenal cortex – Aldosterone and Cortisone.

Adrenal medulla – Adrenaline and Nor-Adrenaline

Functions of Hormones:(2 Marks)

1.Aldosterone – Regulates mineral metabolism.

2. Cortisone - Regulates carbohydrate metabolism.

3.Adrenalin and Nor Adrenalin – prepare the body to face the stressand emergency conditions.

4.Adrenalin and Nor Adrenalin hormones are called Emergencyhormones and they increase the heart beat rate and respiratoryrate.

VII .EXPERIMENT

Exercise No :16Test for Starch (Iodine test)

Question : Find out the presence of starch in the given food samples of A and B by using Iodine solution.

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

MATERIALS REQUIRED: (1 mark) Food sample A and B, Iodine solution, Test tubes, Test tube holder,Test tube stand etc.

PROCEDURE: (1 mark)

1.Take 1 ml of food sample A and B in separate test tubes.

2.Add one drop of Iodine solution in both test tubes and mix well.

3. Observe thecolour change and record.

TABLE: (2 mark)

S. No.	Food Sample	Observation	Presence/Absence
1	A	No Characteristic change	Absence of starch
2	B	Dark blue colourappears	Presence of starch

RESULT: (1 mark)The food sample **B** contains starch.

VIII. MICROSLIDE

Exercise No : 17 **Red Blood Corpuscles**

Question : Identify the given slide with help of microscope and write the reasons with labeled diagram.

Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

Identification:(1 Mark)

The given slide is identified as **Red Blood Corpuscles - (Erythrocytes)**

Reasons: (2 Marks)

1.RBCs are circular, biconcave and disc shaped.

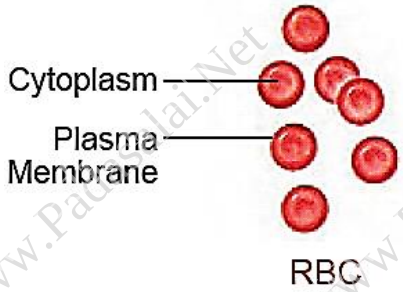
2.The young RBCs have nuclei but the mature RBCs do not have nuclei.

3.RBCs are red due to the presence of a respiratory pigment calledhaemoglobin.

4.RBCs are concerned with carriage of oxygen.

5.Decrease in RBCs causes Anaemia, Increase in numbercausesPolycythemia.

Diagram :(2 Marks)



Exercise No : 18 White Blood Corpuscles (Leucocyte)

Question : Identify the given slide with help of microscope and write the reasons with labeled diagram.

Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

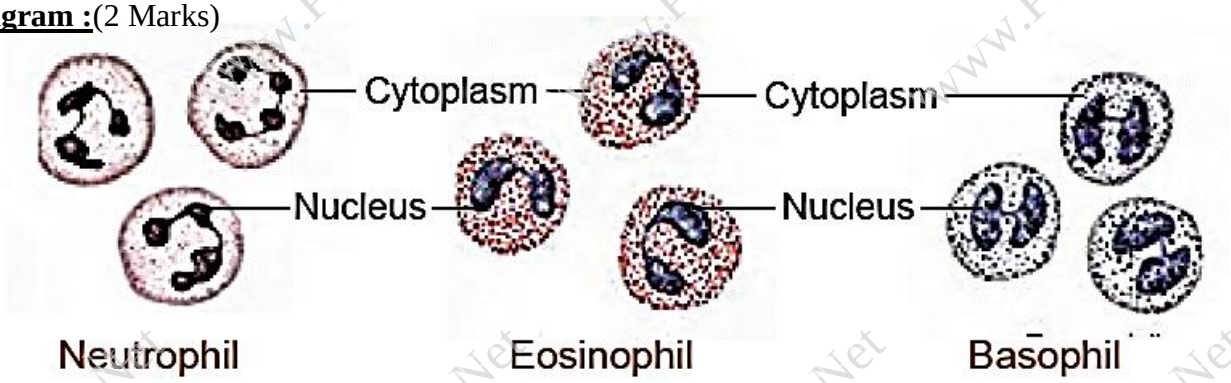
Identification:(1 Mark)

The given slide is identified as **White Blood Corpuscles (Leucocyte)**

Reasons: (2 Marks)

1.WBCs are amoeboid in shape.
2.WBCs have a prominent nuclei.
3.WBCs are concerned with phagocytosis of foreign germs and productionof antibodies which provides immunity against infection.
4.There are five different types of WBC.
5.Increase in WBCs causes Leukemia, decrease in number causesLeukopenia.

Diagram :(2 Marks)



Exercise No : 19Plasmodium

Question : Identify the given slide with help of microscope and write the reasons with labeled diagram.

Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

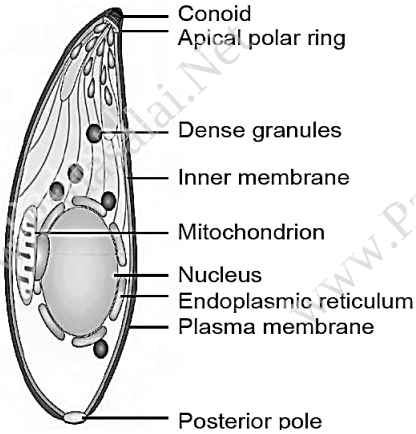
Identification:(1 Mark)

The given slide is identified as **Plasmodium**

Reasons: (2 Marks)

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 man and femaleAnopheles mosquito.
5.The infective stage of Plasmodium is Sporozoite.

Diagram :(2 Marks)



Ex.No. :20 Dissect and display the seed

Aim ;Dissect and display the dicot and monocot seeds.

Materials required :Bean seed, corn seed, dissection needle, small knife, 100 ml beaker, and water.

Procedure :

1. Take the soaked bean and corn seeds.
2. With the help of dissection needle and small knife remove the seed coatof the soaked seeds.
3. Use small knife to split the bean seed.
4. With the help of small knife take the longitudinal section of corn seed.
5. Display the dissected seeds for observation.

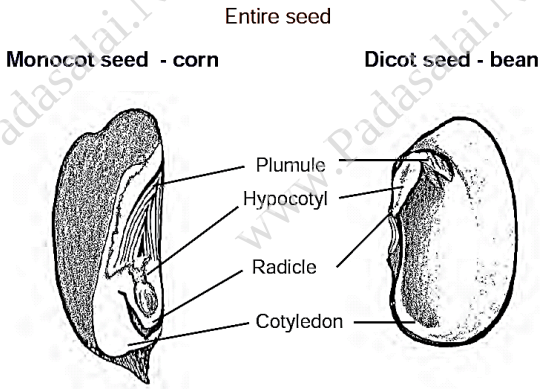
Observation:

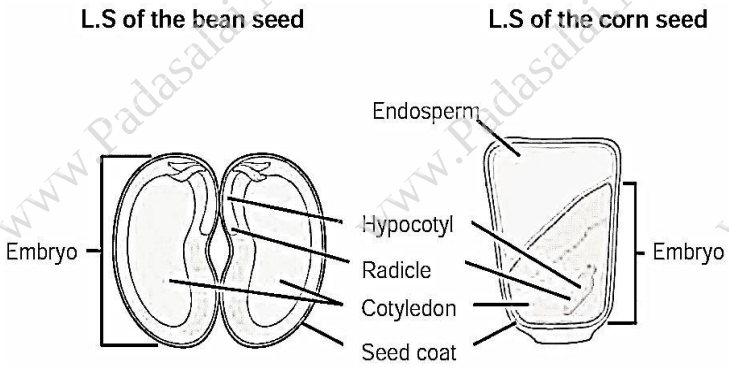
Dicot seed :1.A bean seed(dicot) has a tiny embryo tucked between two halves of the seed.

2.These two halves of a bean seed are cotyledons.

Monoctseed : 1.The corn seed (Monocot) has a tiny embryo inside it.

2.The endosperm food is stored around the embryo.





Ex. No.21 Test tube and funnel experiment

Aim : To prove that Oxygen is evolved during Photosynthesis.

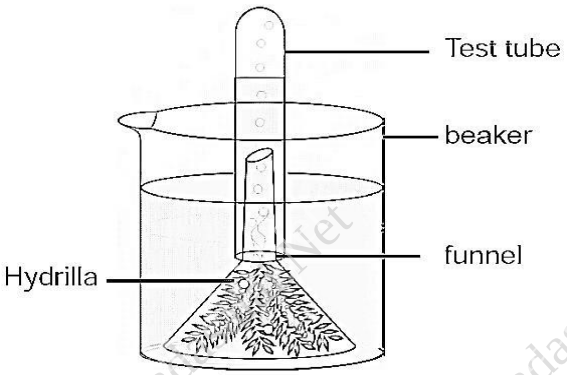
Materials required: Test tube, funnel, beaker, pound water and Hydrilla plant.

Procedure:

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

Observation:

After one hour, it is noted that water gets displaced down from the testtube.



Inference:

During Photosynthesis Oxygen is evolved as a byproduct. Gas bubblesliberated from the Hydrilla plant reach the top of the test tube and itdisplaces the water downwards. Take the test tube and keep the burning stick near the mouth of the test tube. Increased flame will be appeared.Hence, it is proved that Oxygen is evolved during photosynthesis.

Ex.No. 22 Test for lipids (Saponification Test)

Aim : To find out the presence of Fat in the given food samples A and B bysaponification test.

Materials required: Test tubes, Test tube holder Test tube stand, Food samplesA and B, 5% NaOH.

Procedure:

1.Take 1 ml of sample solution A and B in a clean test tube separately.
2.Add 2 ml of 5% NaOH in each test tube and shake well.
3. After noting the changes the results are tabulated.

Observation:

Sample A :Appearance of soapy solution.
Sample B : No change

Table:

Sample	Observation	Inference
A	Appearance of soapy solution	Lipid is presnt
B	No change	Lipid is absent

Result:

Appearance of soapy solution in sample **A**indicate the presence of fat in it.

EX. NO:23 THE BODY MASS INDEX

QUESTION: To calculate the BMI of any one of your classmates by using the BMI formula.

Aim: To calculate the BMI of a person by using BMI formula.

MATERIALS REQUIRED: Weighing machine, Measuring tape.

PROCEDURE:

1.Find out the weight of your classmate by using weighing machine.
2.Find out the height of the same person by using measuring tape.
3.Calculate BMI by using the BMI formula

$$BMI = \frac{\text{Weight (Kg)}}{\text{Height } (m^2)}$$

4.Find out the BMI and record.

TABLE:

S. No.	Persons	Weight (kg)	Height (meter)	Height (meter^2)	BMI = Weight / Height(m^2)
1	S.Kannan	50	1.5	1.5X 1.5 = 2.25	50/2.25=22.2

INFERENCE:The BMI of my classmate SelvanS.Kannan is 22.2 and so he is normal.
(BMI = Below 19 lean, 19 – 25 normal, above 25 obese)

PART – 1 PHYSICAL SCIENCE PRACTICALS

1. Exercise 1 to 7of PART – 1 must be written in the record note and observation note.
2. Exercise 1 to 7 of PART – 1 will be asked in the Government Public Practical Examination.

CHEMISTRY

Ex. no	Experiment
1	You are provided with a solid sample. Prepare a solution and identify the type of solution based on filtration
2.	You are provided with a sample solution. Perform the following tests and identify whether the given sample is an acid or a base
3.	You are provided with samples A&B. Identify if the samples are acids/ bases/neutral by using pH paper

PHYSICS

Ex. no	Experiment
4	Screw Gauge
5	Ohm's Law Verification
6	Mapping of magnetic field
7	Focal length of convex lens

PART – 2PHYSICAL SCIENCE PRACTICALS

1. Exercise 8 to 12 of PART – 2 can be written only in the observation note.
2. Exercise 8 to 12 of PART – 2 will not be asked in the Government Public Practical Examination.

CHEMISTRY

Ex.no	Experiment
8	Prepare a solution from the given salt and identify whether it is an unsaturated solution or saturated solution
9	Identify the basic radical presence in the given salt using sodium hydroxide solution
10	Identify the carboxylic or alcoholic functional group present in the given organic compound by performing the following test 1) Blue litmus paper 2) Sodium carbonate 3) Acidified potassium dichromate

PHYSICS

Ex.no	Experiment
11	Resistors in Series
12	Glass prism

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PART 1 CHEMISTRY

Ex.No.1. You are provided with a solid sample. Prepare a solution and identify the type of solution based on filtration

Aim:(1 Mark)

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

Materials required :

Beaker, water, glass rod, filter papers, test tube, test tube stand, funnel and given solid sample.(sugar, chalk powder)

Note:

True solution - Homogenous and particles do not remain in the filter paper.
Suspension - Heterogeneous and particles remain in the filter paper.

Procedure:(2 Marks)

Experiment	Observation	Inference
Take 50ml of water in a beaker. Add the given solid sample, into the beaker and stir the content gently with the help of glass rod. Filter the solution by using filter Paper.	A) Solute particles do not remain in the filter paper. (OR) b) Solute particles remain in the filter paper.	a) True solution. (OR) b) Suspension.

Result:(2 Marks)

The given solid sample forms _____ Solution (True/Suspension).

Ex. No. 2.You are provided with a sample solution. Perform the following tests and identify whether the given sample is an acid or a base

a) Phenolphthalein b) Methyl orangec) Sodium carbonate d) Zinc granules

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, zinc granules and the given sample.

Note:

S.No	Reactant	Reaction with acid	Reaction with base
1	**Phenolphthalein**	Colourless	Pink
2	**Methyl orange**	Pink	Yellow
3	**Sodium carbonate**	Brisk effervescence Occurs	No Brisk effervescence
4	**Zinc granules**	Bubbles come out.	Bubbles do not come out.

Procedure:

S.No	Experiment	Observation (Colour change)	Inference
1	Phenolphthalein is added in drops to 5ml of test solution	No change in colour	Presence of acid.
2	Methyl orange is added in dropsto 5ml of test solution	Turns pink in colour	Presence of acid.
3	A pinch ofSodium carbonate is added to5ml of test solution	Brisk effervescence occurs	Presence of acid.
4	Little of zinc granules is added to5ml of test solution	Bubbles come out.	Presence of acid.

Result:
The given test solution contains ***Acid***

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(OR)

S.No	Experiment	Observation (Colour change)	Inference
1	Phenolphthalein is added in drops to 5ml of test solution	Turns pink in colour.	Presence of Base
2	Methyl orange is added indrops to5ml of test solution	Turns yellow in colour.	Presence of Base
3	a pinch ofSodium carbonate is added to5ml of test solution	No brisk effervescence Occurs	Presence of Base
4	little of zinc granules is added to5ml of test solution	Bubbles do not come out.	Presence of Base

Result: The given test solution contains ***Base***

***Scoring method (*Aim-1 mark procedure-2mark Result -2mark)**

Ex. No. 3 . You are provided with samples A&B. Identify if the samples are acids/ bases/neutral by using pH paper

Aim:

To identify the nature of the given solution by using pH paper

Materials required:

Sample solutions A&B, pH paper, glass rod and watch glass

Note :

P^H< 7 acidic nature

P^H> 7 Basic nature

P^H = 7 neutral

Procedure:

Experiment	Test Sample	Observation		Inference Nature of solution
		Colour Produced	Approximate P^H	
Add a drop of each sample on the pH paper and observe the colour change.	lemon juice (A)	Red	2	Acid
	Baking soda (B)	Blue	8	Base

Result:

1. The given sample A is**acid**

1. The given sample B is **base**

***Scoring method (*Aim-1 mark procedure-2mark Result -2mark)**

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PART -1 PHYSICS

Ex. No. 4 : Screw Gauge

Aim : To find out the thickness of the given one rupee coin.
Materials required: Screw gauge, One rupee coin.
Formula :(1 Mark)

Least count = ___P_i_tc_h___(mm)
No. Of HSD

Thickness = P.S.R + (H.S.C X L.C) ± Z.C (mm)

Note:

No zero error- the zero of the head scale coincides with the pitch scale axis
Positive Zero Error-the zero of the head scale lies below the pitch scale axis
Negative Zero error -the zero of the head scale lies above the pitch scale axis

Procedure:(1 Mark)

1. Find the least count and the zero error of the screw gauge.
2. Place the given coin firmly between two studs.
3. Note the pitch scale reading (PSR) and the head scale division (HSC).
4. Repeat the experiment for different positions of the coin.
5. Tabulate the readings. The average of the readings gives the thickness of the coin.

Table: 01(1 + 1 = 2 Marks)

Pitch =1mm L.C =0.01mm Z.E =nil Z.C =nil

Trial No.	P.S.R (mm)	H.S.C	H.S.C x L.C (mm)	Thickness of the coin = P.S.R + (H.S.C X L.C) ± Z.C (mm)
1.	1	29	0.29	1+(0.29) = 1.29
2.	1	31	0.31	1+(0.31) = 1.31
			Mean	1.30

Result:(1 Mark)

The thickness of the given coin = **1.30** mm

(**Least count** – 1 mark **Procedure** – 1 mark **Tabulation** – 1+1 mark **Result** +unit – 1 mark)

Additional

Table: 02 (negative zero error)

Pitch =1mm L.C =0.01mm **Z.E = -0.05mm** Z.C = +0.05mm

Trial No.	P.S.R (mm)	H.S.C	H.S.C x L.C (mm)	Thickness of the coin = P.S.R + (H.S.C X L.C) ± Z.C (mm)
1.	1	27	0.27	1+(0.27)+0.05 = 1.32
2.	1	26	0.26	1+(0.26)+0.05 = 1.31
			Mean	1.31

Result:

The thickness of the given coin =**1.31** mm

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Table: 03 (positive zero error)

Pitch =1mm L.C =0.01mm **Z.E = + 0.05mm** Z.C = - 0.05mm

Trial No.	P.S.R (mm)	H.S.C	H.S.C x L.C (mm)	Thickness of the coin = P.S.R + (H.S.C X L.C) ± Z.C (mm)
1.	1	34	0.34	1+(0.34)-0.05 = 1.29
2.	1	36	0.36	1+(0.36)-0.05 = 1.31
			Mean	1.30

Result:

The thickness of the given coin = **1.30** mm

Ex. No. 5 . Ohm's Law Verification

Aim: To determine the resistance of the given wire and to verify the Ohm's law.

Apparatus required:

A resistor of unknown value, an ammeter (0-5 A), a voltmeter (0-10V), a battery eliminator, plug key and connecting wires.

Formula:(½ Mark)

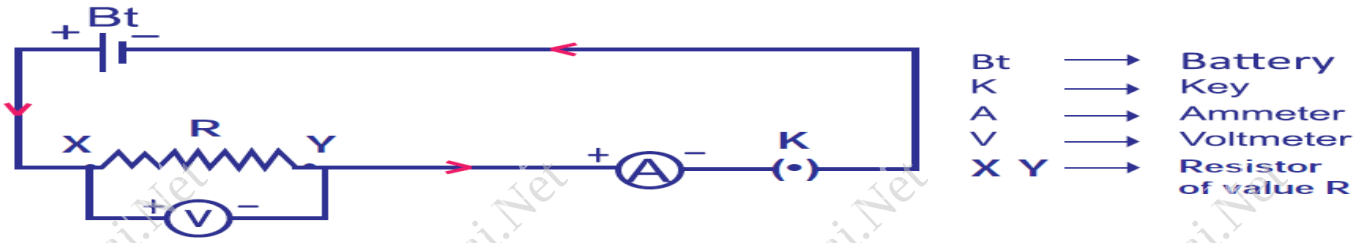
$$\frac{V}{I}$$

Resistance of the wire R = –– ohms

V - Potential difference in volt (V) volt

I - Current in ampere (A) ampere

Circuit diagram : (½ Mark)



Procedure:(1 Mark)

1. Set up the circuit as shown in figure.
2. Note the readings of the ammeter and voltmeter when 2V Voltage is applied in the circuit.
3. Repeat the experiment by varying the rating of the battery eliminator and record them.

Table (1 Mark)

Sl. No.	Voltage applied in the circuit (in volt)	Ammeter reading, I (in ampere)	Voltmeter reading, V (in volt)	Resistance of the resistor R=V/I (in ohm)
1	2	0.3	0.6	2
2	4	0.6	1.2	2
3	6	0.9	1.8	2
4	8	1.3	2.6	2
			Mean	2

Mean value of resistance R of the resistor = __2___ Ω

calculation

1, V = 0.6V; **I** = 0.3A R = V/I Ω = 0.6/0.3 **= 2Ω**

2, **V** = 1.2V; **I** = 0.6A; R = V/I Ω = 1.2/0.6 **= 2Ω**

3. **V** = 1.8V; **I** = 0.9; R = V/I Ω = 1.8/0.9 **= 2Ω**

4, **V**= 2.6V; **I** = 1.3A; R = V/I Ω = 2.6/1.3 **= 2Ω**

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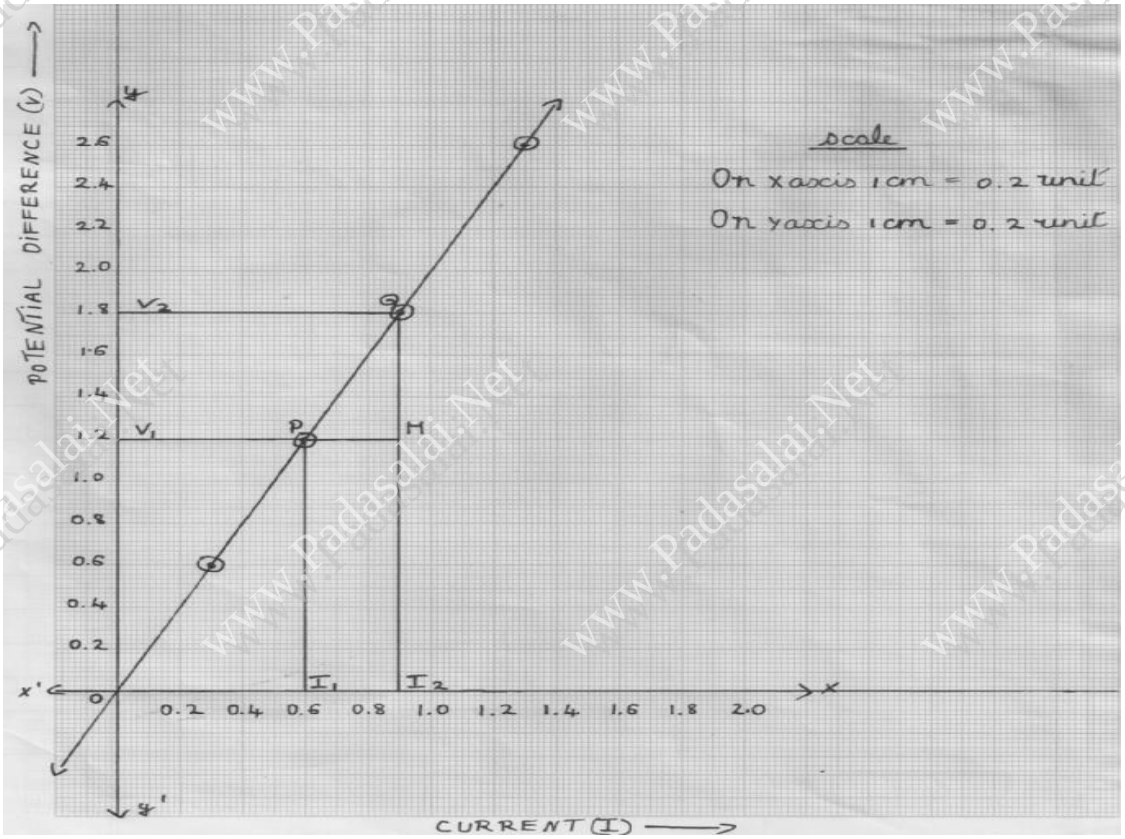
Graph:(1 Mark)

1.Draw the *x* and *y* axes with a suitable scale for I and V values and mark its value on the graph paper.
2, Join all the points and find the slope between two points P and Q on the graph paper which gives the resistance of the resistor used in the circuit.
3. Extend the straight line of the graph backwards to check whether it passes through the origin of the graph.



$$\text{SLOPE} = \frac{QM}{MP} = \frac{V_2 - V_1}{I_2 - I_1}$$

$$\text{Slope} = \frac{1.8 - 1.2}{0.9 - 0.6} = \frac{0.6}{0.3} = 2\ \Omega$$

Result:(1 Mark)

1. Resistance R of the resistor obtained from the calculations =**2 ohm.**
2. Resistance R of the resistor obtained from the graph = **2 ohm.**
3. The graph between V and I is a straight line and passes through the origin. This verifies the Ohm's law.

(**Formula** – 1/2 mark **Circuit Diagram** – 1/2 mark **Procedure** – 1 mark **Tabulation** – 1 mark **Graph** – 1 mark **Result** + unit – 1 mark)

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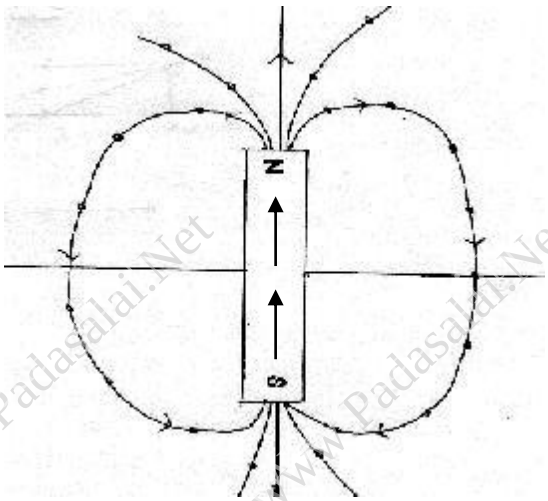
Ex. No. 06 Mapping of magnetic field

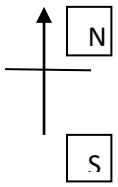
Aim:

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

Apparatus required:

Compass Needle, sheets of white paper and Bar magnet.





Procedure:

1. A bar magnet is placed on the magnetic meridian such that its north pole points towards geographic north.
2. Mark the positions of two ends of the needle as you move the compass needle from North Pole to South Pole.
3. The dots are joined as a smooth curve
4. Repeat the above procedure and draw as many lines as you can

5 Drawn curved lines represent the direction and the magnetic field of the magnet

Result:

The magnetic lines of force are mapped when the bar magnet is placed with itsNorth Pole facing geographic north.
The mapped sheet is attached

Magnetic meridian – 1 mark Procedure – 1 mark Tabulation – 1+ 1 mark Result + unit – 1 mark

07.Focal length of convex lens

Aim:

To determine the focal length of the given convex lens by

I. **distance object method** II.**u-v method**

Materials required :

Convex lens, lens stand, white screen, meter scale, and illuminated wire gauze.

Formula : (1 mark)

Focal length of the convex lens by u-v method

f=UV/U+V cm

u - is the distance between the lens and the object cm

v - is the distance between the lens and the image. cm

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Procedure: (1 mark)

Distant object method:

1.The convex lens is mounted on the stand and is kept facing a distant object

2.The position of the white screen and the convex lens isadjusted to get a clear, diminished and inverted image of the object

3. The distance between the convex lens and the screen is measured which gives the focal length of theconvex lens (f).

u v method:

1. Convex lens mounted on a stand is placed in front of the illuminated wire gauze at a certain distance.

2 .Four values of 'u' are chosen such that the two values of 'u' less than 2f and the other two values of 'u' greater than 2f.

3. The screen is adjusted to get a clear image.

4. The distance between the lens and the screen is taken as 'v' and it is measured for each experimental value of 'u'

5. Tabulate the readings. The average of the readings gives focal length of the convex lens by u-v method

Table : (1 mark)

TrialNo.	Nature of image	Object distance 'u' cm	Image distance 'v'cm	Focal length f=UV/U+V cm
1	u <2f(magnified)	30	60	**20**
2	u <2f(magnified)	35	46	**20**
3	u > 2f(diminished	45	36	**20**
4	u > 2fdiminished	50	33	**20**
			Mean	**20**

Result: (1 mark)

The focal length of the given convex lens by

i. Distance object method (f) = **20 cm**

ii.U-V Method (f) = **20 cm**

CALCULATION:

1.**u**=30 cm; **v**=60 cm; 2. **U** = 35 cm; v = 46 cm 3.**u** = 45 cm; v = 36 cm; 4.**u**=50cm; **v**=33cm;

f= UV/U+V cmf= UV/U+V cmf= UV/U+V cmf= UV/U+V cm

= 30*60/30+60= 35*46/35+46 = 45*36/45+36 = 50*33/50+33

= 1800/90 = 1610/81 = 1620/81 = 1650/83

= **20 cm** = **19.8 cm** = **20 cm** = **19.8 cm**

(**Formula** – 1 mark **Procedure** – 1 mark **Tabulation** – 1+1mark**Result + unit** – 1 mark)

PART 2 CHEMISTRY

Ex.No.8. Prepare a solution from the given salt and identify whether it is an unsaturated solution or saturated solution

Aim: (1 Mark)

To prepare a solution from the given salt and identify whether it is an unsaturated solution or saturated solution.

Materials required :Beaker, 50 ml of water, a glass rod and NaCl salt.

Preparation of saturated and an unsaturated solution:

5g or 10g or 20g of NaCl in 100 ml water forms unsaturated solution.
36g of NaClin 100 ml of water at room temperature forms saturated solution

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Note:

Unsaturated solution- A solution in which the solute is in lesser amount in comparison with the solvent

Saturated solution- A solution in which no more solute can be dissolved in a at a definite amount of solvent given temperature

Procedure: (2 Marks)

Experiment	Observation	Inference
1. Take 100ml of water in a beaker. Add 20g of NaCl into the beaker and stir well 2. Take 100ml of water in a beaker. Add 36g of NaCl into the beaker and stir well	a) No more salt particles remain in the beaker. b) Less amounts of salt remains in the beaker.	a) The solution is Unsaturated.. b) The solution is saturated solution

Result:(2 Marks)

The given salt forms _____ solution (Unsaturated/ saturated).

Ex. No.9. Identify the basic radical presence in the given salt using sodium hydroxide solution

Aim :

To identify the basic radical present in the given salt by the action of sodium hydroxide solution.

Materials required:

Test tube, test tube stand, sodium hydroxide solution distilled water and given salt(copper sulphate, Iron sulphate, aluminum chloride).

NOTE:

Basic radical is the cation or positive ion from the "parent" base/alkali (most often a metal ion)

Theory:

Most of the metals generally form precipitate of respective metal hydroxide with sodium hydroxide solution

1. $CuSO_{4(aq)}$ + 2 $NaOH_{(aq)}$ -----→ $Cu(OH)_{2(s)}$ + Na_2SO_4.
coppersulphate Bluish white precipitate

2. $FeSO_{4(aq)}$ + 2 $NaOH_{(aq)}$ -----→ $Fe(OH)_{2(s)}$ + Na_2So_4
Iron sulphateDirty green precipitate

3. $AlCl_{3(aq)}$ + 3 $NaOH_{(aq)}$ -----→ $Al(OH)_{3\ (s)}$ + 3 NaCl
Aluminum chloride White precipita

Procedure:

Dissolve few grams of the given salt in 10 ml of distilled water. This solution is called salt solution

Experiment	Observation	Inference
Sodium hydroxide test To the salt solution add sodium hydroxide solution in drop by drop	a) Bluish white precipitate formed (OR) b) Dirty green precipitate formed (OR) c) White precipitate formed	a) Presence of cupric ion(Cu+2) (OR) b) Presence of ferrous ion (Fe+2) (OR) c) Presence of Aluminum ion (Al+3).

Result: The given salt contain ____basic radical.(cupric ion/ ferrous ion/ Aluminum ion)

***Scoring method (*Aim-1 mark procedure-2mark Result -2mark)**

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Ex. No. 10 Identify the carboxylic or alcoholic functional group present in the given organic compound by performing the following test

1) Blue litmus paper 2) Sodium carbonate 3) Acidified potassium dichromate

Aim : (1 Mark)

To identify the carboxylic or alcoholic functional group present in the given organic compound

Materials required: Test tubes, blue litmus paper, glass rod sodium carbonate salt phenolphthalein solution, acidified potassium dichromate solution and the given organic compound(ethanol, Acetic acid).

Note:

S.No	Reactant	Reaction with ethanol (alcohol)	Reaction with Acetic acid (carboxylic acid)
1	Blue litmus paper	No change.	Blue litmus paper turns into red.
2	Sodium carbonate salt	No brisk effervescence.	Brisk effervescence
3	acidified potassium dichromate solution	The red orange solution turns green	No change in colour .

Procedure: (2 Marks)

S.No	Experiment	Observation	Inference
1	Dip blue litmus paper into the given compound	No change.	Presence of Alcoholic group
2	Add a pinch of sodiumcarbonate to given compound	No brisk effervescence.	Presence of Alcoholic group
3	Add acidified K2Cr2O 7 solution in drops to given compound	The red orange solution turns green	Presence of Alcoholic group

Result:**(2 Marks)** The given organic compound contain **Alcohol** functional group

(OR)

Procedure: (2 Marks)

S.No	Experiment	Observation	Inference
1	Dip blue litmus paper into the given compound	Blue litmus paper turns into red.	Presence of Carboxylic group
2	Add a pinch of sodiumcarbonate to given compound	Brisk effervescences	Presence of Carboxylic group
3	Add acidified K2Cr2O 7 solution in drops to given compound	No change in color	Presence of Carboxylic group

Result: **(2 Marks)**

The given organic compound contain **carboxylic** functional group

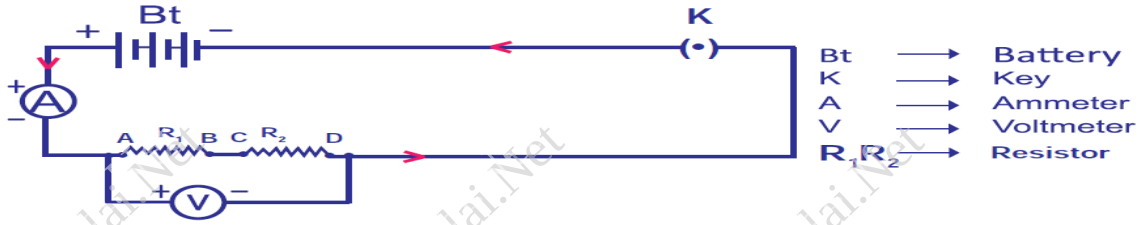
Ex. No. 6 .Resistors in Series

Aim:
To determine the equivalent resistance of two resistors connected in series.

Materials required:
Two resistors of 1 Ω and 2 Ω, an ammeter (range 0-5 A), a voltmeter (range 0-5 V), a battery eliminator, rheostat, plug key and connecting wires.

Formula: (½ mark)
Effective Resistance of the Resistors connected in series Rs = R1 + R2 Ω
//The one who is lazy becomes poor, but the one who works DILIGENTLY becomes wealthy. //

Circuit diagram (½ Mark)



Procedure: (1 Mark)
1. The given 2 resistors are connected in series as shown in the circuit diagram
2. Do the experiment for three different values of current through the circuit by adjusting rheostat.
3. Record the readings of the ammeter and voltmeter in each case
4. Tabulate the readings. The average of the readings gives the equivalent resistance of two resistors

Table (1 + 1 = 2 Marks)

S.No	Current through the Series Combination, Is (in ampere)	Potential difference across the series, Vs (in volt)	Equivalent Resistance of the combination Rs=Vs/Is(in ohm)	Experimental Average value of Rs (in ohm)	Theoretical Average value of Rs=R1+ R2 (in ohm)
1	0.2	0.6	3	3	Rs=1+2 = 3
2	0.3	0.9	3		
3	0.4	1.2	3		

R1 =_ 1Ω and R2 = 2Ω

Calculation

1, V = 0.6V; **I** = 0.2A
R = V/I Ω
= 0.6/0.2
= 3Ω

2, **V** = 0.9V; **I** = 0.3A;
R = V/I Ω
= 0.9/0.3
= 3Ω

3. **V** = 1.2V; **I** = 0.4;
R = V/I Ω
= 1.2/0.4
= 3Ω

Result: (1 Mark)
The equivalent resistance of the series combination of the two given resistors is found to be the same in the experimental and theoretical value.

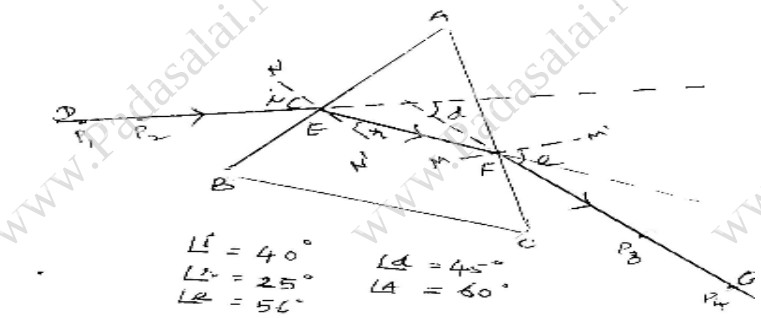
Ex. No.12 Glass prism

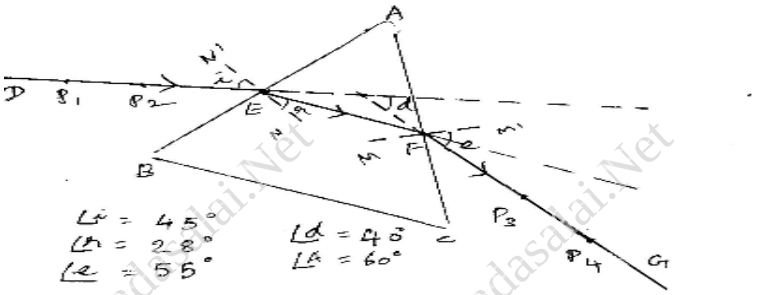
Aim: To trace the path of a ray of light through a glass prism and toidentify the rays and measure the different angles.

Materials required:

A glass prism, drawing board, white paper, adhesive tape or drawing pins,pins, a measuring scale, and a protractor.

i)





Procedure :

1. Place a prism on a white sheet of paper and trace its boundary as ABC.
2. Draw the normal and also draw a line DE making any angle, preferably between 30º and 60º.
3. Fix two pins on one side P_1 and P_2(say PQ) on line DE.
4. Looking to other side fix two more pins p_3 and p_4 (say RS) in such a way that all the four pins appear to be in a same line.
5. Remove the pins and mark their positions.
6. Join PQ and RS. Extend them to meet the faces of prism at E and F respectively. Also join E and F.
7. DE represents the incident ray, EF represents the refracted ray and FG represents the emergent ray.
8. An angle at H is formed from extended incident ray and extended emergent ray. This is called angle of deviation.
9. Draw another normal line to the refracting surface AC of the prism at point F.
10. Measure the angle of incidence, the angle of refraction and the angle of emergent and record the same.

Sl.no	Angle of incidence (i)	Angle of refraction (r)	Angle of emergence (e)	Angle of Deviation (d)
1	40	25	56	45
2	45	28	55	40

Result:

1. The path of light incident on one face of a glass prism is shown.
2. The different rays and angles are identified as below

Incident ray ----PQ---- angle of incidence __∟i___ angle of the prism ∟A
Refracted ray ___EF___ angle of emergence __∟e____
Emergent ray __FG____ angle of deviation __∟d____

3. **The angle of incident ray---- 5. The angle of deviation-----**

Diagram – 1 mark Procedure – 1 mark Tabulation – 1+ 1 mark Result + unit – 1 mark

--------- ALL THE BEST ----------

//The one who is lazy becomes poor, but the one who works DILIGENTLY becomes wealthy. //