

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

SSLC

BIOLOGY PRACTICAL MANUAL – 2014



**PREPARED BY
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CONTENT**BIO-BOTANY****I.FRUIT**

Classify the given fruit and give reasons with diagram

EX. NO.1	Berry -Tomato	
EX. NO.2	Aggregate - Polyalthia	
EX. NO.3	Multiple - Jackfruit	
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Dissect and display the floral parts like Calyx, Corolla, Androecium and Gynoecium of any locally available flower.		
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EX. NO.5	Datura metal	
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Identify the given slide and write notes with neat labeled diagram		
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Identify the flag labeled endocrine gland and write the location, hormones secreted and their functions.		
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Identify the given slide and write notes with neat labeled diagram		
EX. NO.17	Red Blood Corpuscles - (Erythrocytes)	
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Experiment to be demonstrated by the teacher.	Ex. No. 20	Classification of seed – Monocot / Dicot
	Ex. No. 21	Test Tube and Funnel Experiment
	Ex. No. 22	Test For Lipids (Saponification Test)
	Ex. No. 23	The Body Mass Index (BMI)

- Note :**
- Exercise 1 to 19 must be written in the record note and observation note.
 - Exercise 1 to 19 will be asked in the Government Public Practical Examination.
 - Exercise 20 to 23 can be written only in the observation note.
 - 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.

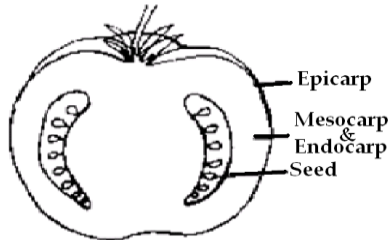
Identification : The given fruit is identified as **L.S. of Tomato.**

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

Reasons : (2 Marks)

- 1.Fruit is developed from the single flower, multicarpellary, 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.

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.**

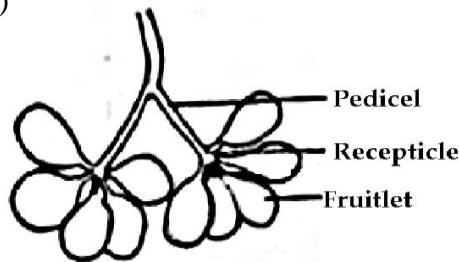
Classification : Aggregate fruit – (e.g.) Polyalthia (1 Mark)

Reasons: (2 Marks)

- 1.Polyalthia develops from the single flower with multicarpellary apocarpous 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 : 3

Jackfruit

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 **Jackfruit**

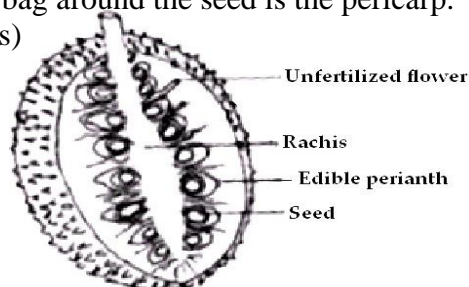
Classification : Multiple fruit - (e.g.) Jack fruit (1 Mark)

Reasons : (2 Marks)

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

Diagram : (2 Marks)

L.S. of Jack fruit



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II. FLOWER

Exercise No : 4

Question : 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

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

Flower taken for dissection : Hibiscus rosasinensis

Procedure :

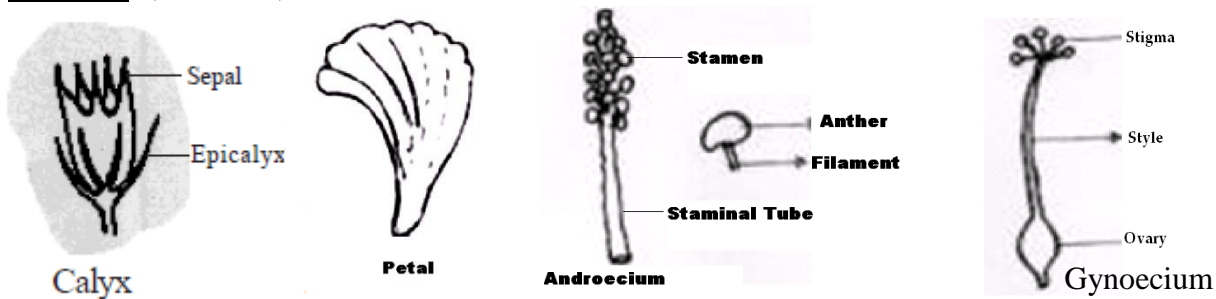
1. Calyx, Corolla, Androecium and Gynoecium of the flower of **Hibiscus rosasinensis** are separated and pasted on a white paper.

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)



Exercise No : 5

Question : 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

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

Flower taken for dissection : Datura metal

Procedure :

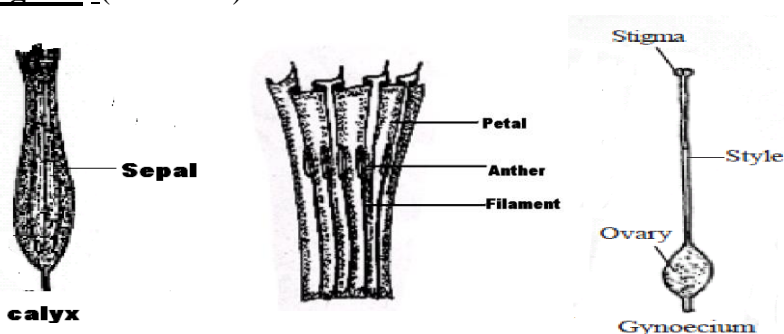
1. Calyx, Corolla, Androecium and Gynoecium of the flower of **Datura metal** are separated and pasted on a white paper.

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)



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Exercise No : 6

Question : 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

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

Flower taken for dissection : *Clitoria ternatea* (Sangupoo)

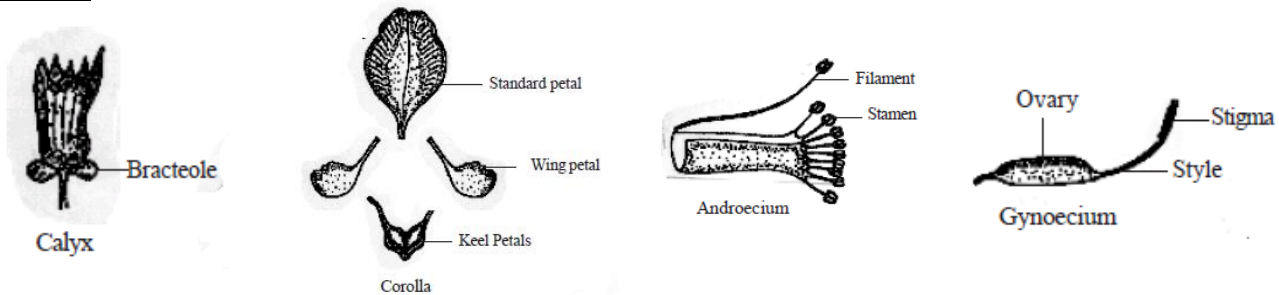
Procedure :

1. Calyx, Corolla, Androecium and Gynoecium of the flower of *Clitoria ternatea* 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.

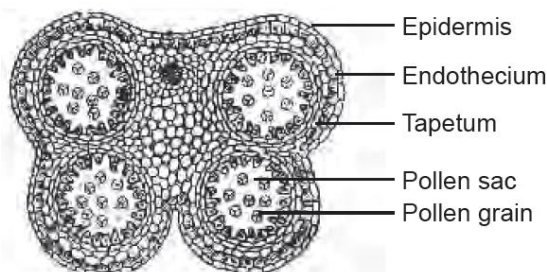
Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

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

Diagram : (2 Marks)



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Exercise No : 8

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

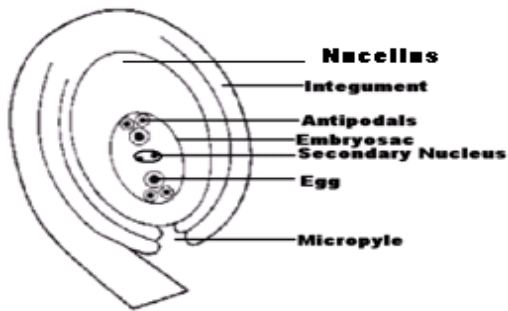
Aim: To identify the given slide with help of microscope and to write the reasons with labeled diagram.

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 coats called integuments.
2. The integuments leave a small opening at the apex of the ovule called micropyle.
3. The embryosac is found inside the nucellus.
4. Embryosac contains Eight nuclei.

Diagram : (2 Marks)



IV. PHYSIOLOGICAL EXPERIMENT

Exercise No : 9 Fermentation 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 Lime water.

Procedure: (1 Mark)

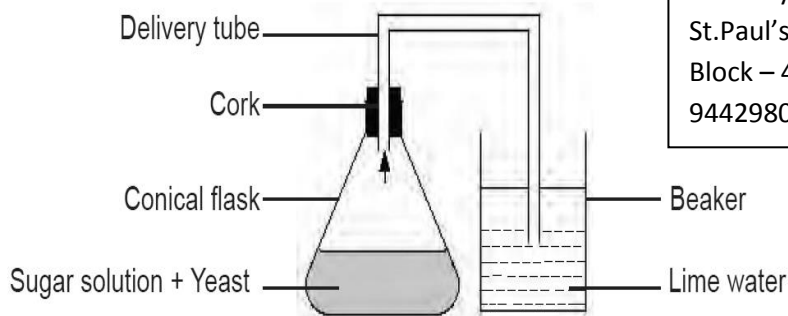
1. Take sugar solution with small quantity of baker's yeast in a (2/3) conical flask.
2. Close the mouth of the conical flask with one holed rubber cork and insert a delivery tube in the cork.
3. Immerse the other end of the delivery tube in a beaker containing lime water.
4. Keep the apparatus in sunlight 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, CO₂ is released and ethanol is formed.
2. The CO₂ turns the lime water milky and the smell is due to the formation of ethanol.
3. Hence the process of fermentation is proved.



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BIO – ZOOLOGY

V. MODEL - HUMAN ORGANS

Exercise No : 10 L.S.of Human Heart

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

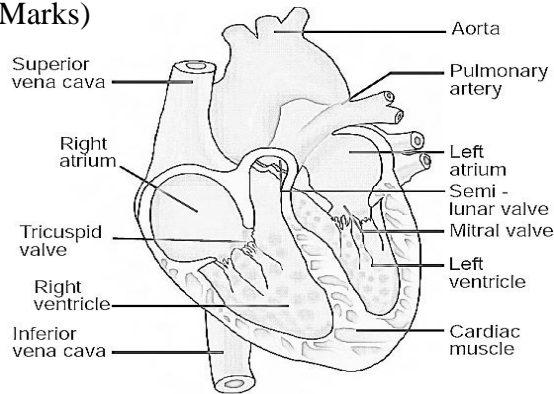
Aim : To identify the given model and to write the notes with labeled diagram.

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 : 11 L.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.

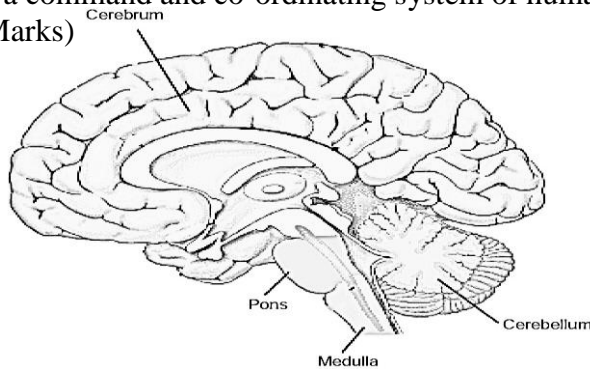
Identification: (1 Mark)

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, midbrain and 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)



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Exercise No : 12 L.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.

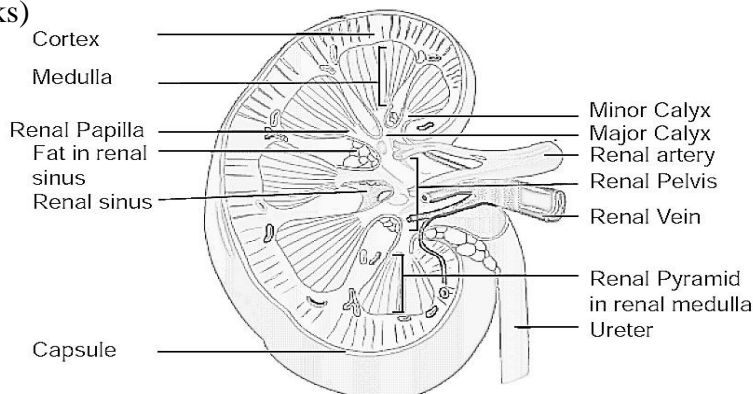
Identification: (1 Mark)

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

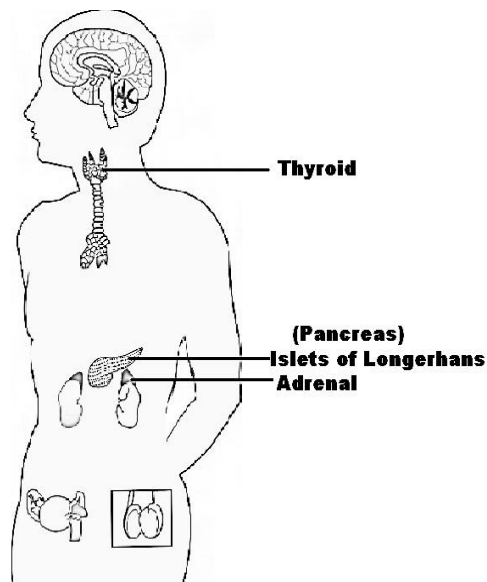
Notes: (2 Marks)

- 1.Kidney is the principal excretory organ of our body.
- 2.Kidney is bean shaped paired structure and located in the upper abdominal region.
- 3.A thin 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.

Diagram : (2 Marks)



VI. ENDOCRINE GLANDS – MODEL



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Exercise No : 13 **Thyroid 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 on either 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 and cretinism.
6. Excessive secretion causes Grave's diseases.

Exercise No : 14 **Pancreas – 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 the Pancreas.

Location: (1 Mark) Islets of Longerhans are seen embedded in Pancreas which is located 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 deposit 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 : 15**Adrenal 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 stress and emergency conditions.
4. Adrenalin and Nor Adrenalin hormones are called Emergency hormones and they increase the heart beat rate and respiratory rate.

VII. EXPERIMENT**Exercise No : 16****Test 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 the colour 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 colour appears	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.

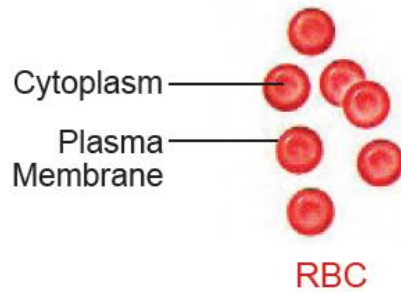
Identification: (1 Mark)

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 called haemoglobin.
4. RBCs are concerned with carriage of oxygen.
5. Decrease in RBCs causes Anaemia, Increase in number causes Polycythemia.

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.

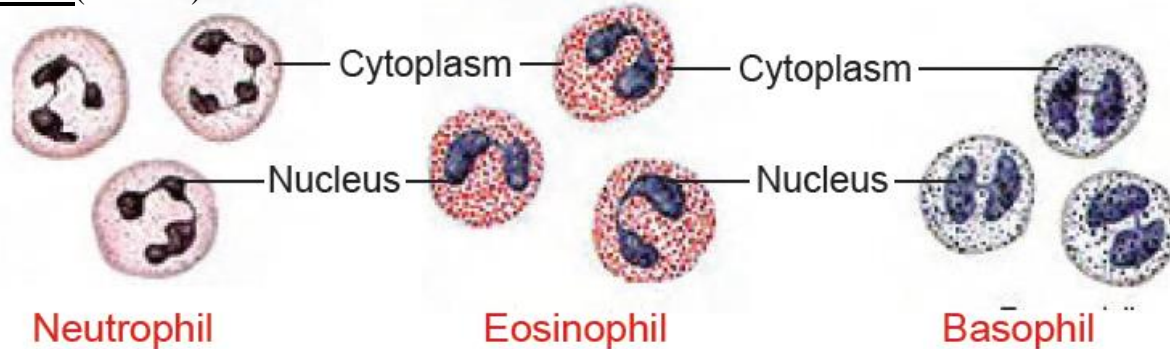
Identification: (1 Mark)

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 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.

Diagram : (2 Marks)



Exercise No : 19

Plasmodium

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.

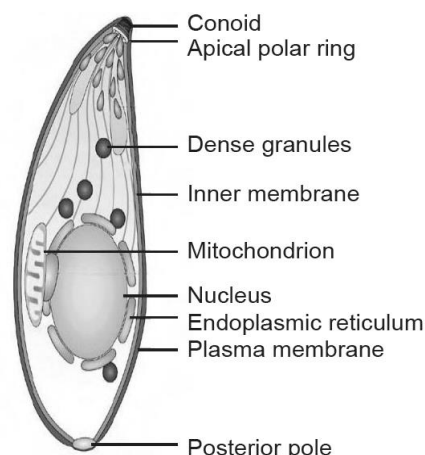
Identification: (1 Mark)

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 female Anopheles mosquito.
5. The infective stage of Plasmodium is Sporozoite.

Diagram : (2 Marks)



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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 coat of 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.

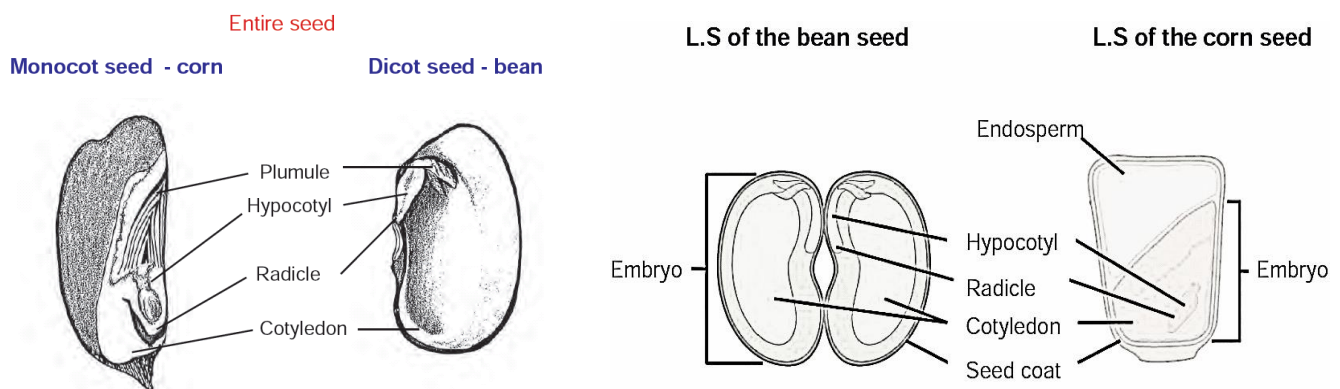
Observation :

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.

Monocot seed : 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.

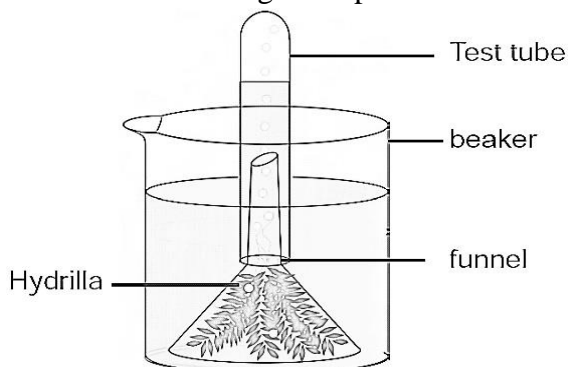
Materials required: Test tube, funnel, beaker, pond water and Hydrilla plant.

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 test tube.



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Inference:

During Photosynthesis Oxygen is evolved as a byproduct. 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 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 by saponification test.**Materials required**:Test tubes, Test tube holder Test tube stand, Food samples A 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 present
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

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

- 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 Selvan S.Kannan is 22.2 and so he is normal.
(BMI = Below 19 lean, 19 – 25 normal, above 25 obese)

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