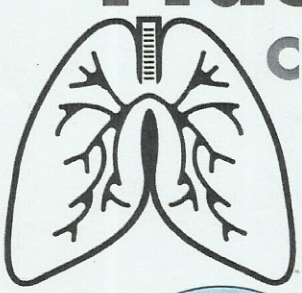
BANGLADESH SCHOOL & COLLEGE, SAHAM

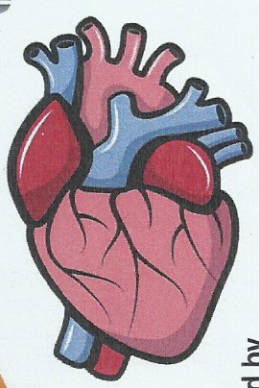
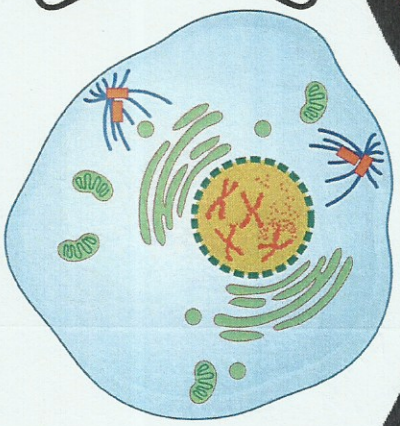
Sultanate of Oman

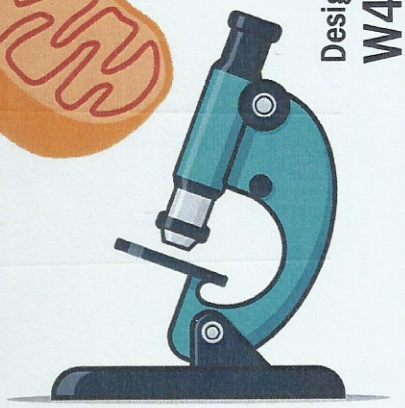
Biology 1st Paper

Practical Notebook

Class: Eleven - Twelve



Designed by W4H1D

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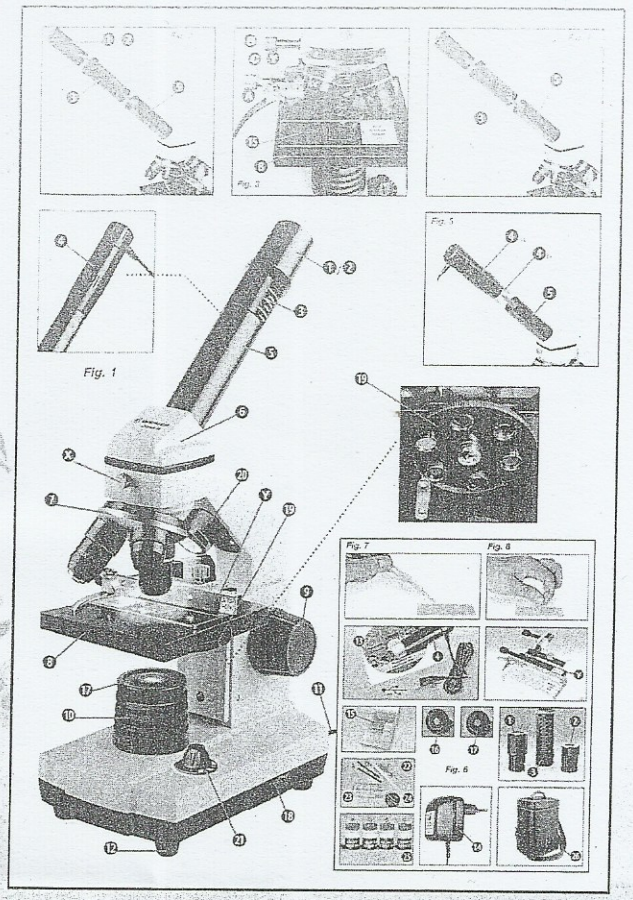


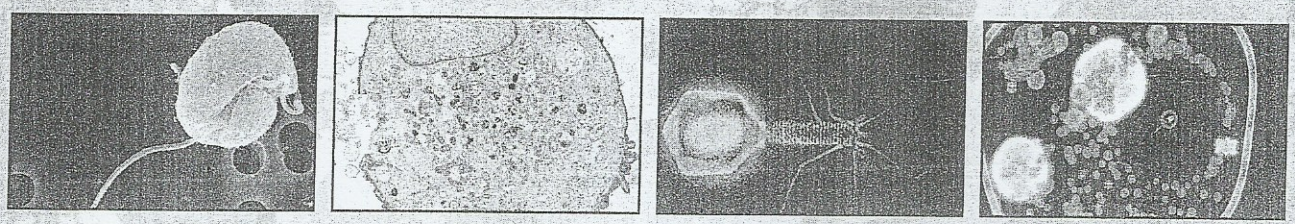
BIOLOGY

ALL PARTS OF THE MICROSCOPE:

1. 5x WF Eyepiece
2. 16x WF Eyepiece
3. Barlow lens
4. PC-Ocular
5. Eyepiece holder
6. Microscope head
7. Objective revolver
8. Microscope stage
9. Focus wheel
10. LED lighting (Transmitted Light)
11. Electricity supply
12. Microscope base
13. Photomiser SE Software
14. Wall connector
15. 10 slides, 10 covering glasses
16. Matted lens
17. Condenser lens
18. Dimmer
19. Colour filter disc
20. LED lighting (Direct light)
21. Direct/Transmitted light switch
22. a) Microscopy instruments
    b) Pipette
    c) Pincers
23. Prawn breeding plant
24. MicroCut
25. Carrying case

X. Locking screw

Y. Mechanical plate



1st Paper

Name : Najmul Huda

School/College: Bangladesh School & College, Saham

Class : XII Roll : 2000

Section : Science Year : 2020-2021

Registration No. :

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This is to certify that Mr./Miss _____

a Student of _____ Class Roll No. _____ has performed the required

Number of Experiments in BIOLOGY Laboratory of _____

School/College/University as per Syllabus during the session _____

_____

Head of the Department

NAME OF THE EXPERIMENT

Page No. 01

Observation of different stages of Mitosis Cell division (from permanent slides)

Exp. No. 01

Date 19-02-2022

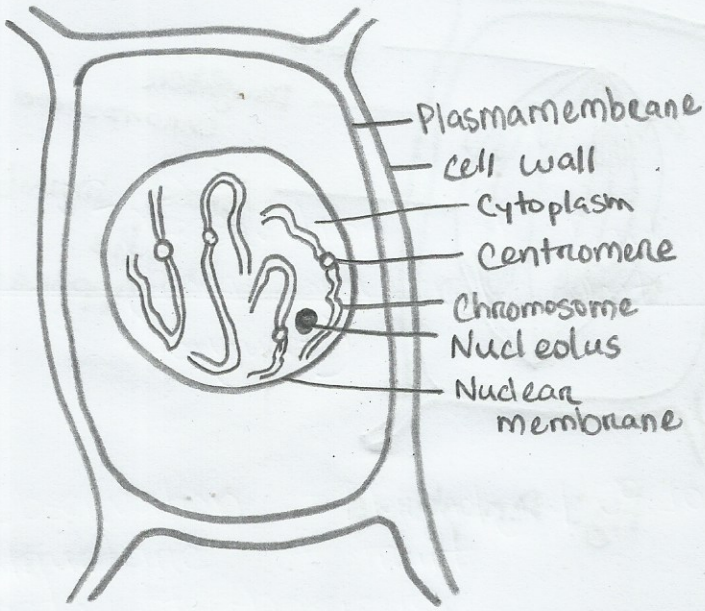

Fig: Prophase

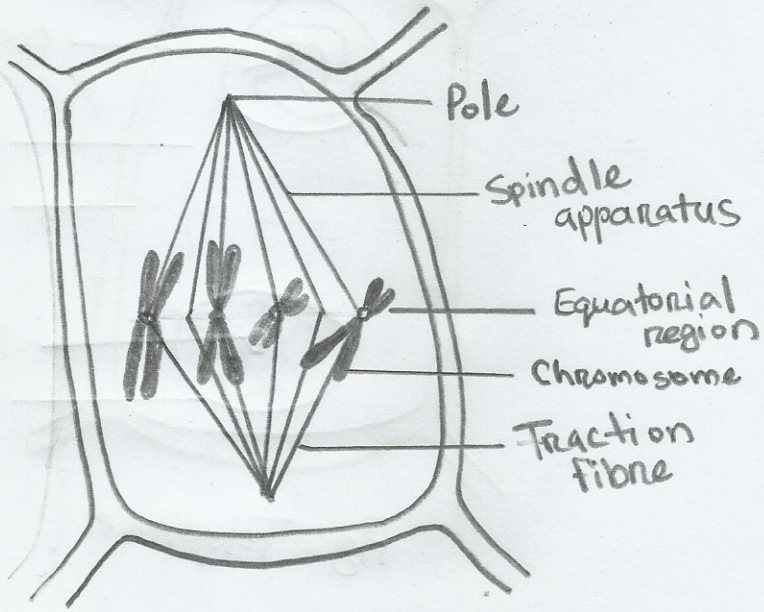

Fig: Metaphase

NAME OF THE EXPERIMENT

Page No.

Exp. No.

Date

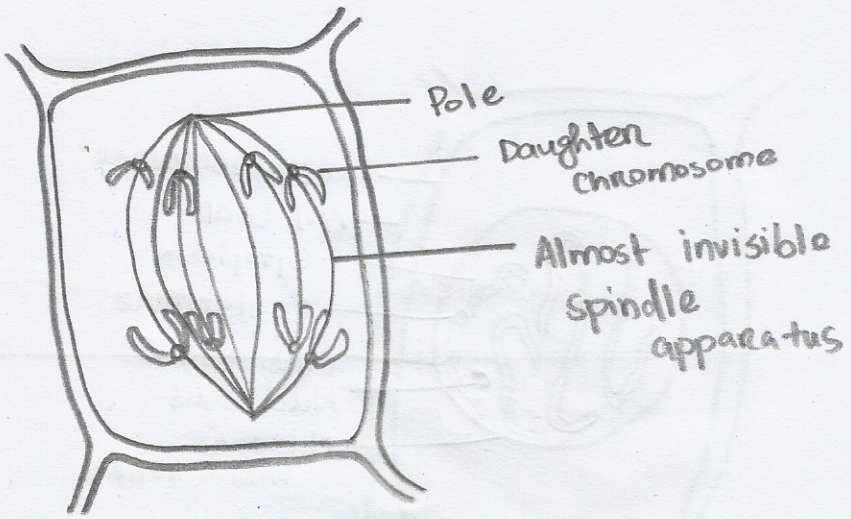

Fig: Anaphase

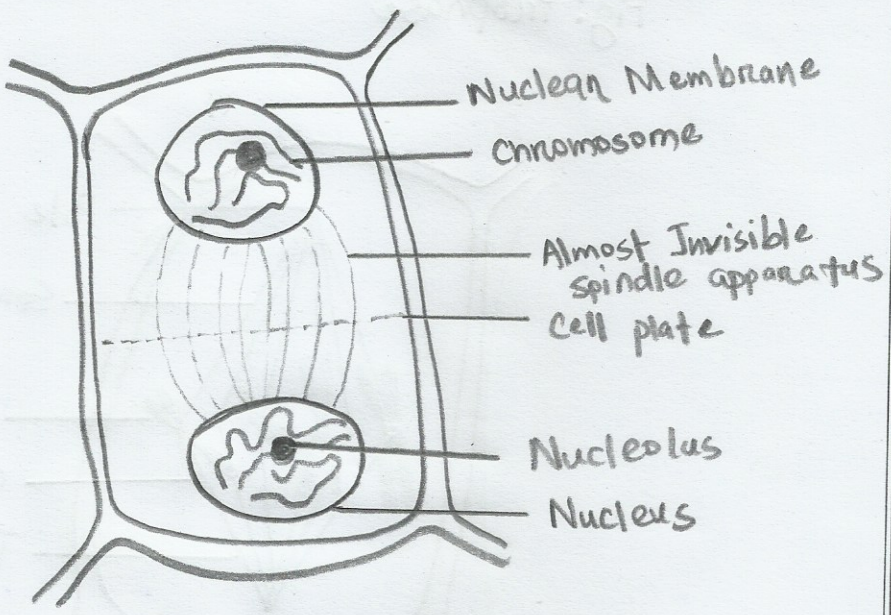

Fig: Telophase

Name of the Experiment : Observation of different stages of Mitosis Cell Division (from permanent slides)

Page No.: 02
Exp. No.: 01
Date: 19-02-2022

Required Materials:

Slides, microscope etc.

[1] Observation of Prophase of Mitosis (During which the chromosomes appear, shorten and thicken):-

Diagnostic features/ Identifying characteristics of Prophase are:-

i) Nucleus is distinct and swollen
ii) Chromosomes are distinct, thin and elongated.
iii) Chromosomes are deeply stained.
iv) Nuclear membrane and nucleolus are present.

Identification:-

Due to presence of the above characteristics, the specimen (permanent slide) supplied is the prophase of Mitosis.

[2] Observation of Metaphase of Mitosis (During which the nuclear membrane dissolves and a spindle forms to the center of which the chromosomes attach themselves):-

Diagnostic features/ Identifying characteristics of Metaphase are:-

i) Nuclear membrane and nucleolus are absent.
ii) The chromosomes are arranged on the equatorial plane.

Name of the Experiment : .....

.....

Page No.:

Exp. No.:

Date:

iii) The chromosomes are short and thickened.
iv) Each chromosome contains two chromatids which remain attached at the centromere.
v) Spindle system is present and two traction fibers from opposite poles are attached to the centromere of each chromosome.

Identification:

Due to the presence of the above characteristics, the stage supplied (or shown under microscope) is the Metaphase of Mitosis.

[3] Observation of the Anaphase of Mitosis (During which duplicates of the chromosomes seperate and migrate characteristics to the ends of the spindle):

Diagnostic features / Identifying Characteristics of Anaphase are:

i) Nuclear membrane and nucleolus are absent.
ii) Two sets of daughter chromosomes moving towards the opposite poles.
iii) The chromatids are V, L, J and I shaped.
iv) Each chromosome has single chromatid.
v) The centromere is advanced towards the pole and chromatids are preceding.

Name of the Experiment: Observation of different stages of Mitosis Cell Division (from permanent slides)

Page No.: 03
Exp. No.: 01
Date: 21-02-2022

Identification:

Due to presence of above characteristics, the stage supplied (or shown under microscope) is the Anaphase of Mitosis.

[4] Observation of the Telophase of Mitosis (During which two nuclear membranes from each enclosing one set of chromosomes. The cytoplasm also divides in this stage, so that two new diploid cells are formed, each containing a set of chromosomes identical to that of the parent cell):

Diagnostic features / Identifying characteristics of Telophase are:-

i) The daughter nuclei are present at the two opposite poles.
ii) The chromosomes are thin, elongate and coiled forming nuclear reticulumn.
iii) Nucleolus and nuclear membrane are present.

Identification:

- The above characteristics indicate that the stage shown (on the slide) is the Telophase of Mitosis.

Name of the Experiment : .....

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Page No.:

Exp. No.:

Date:

Precautions:

1) Microscope should be very powerful.
2) Microscope should be focused perfectly.

NAME OF THE EXPERIMENT

Observation of Bacteria (from sour curd/white yougurt).

Page No. 04

Exp. No. 02

Date 21-02-2022

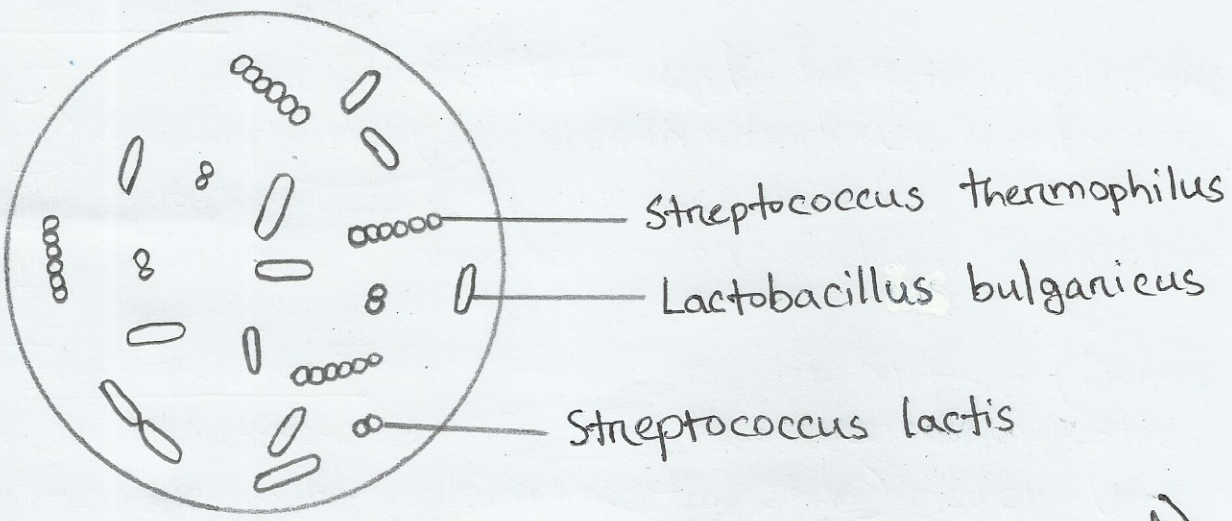

Fig: Observation of Bacteria (from sour curd).

Name of the Experiment : Observation of Bacteria (from sour curd / white yogurt)

Page No.: 05
Exp. No.: 02
Date: 21-02-2022

Required Materials and Chemicals:

Sample sour curd, test tube, glass slide, cover glass, transfer loop, marker pen, water, blotting paper, spirit lamp, 1% crystal violet or safranin solution, microscope etc.

Procedure:

To observe the bacteria, a suspension of curd is to be made:

1) Preparation of curd suspension: 50 ml of sour curd and same amount of distilled water has to be taken in a 250 ml conical flask. Then it should be shaken to mix properly. Let it stand still for 20 minutes. The heavy part of the curd will be deposited at the bottom of the flask and at the top there will be the separated clear liquid. This clear liquid part is the bacterial suspension. The suspension should be separated in a different sterile test tube by a sterile dropper.

2) Preparation of slide by Cover Slip: A small drop of the sour curd bacterial suspension is taken on a new and clean glass slide, new and clean cover slip is slowly placed with the help of a forceps over the drop. It

Name of the Experiment : .....

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Page No.:

Exp. No.:

Date:

should be done carefully so that there is no air bubble between the slide and cover slip.

3) Staining the Bacterial Cells: To make the bacterial cells visible, it requires staining. There are several staining methods, we shall use very simple staining method in which one percent crystal violet or safranin is used. Now we add few drops of the stain on the heat fixed bacterial cells and wait for 4-5 minutes. After this the slides are wished with clean running water very lightly. By this process, extra strains will be removed. The slides are soaked with bloating paper to remove extra water and then air dried and covered with cover slips.

4) Now the slide and cover slip to be put on the stage of the microscope for observation.

Observation:

The slides are observed under microscope focusing at the center of the marked circle. First we use low power objective and then by high power objective (600x and 1000x) respectively. Before using the high power immersion oil is to be added between the

Name of the Experiment : Observation of Bacteria (from sour curd / white yougurt)

Page No.: 06

Exp. No.: 02

Date: 28-02-2022

objective and the slide. We shall observe violet colored small rod or round shaped cells scattered here and there on the slide either single or in group.

Identification:

Round shaped bacteria ⟶ Streptococcus thermophilus

Rod shaped bacteria ⟶ Lactobacillus bulgaricus

Precautions:

1) Before using a cover slip, care should be taken so that air bubble enters into the covered area.

2) Fresh and dry slide should be used - no trace of oil or water should be there.

3) The suspension of curd should be very clean.

4) Microscope should be adjusted very carefully.

5) Care should be taken so that the lens of the objective does not touch the cover slip.

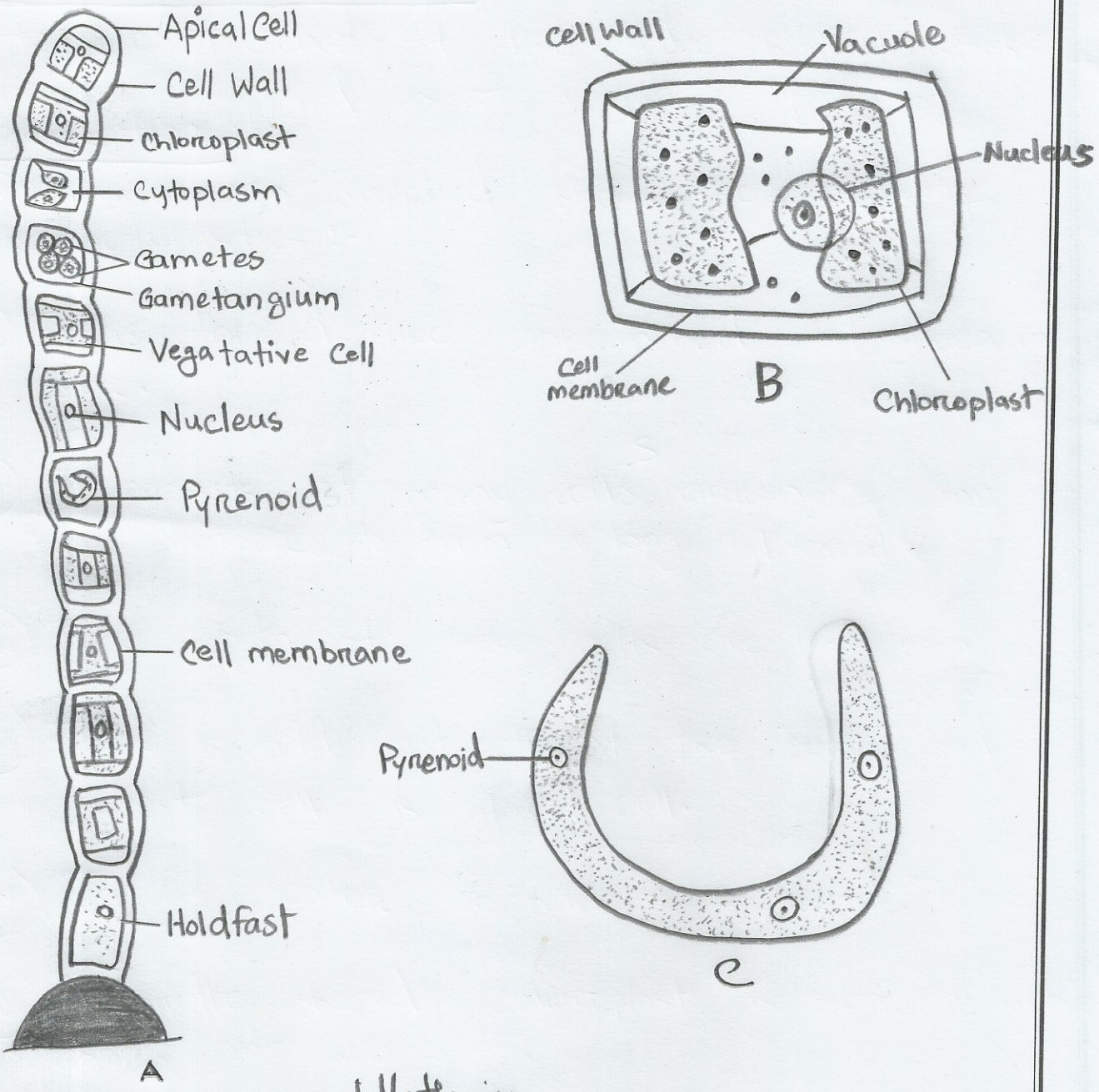
NAME OF THE EXPERIMENT

Observation of permanent slide of Ulothrix.

Page No. 07

Exp. No. 03

Date 28-02-2022



Ulothrix

Fig: Observation of permanent slide of Ulothrix.

Name of the Experiment : Observation of permanent slide of Ulothrix.

Page No.: 08

Exp. No.: 03

Date: 28-02-2022

Required Materials:

A permanent slide, compound microscope etc.

Observation:

The specimen supplied shows the following characteristics :-

i) It is thread like unbranched and green in color.

ii) It consists of many cells arranging one after another to form a long filament.

iii) The length of these cells are less than width.

iv) There is hold fast cell at the bottom and uppermost cell is apical cell.

v) In the center, a nucleus is found.

vi) A girdle shaped chloroplast is seen in which pyrenoids are also seen.

vii) The basal cell of the filament is colorless, slender, elongated and called hold fast.

Name of the Experiment : .....

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Page No.:

Exp. No.:

Date:

Identification:

Due to the presence of the above characteristics the specimen supplied is of a green algae of the genus Ulothrix.

NAME OF THE EXPERIMENT

Oberservation of Morphological structure of fruit body of Agaricus.

Page No. 09

Exp. No. 04

Date 01-03-2022

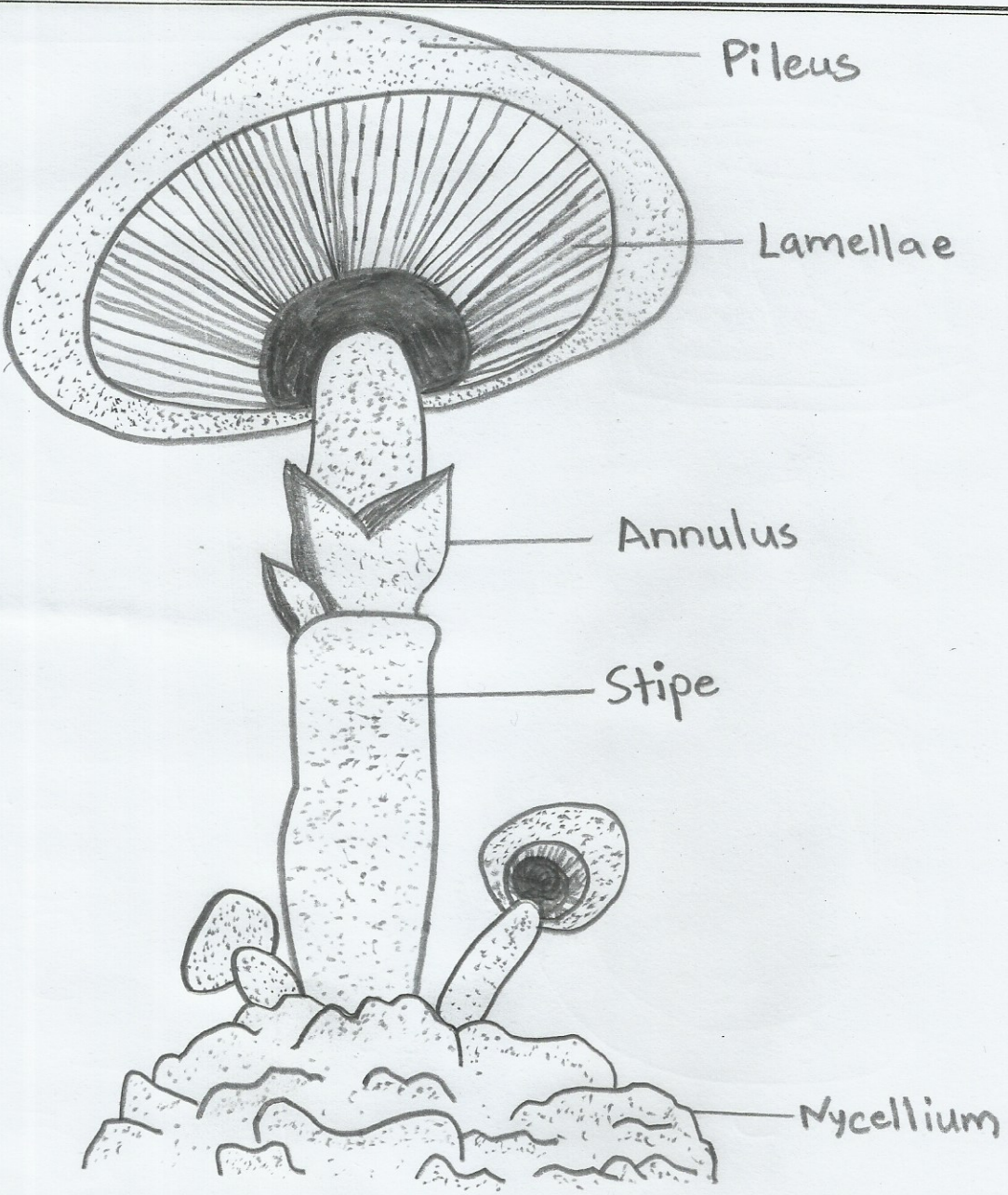

Fig: Observation of Morphological Structure of fruit body of Agaricus.

Name of the Experiment : Observation of morphological structure of fruit body of Agaricus.

Page No.: 10

Exp. No.: 04

Date: 01-03-2022

Required Materials:

A complete agaricus plant, compound microscope, blade, slide, cover slips, forceps, water etc.

Observation:

Identifying Characteristics are:

i) The sample looks like small open umbrella and white in color.

ii) The upper widened portion is the pileus and lower narrow rod like portion is the stipe.

iii) On the upper portion of the stipe ring shaped, Annulus is present.

iv) The upper portion of pileus is smooth and white and from the lower portion numerous vertical plate like gills remain suspended in radiating rings.

v) Pileus surface is fleshy, dry, smooth and white or brown in color.

Identification:

Due to the presence of above characteristics, the sample observed is the fruit body of Agaricus.

NAME OF THE EXPERIMENT

Observation of Pteris Sporophyte

Page No. 11

Exp. No. 05

Date 01-03-2022

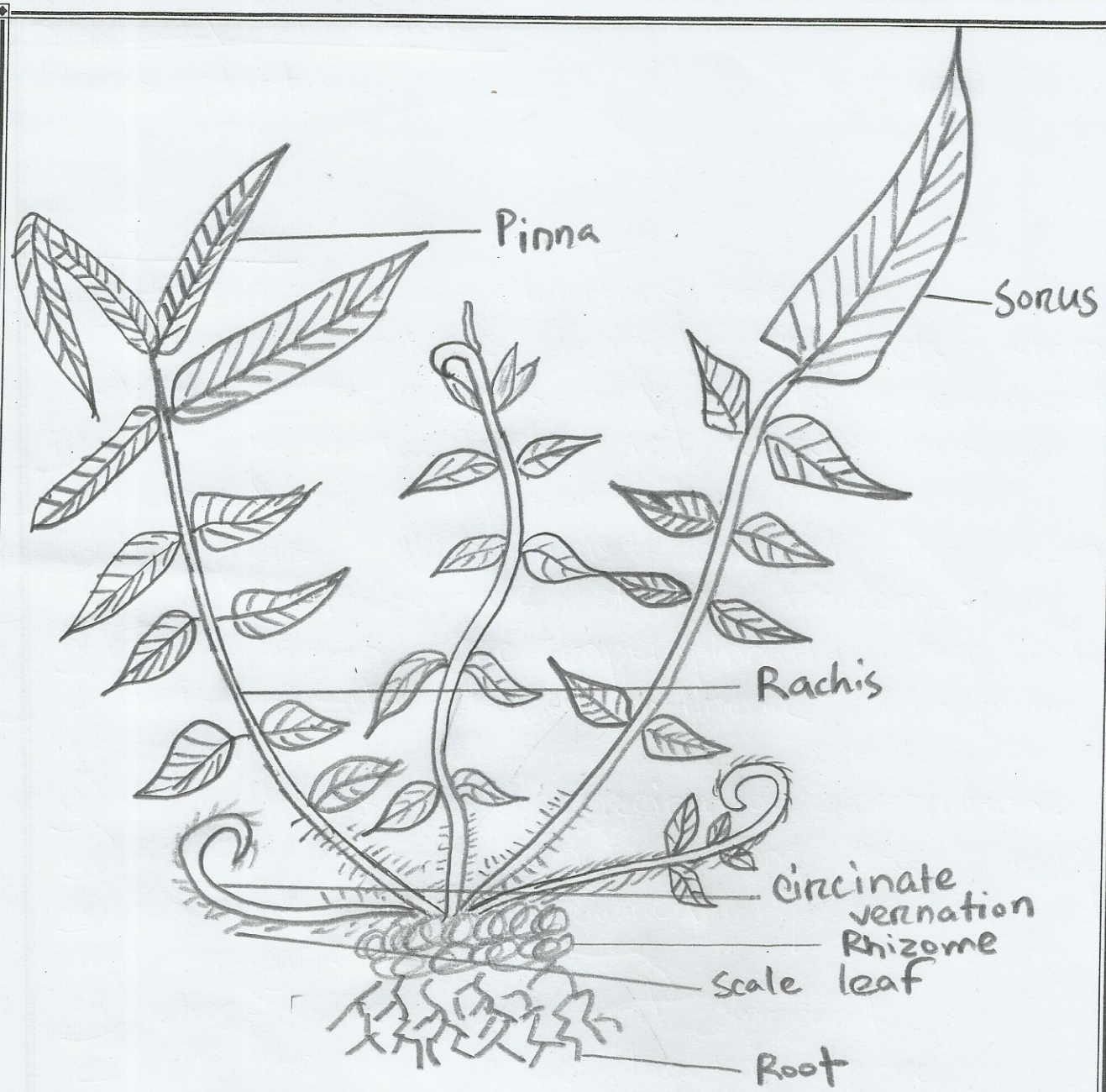

Fig: Observation of Pteris Sporophyte

Name of the Experiment : Observation of Pteris Sporophyte.

Page No.: 12

Exp. No.: 05

Date: 08-03-2022

Required Materials:

Pteris plant etc.

Observation:

Identification characteristics are:

i) The plant body is divided into roots, stem and leaves but flowers and fruits are absent.

ii) Stem is short, thick and rhizomateus which is covered by scaly ramenta.

iii) Numerous adventitious roots develop from the ventral surface of the rhizome.

iv) The leaves are imperipinnatly compound. Leaflets sessile elongated, linear with plane margins.

v) Young leaves show circination vernation.

vi) Leaves bear sporangia along the margin which are partially covered by the curved leaf margin.

vii) Leaves are green and compand.

viii) At the margin of the leaf there are soni.

Identification:

The specimen supplied as a whole plant (sporophyte) of Pteris, belongs to pteridophyta.

NAME OF THE EXPERIMENT

Identification of the Family Malvacae

Page No. 13

Exp. No. 06

Date 16-03-2022

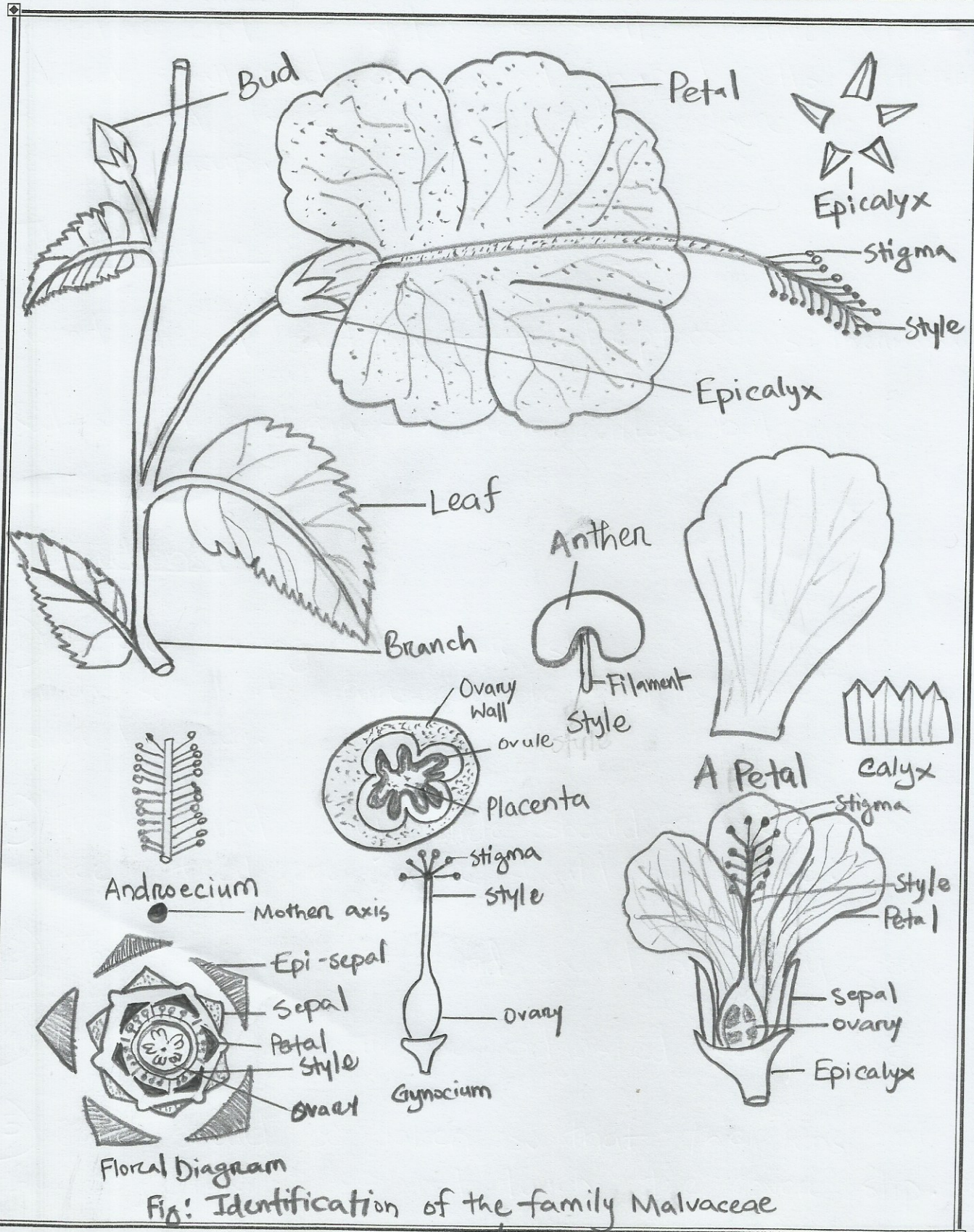

Fig: Identification of the family Malvaceae

(China-rose / Hibiscus rosa sinensis)

Name of the Experiment : Identification of the Family Malvaceae

Page No.: 14
Exp. No.: 06
Date: 08-03-2022

Required Materials:

One sample complete flower, blade, forceps, slide, brush, white paper, blotting paper, water etc.

Specimen : China rose (Hibiscus rosa-sinensis)

Habit	: A woody shrub.
Stem	: Woody, cylindrical
Leaves	: simple, alternate, stipulate, reticulate vernation
Inflorescence	: solitary, definite
Flowers	: Solitary, axilary, complete, regular, hypogynous, bisexual, large, white, pink or red in odor, epicalyx present.
Epicalyx	: 5-6, free, green in color.
Calyx	: Sepals (5) gamosepalous, green in color.
Corolla	: Petals 5, slightly united below; aestivation twisted, regular, red or pink or white in colon, mucilaginous
Androecium	: Stamens many, monodelphous, epipetalous, filament united to form a tube around the gynoecium, anther, reniform, free and unilocular, pollen grain large, spiny.
Gynoecium	: Carpels 5, syncarpous; ovary superior, 5 locular, stigma 5, styk one, ovule two in each chamber.
Placentation	: Axile.

Name of the Experiment : .....

.....

Page No.:

Exp. No.:

Date:

Fruit : Not found.

Floral formula : ⊕ ♂ $EK_5K_{(5)}\overline{C_5A_{(\infty)}}G_{(5)}$

Observation:

Identifying characteristics are:

i) Tender parts of the plants are hairy and mucilaginous.

ii) Solitary flower and generally epicallyx present.

iii) Stamen many, monodelphous, filament united together to form tube around the style.

iv) There are free lateral stipules.

v) Anther reniform, free, unilocular, superion ovary is present.

vi) Pollen grain large and spiny.

Identification:

The supplied specimen is under Malvaceae family.

Precaution:

1) Flower should be fresh.

2) For longitudinal and transverse section a sharp blade should be used.

3) All the parts of the flower should be seperated very carefully by forceps.

NAME OF THE EXPERIMENT

Page No. 15

To dissect (T.S.), observe and identify monocot roots with labelled diagram.

Exp. No. 07

Date 23-03-2022

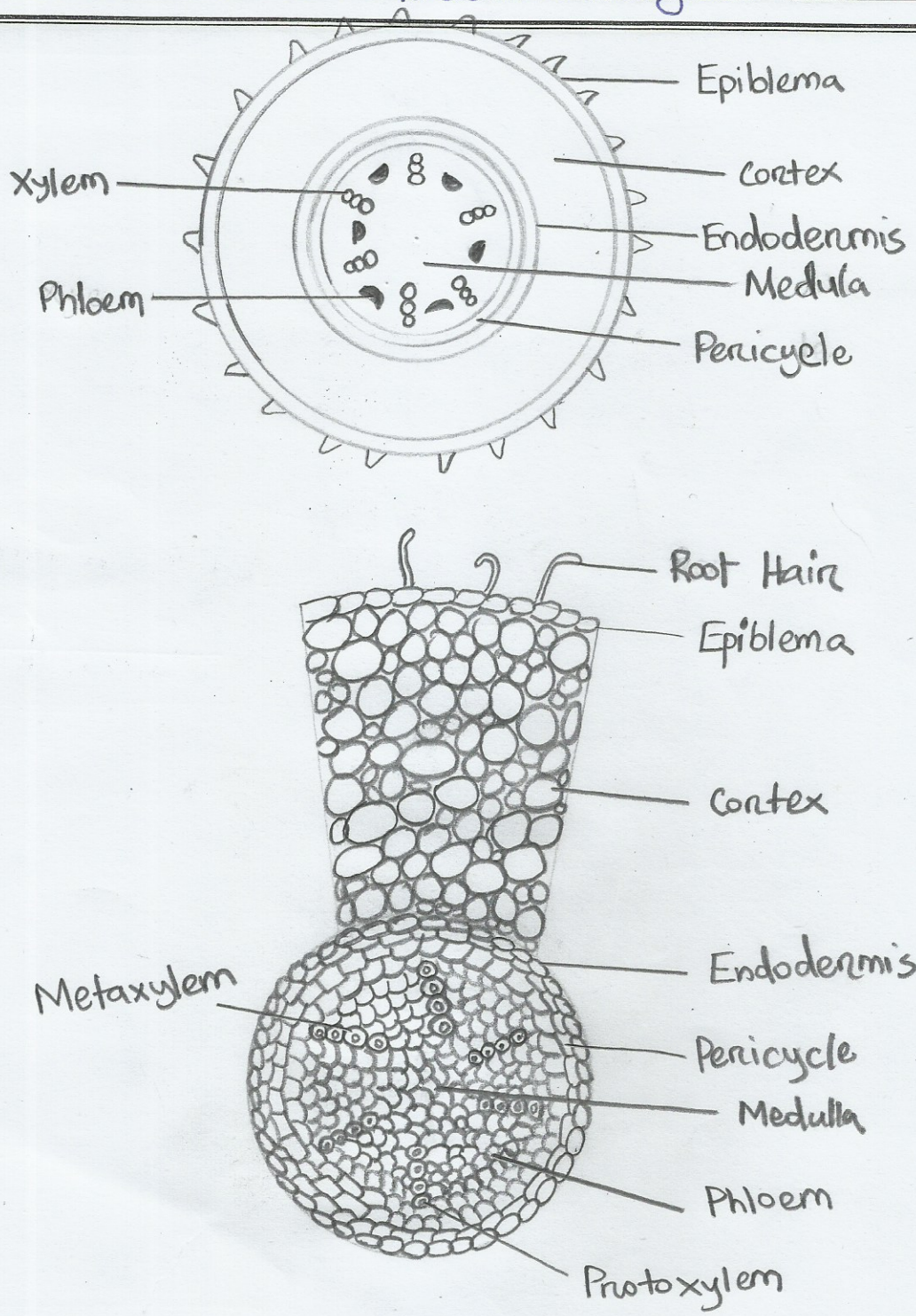

Fig: To dissect, observe and identify of Monocot (canna) root.

Name of the Experiment : To dissect (T.S.) observe and identify monocot roots with labeled diagram.

Page No.: 16

Exp. No.: 07

Date: 16-03-2022

Required Materials:

Specimen (young root), sharp blade (razor), two fine brushes, 3 petridish, clean water, safranine, microscope.

Procedure:

1) For the observation of internal structure, take a thin transverse section of supplied specimen with sharp blade.
2) Then the thin section should be kept in water of petridish. Few drops of safranine solution will be put on the petridish. The vascular bundles and some other tissues will become red and easily visible under microscope.
3) Now, observe under compound microscope in higher magnification (adjusted under 10X objective and finally observe under 40X objective).

Internal structure of monocot root:

1) Epiblema: It is composed of one row thin walled parenchymatous cells. Some cells of this layer being extended give rise to one-celled root hairs.
2) Outer Cortex: This layer is composed on thin layer parenchymatous cells. The outer extends from epiblema up to the endodermis. Inter-cellular spaces are present in the outer cortex.

Name of the Experiment : .....

.....

Page No.:

Exp. No.:

Date:

3) Endodermis: It is situated just beneath the cortex. This layer is composed of one row of compactly arranged cells.

4) Pericycle: It is composed of one row thin walled parenchymatous cells.

5) Vascular bundle: Xylem and phloem of the vascular bundles are arranged radially in a circle ie. xylem and phloem bundle lie alternately in different radii. The number of vascular bundles is usually more than six. The position of metaxylem is towards the center while the protoxylem is towards the periphery.

6) Medullary rays: The parenchymatous cell present in between xylem and phloem bundles is known as medullary rays.

7) Pith: This layer is composed of round shaped parenchymatous cells arranged compactly at the center. It occupies a large portion.

Observation:

Identifying Characteristics are:

i) Unicellular root hairs are present in the epiblema.

ii) Cuticle is absent in the epiblema.

iii) Cortex is not divided into different layers.

iv) Vascular bundles are of radial type.

Name of the Experiment : To dissect (T.S.), observe and identify monocot root with labeled diagram.

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Exp. No.: 07
Date: 21-03-2022

v) Metaxylem is towards the center while protoxy is towards the periphery i.e. exarch.
vi) The number of xylem and phloem bundles are usually more than six.
vii) Medulla is large and clear.

Identification:

For the above characteristics, the supplied specimen is monocotyledonous canna (Kalaboti) root.

NAME OF THE EXPERIMENT

To dissect (T.S.), observe and identify monocot stem with labelled diagram.

Page No. 18

Exp. No. 08

Date 23-03-2022

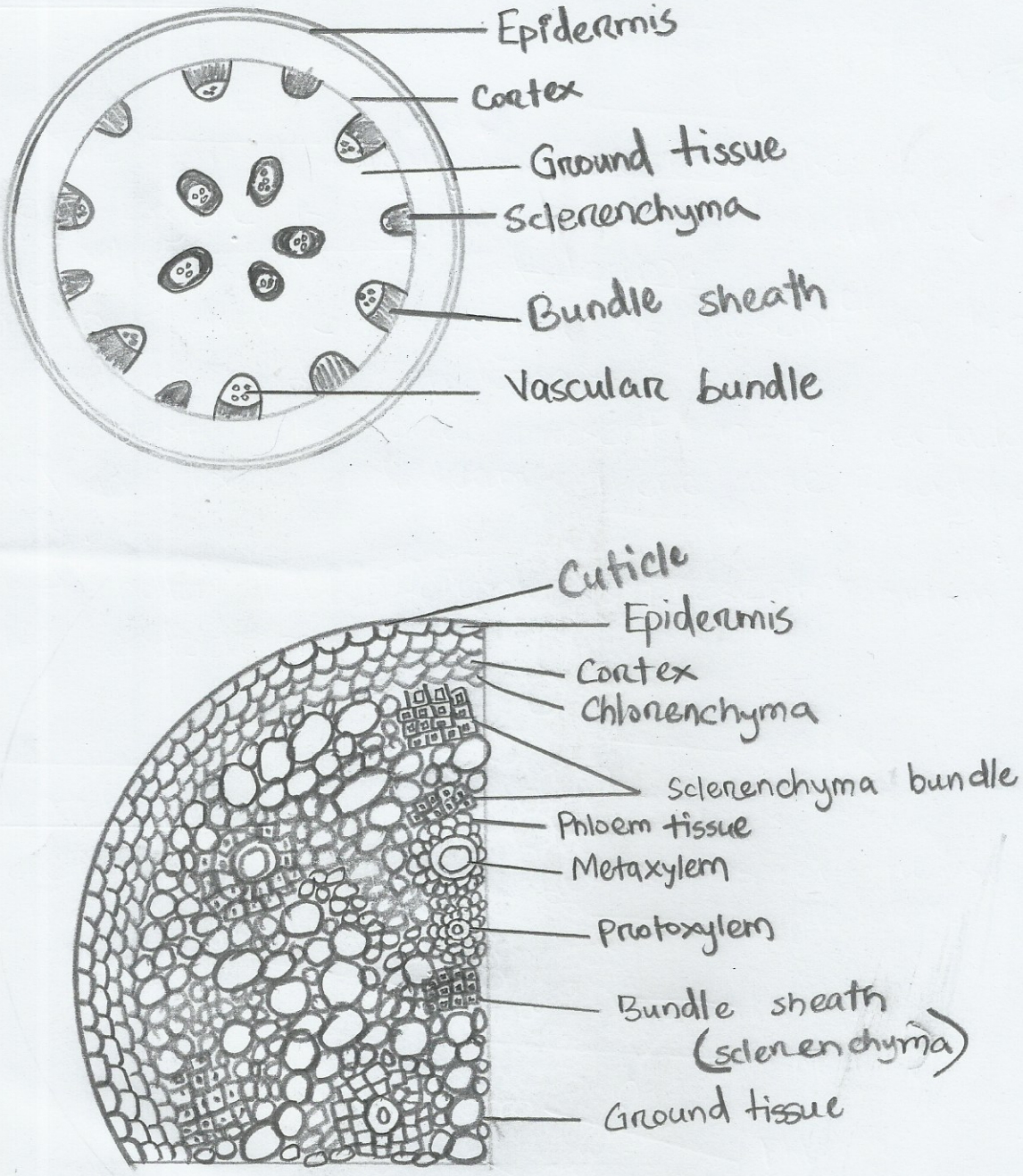

Fig: To dissect (T.S.), observe and identify monocot stem.

Name of the Experiment : To dissect (T.S.), observe and identify monocot stem with labeled diagram.

Page No.: 19
Exp. No.: 08
Date: 21-03-2022

Required Materials:

Specimen (young root), sharp blade (razor), two fine brushes, 3 petridish, clean water, safranine solution, microscope.

Procedure:

1) For the observation of internal structure of the plants, take a thin transverse section of supplied specimen with sharp blade.
2) Then the thin section should be kept in water of petridish. Few drops of safranine solution will be put on that petridish. The vascular bundles and some other tissue will become red and easily visible under microscope.
3) Now, observe under compound microscope in higher magnification.

[Internal structure of monocot stem:

1) Epidermis : The epidermis is the outermost layer composed of parenchymatous cells. The outer wall of the epidermis bears cuticle.
2) Hypodermis: It is composed of the two layers of parenchymatous cells lying beneath

Name of the Experiment : .....

.....

Page No.:

Exp. No.:

Date:

epidermis.

3) Chlorenchyma: It is a layer of chlorophylous parenchyma cells. It's a single cell layer.

4) Sclerenchyma: The patches of sclerenchyma cells are present in different places below the chlorenchyma.

5) Ground tissue: This layer of parenchyma cells extends up to the center. The cells of this layer have thin walls and intercellular space.

6) Vascular bundles: The vascular bundles are numerous and scattered in the ground tissue. They are conjoint, collateral and the cambium is lacking. On both outer and inner sides, of the vascular bundle, there are two layers of sclerenchymatous cells. The metaxylem remains towards the periphery while protoxylem is remaining towards the center.

Observation:

Identifying characteristics are:

i) Cuticle is present in the epidermal layer.

ii) Vascular bundles are conjoint and collateral.

iii) The metaxylem is situated towards the periphery and the protoxylem is situated towards towards the center i.e. exarch.

Name of the Experiment : To dissect (T.S.), observe and identify monocot stem with labelled diagram.

Page No.: 20
Exp. No.: 08
Date: 21-03-2022

iv) So, it is a stem.
v) Vascular bundles are scattered in the ground tissue.
vi) Cambium is absent in between xylem and phloem.
vii) The membranes of sclerenchymatous cells are present on both sides of the vascular bundle.
viii) Ground tissue is not well organised.

Identification:

- Therefore, the supplied specimen is the stem of monocot plant canna (Kalaboti).