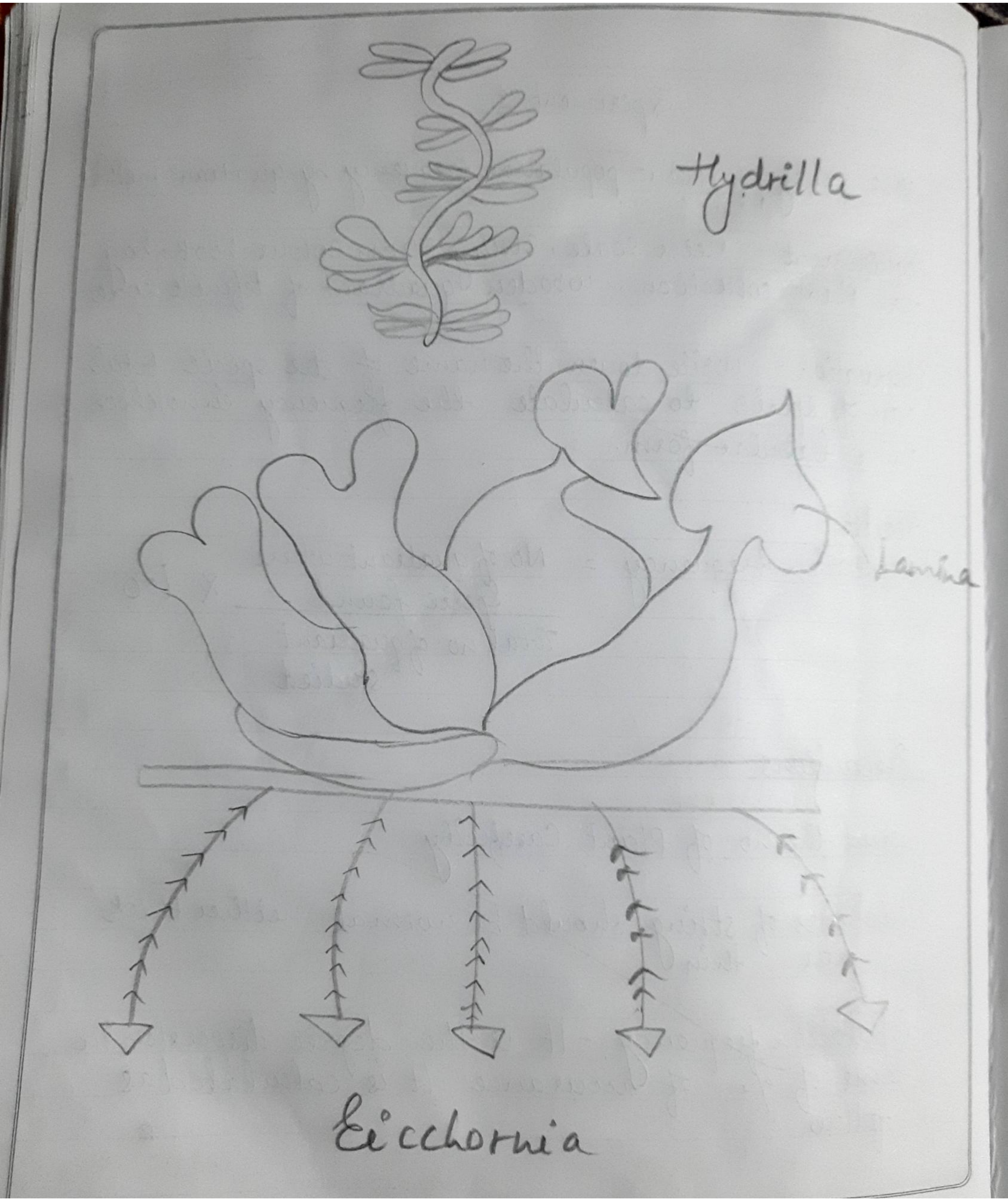

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Experiment 11

AIM: To study plant and animals found in aquatic condition and Comment upon their morphological adaptation.

Morphological adaptation in Plant :-

Requirement Living or preserved Specimen of Hydrilla, Eichornia, Ceratd, phyllum and Nealumbo

Observation

a) Hydrilla

(i) It is a common submerged hydrophyte with poorly develop adventitious roots and later got detached to become suspended.

(ii) It is found in shallow fresh water of ponds, pools, lakes etc

b. It is Spongy and feacible
2. Leaves arise in whorls from each node
3. It produces vegetatively by Seeds.
4. Plant Parts are covered by a large layer

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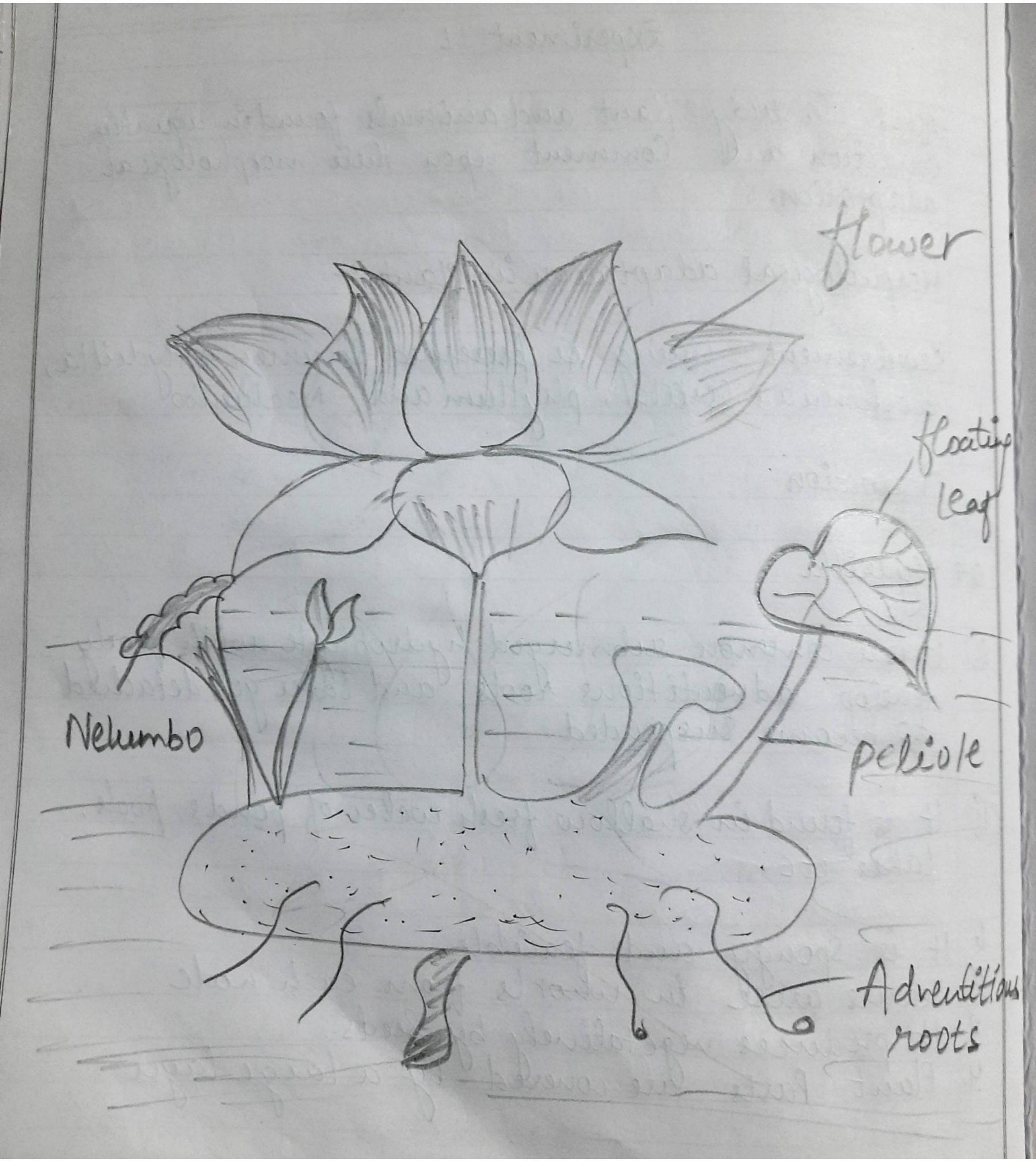

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b+ Eicchornia (water hyacenth

→ Plant are free floating, aquatic weeds occue adcundately in ponds, lakes and ditches blocking water channels.

→ Plant grounds grows by means of Spongy offset (steam) having nodes.

→ Clustres of brown adventetious roots arise from each. Roots act as balance

→ Root Caps are present but are replaced by apical root pockets.

→ Result of large, sponge, aerial leaves arises from root nodes.

C+ Nelumbo (Lotus)

→ Plant are perennial, enclosed hydrophytes which usually grow in shallow water.

→ The root are adventetious and slender

→ Air Spaces in particle and lamina.

→ Leaues are large and floating

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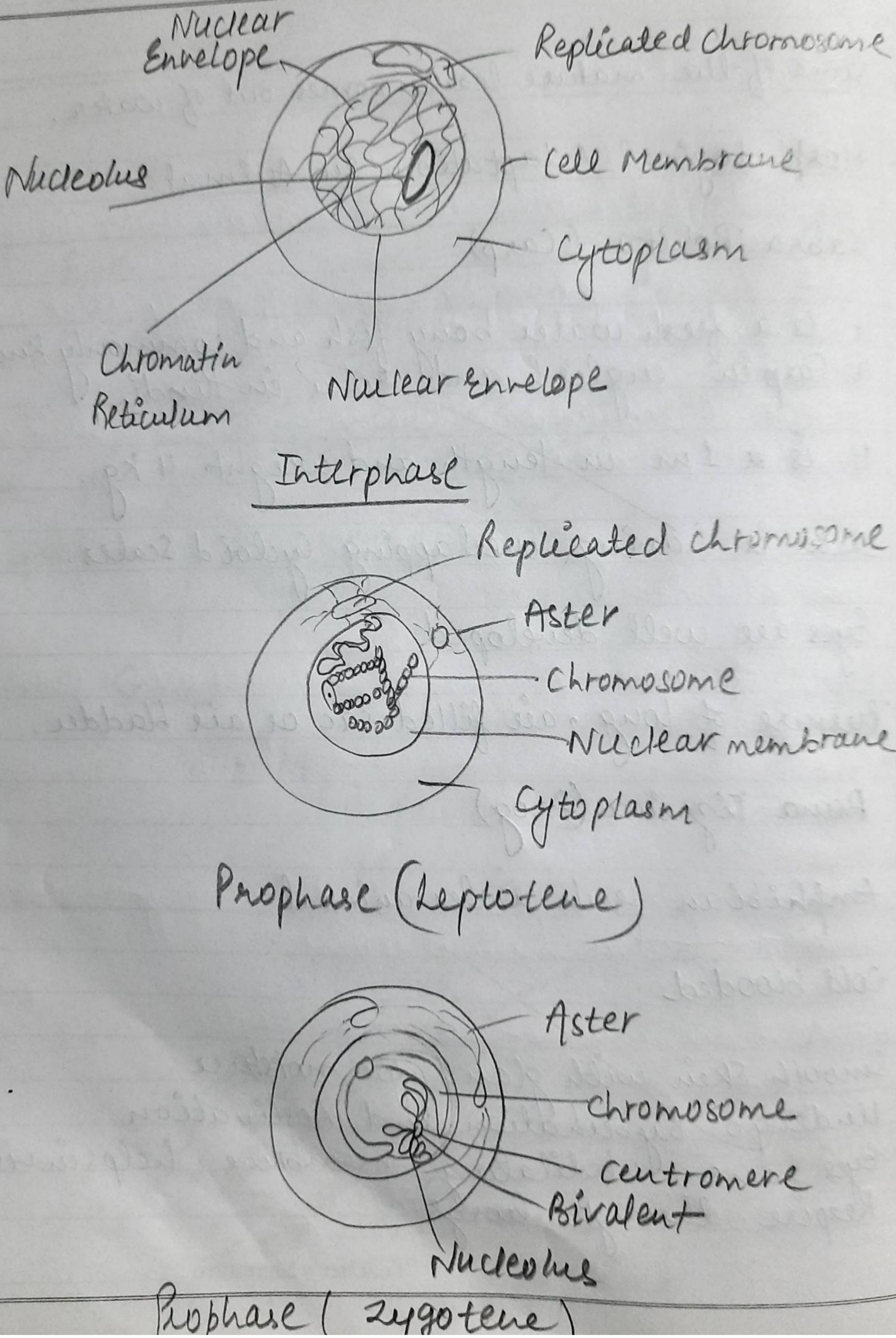

Interphase

Prophase (Leptotene)

Prophase (Zygotene)

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Experiment 12

AIM: To study meiosis in Onion bud cells or grass hopper through permanent slide.

Requirement → Permanent stained Cytological slides of meiosis in onion bud or testes of grasshopper.

Observation and Comments

On observing different phases of cell division can be seen meiosis increases 2 sequential cycles of nuclear and cell division called Meiosis I and Meiosis II but only a single cycle of DNA replication.

Interphase →

It occure prior to meiosis It is similar to interphase of mitosis except S phase is prolonged. DNA replication occur- each chromosomes comes to have a 2 chromatid

A] Meiosis I

Heterotypic or Reduction division

It is divided into four stages :-

1. Prophase → It is more complicated and prolonged and is subdivided into :-

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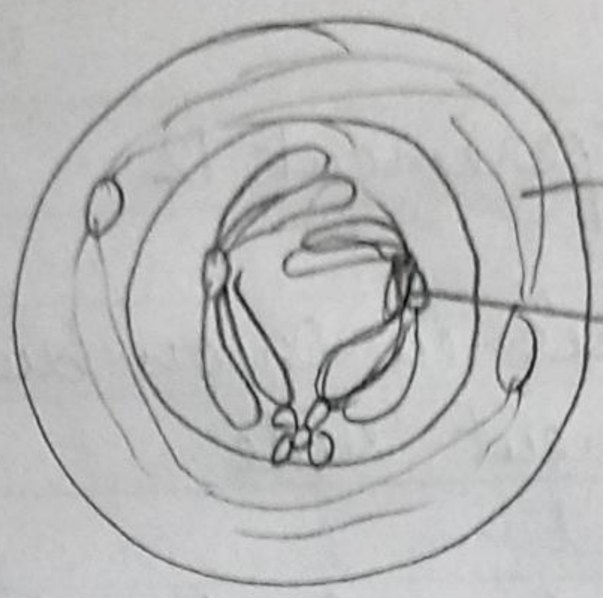
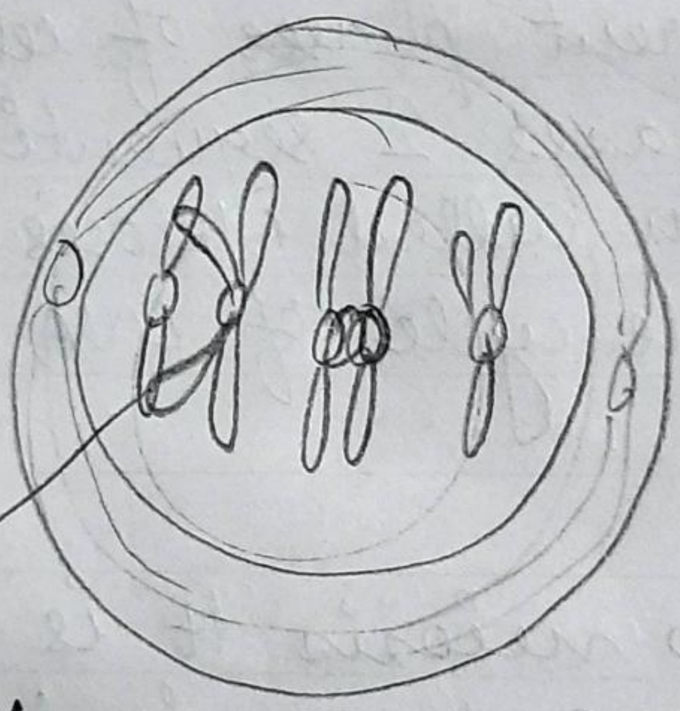


Prophase (Pachytene)



Prophase (Diplotene)

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[a] Leptotene

(i) Enlarge Nucleus

(ii) The chromatin fibre shaken and elongated chromosome become clear

(iii) The chromosome shorten

(iv) Both the centriole separated and develop astral rays.

(v) Chromatid of the replication chromsome are not distinguishable

[b] Zygotene

(i) Two homologous chromosomes are attached to eachother and this is called Synaps.

(ii) On account of synapsis, chromosomes form pairs ie bivalent

(iii) The no. of bivalent is half the total no. of chromosome

[C] Pachytene

(i) The paired chromosomes shortened.

(ii) The chromatids on the some chromosome are called sister chromatid.

(iii) The 2 chromatid of homologous chromosome of a

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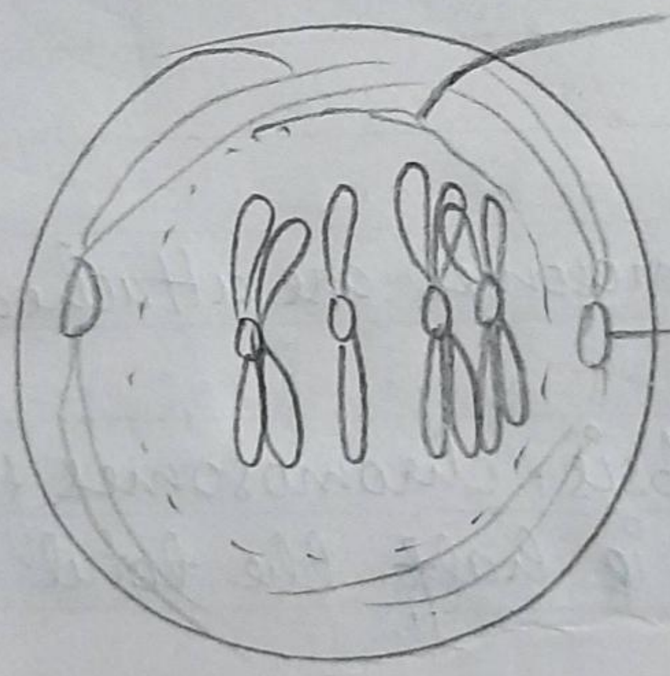

Prophase (Diakinesis)

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bivalent are called non sister chromatid.

(iv) Crossing over takes place it is the exchange of chromatid segments b/w 2 homologous chromosome.

(v) Cross over is an Enzymatic process

[d] Diplotene

(i) The nucleoprotein fusion complex of the synapses chromosome dissolves

(ii) The four chromatid of a bivalent become distinguished tetrad storage

(iii) Homologous chromosome separate except the region

(iv) The point of contact are called chiasmata

(v) The homologous chromosomes appear like ring like or chain like

[e] Diakinesis

(i) Chiasmata shift towards the ends of the paired chromosomes and it is called termination.

(ii) The bivalent of Satellite chromosome remain united with nucleus

(iii) Nuclear mmb. starts degenerating.

2. Metaphase

(i) The bivalent become arranged across the equitorial plate of the spindle in the such a way that each chromosome of a bivalent faces opp. pole of Spindle.

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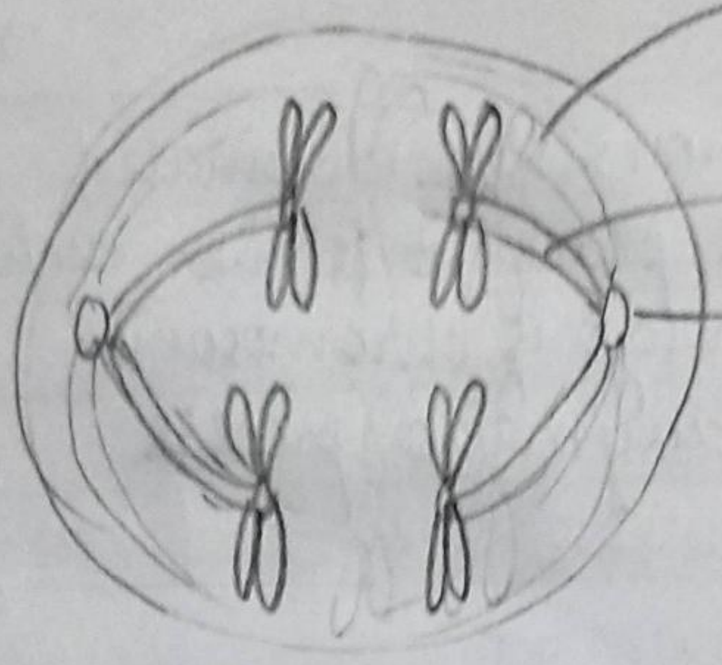
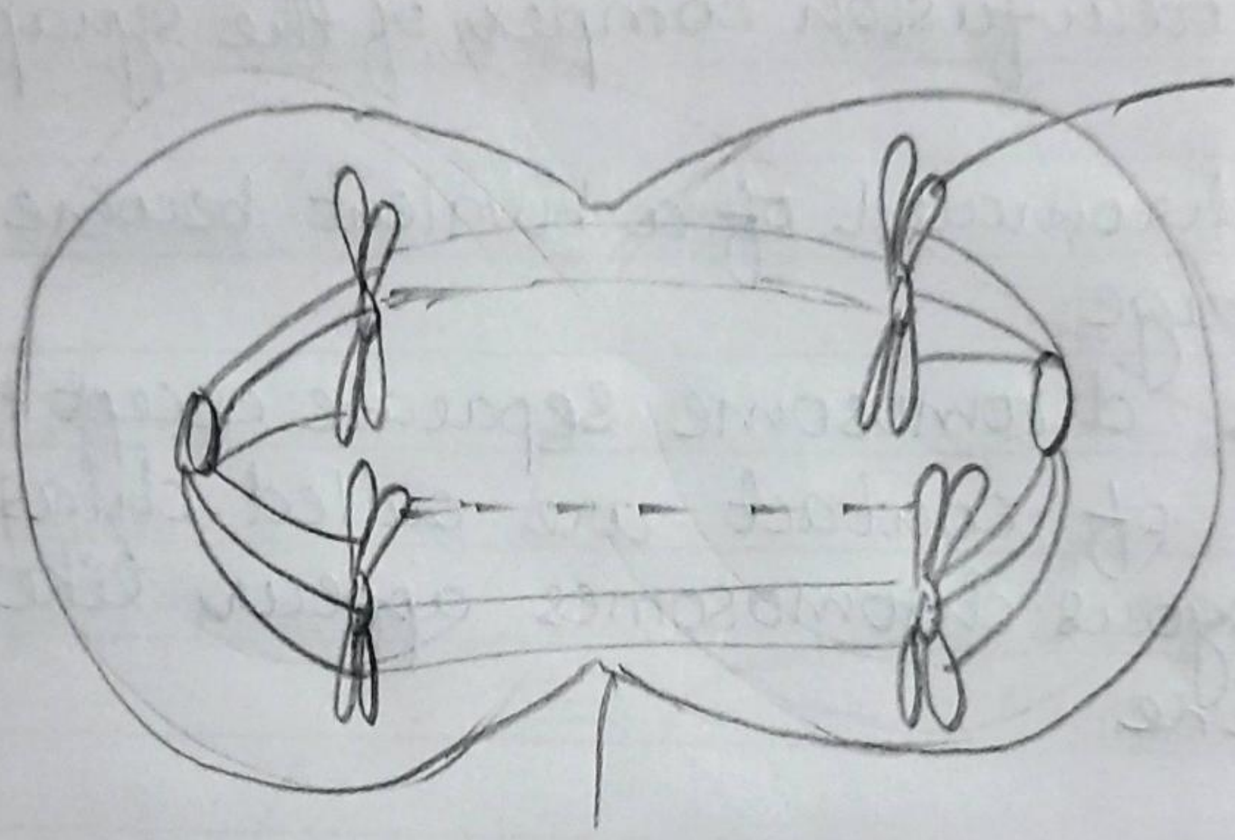
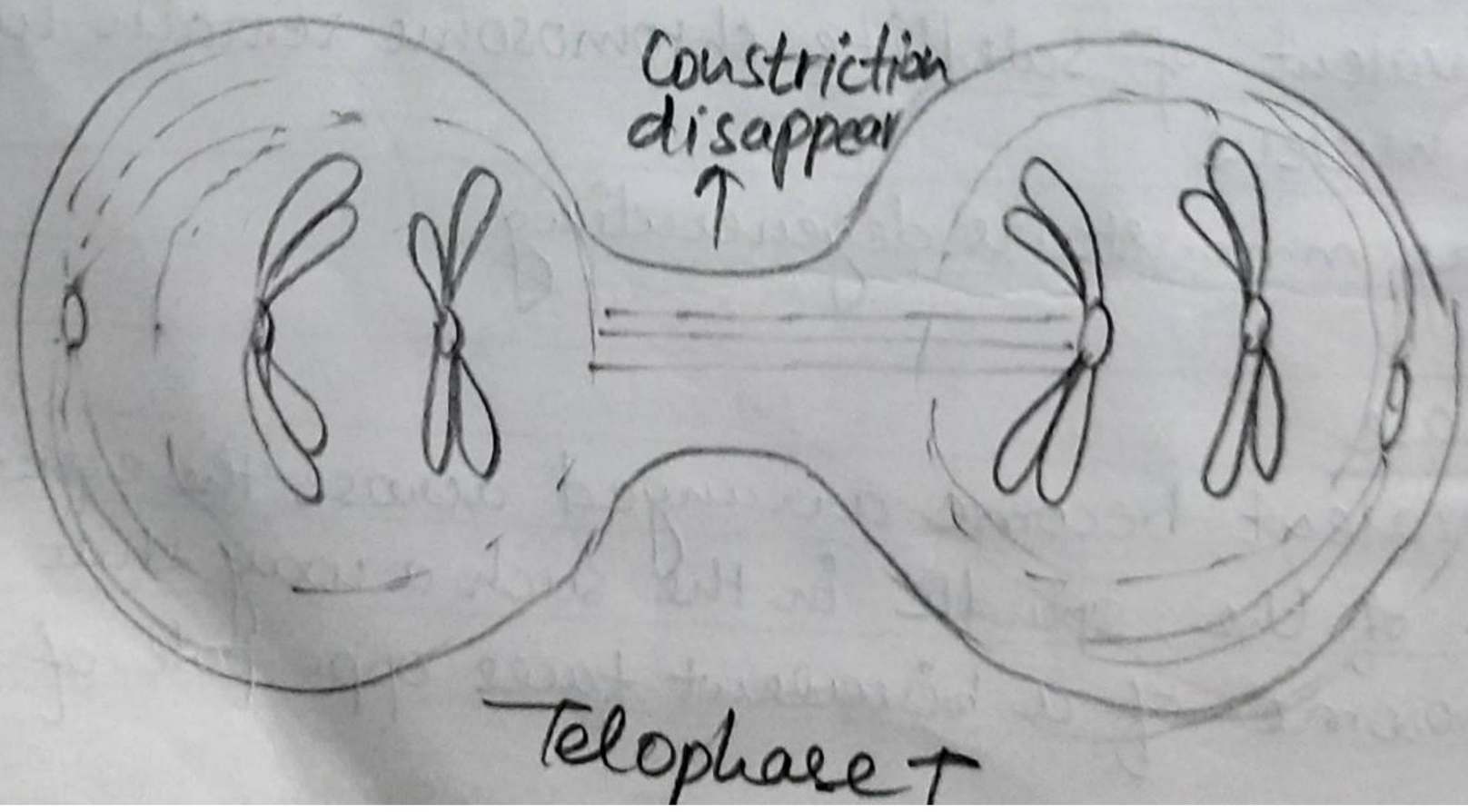


Metaphase I



Anaphase I



Telophase I

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(ii) Formation of double metaphase plate, since there are 2 centrosome in each bivalent

(iii) The spindle fibre get attached to the centromere of the chromosome by chromosome or force fibre.

(iv) The distribution of bivalent is at random the maternal and paternal chromosome can face any chromosome pole

3. Anaphase I

(i) The homologous chromosome break their connection and separate out a process called disjunction.

(ii) The separated chromosomes or univalent are also called dyad.

(iii) The chromosomes more towards spindle poles along the path of fibre
Chromosomes move towards spindle poles a

(iv) At the end of Anaphase I two groups of chromosomes with half the no. of chromosome are presented each spindle poles

A. Telophase

(i) The polar group of chromosomes arrange themselves in 2 haploid group.

(ii) The chromosome elongate

(iii) A nucleus is formed by the satellite chromosome

(iv) Reappearance of nuclear membrane.

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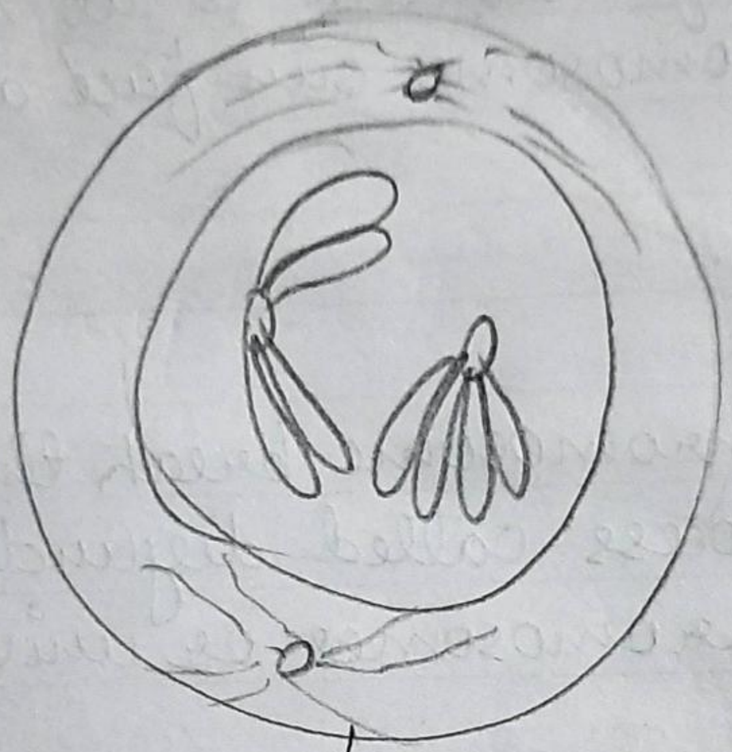

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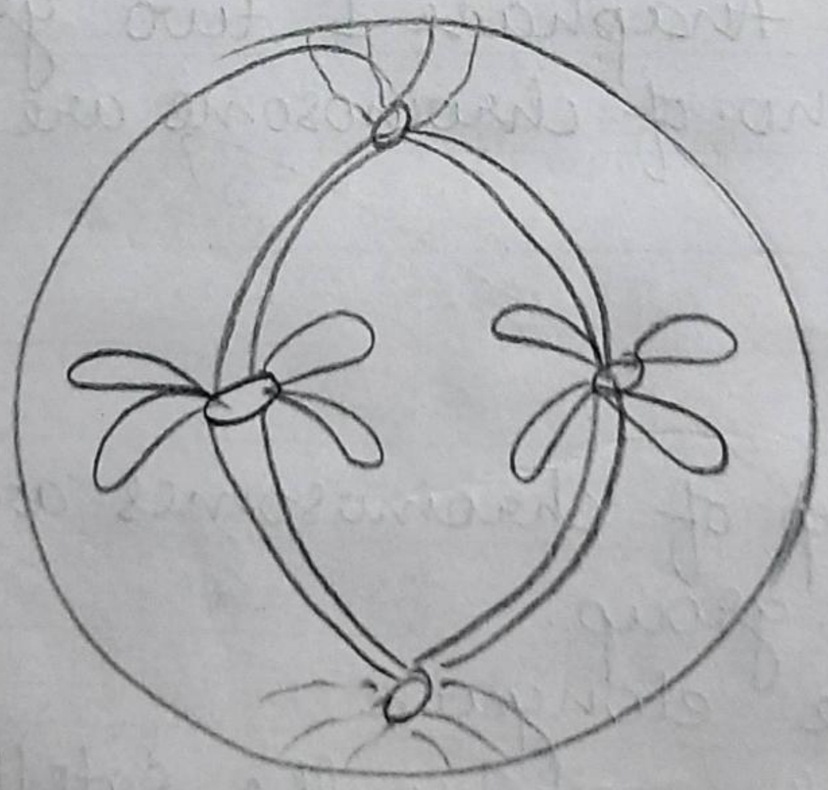

Metaphase II

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Expt. No. Page No.

B. Meiosis II

It is shorter than the typical mitotic division The division maintain the no. of chromosome produced at the end of Meiosis I It is divisible into prophase II, Metaphase II, Anaphase II, Telophase II.

(1) Prophase II

(i) This nuclear division is very high or brief

(ii) The centriole develop faster and move to opposite pole

(iii) The chromosome shorten, nucleolus and nuclear envelope degenerate

(iv) The chromatid of individual chromosome are usually divergent.

(2) Metaphase II

(i) 2 achromatic bipolar fibrous spindles are formed

(ii) The 2 spindles are either || or at right angles to one another

(iii) The chromosomes reach the respective spindle and arranged them solve in such a fashion that their centromere come to lie at Equator forming a single metaphasic plate

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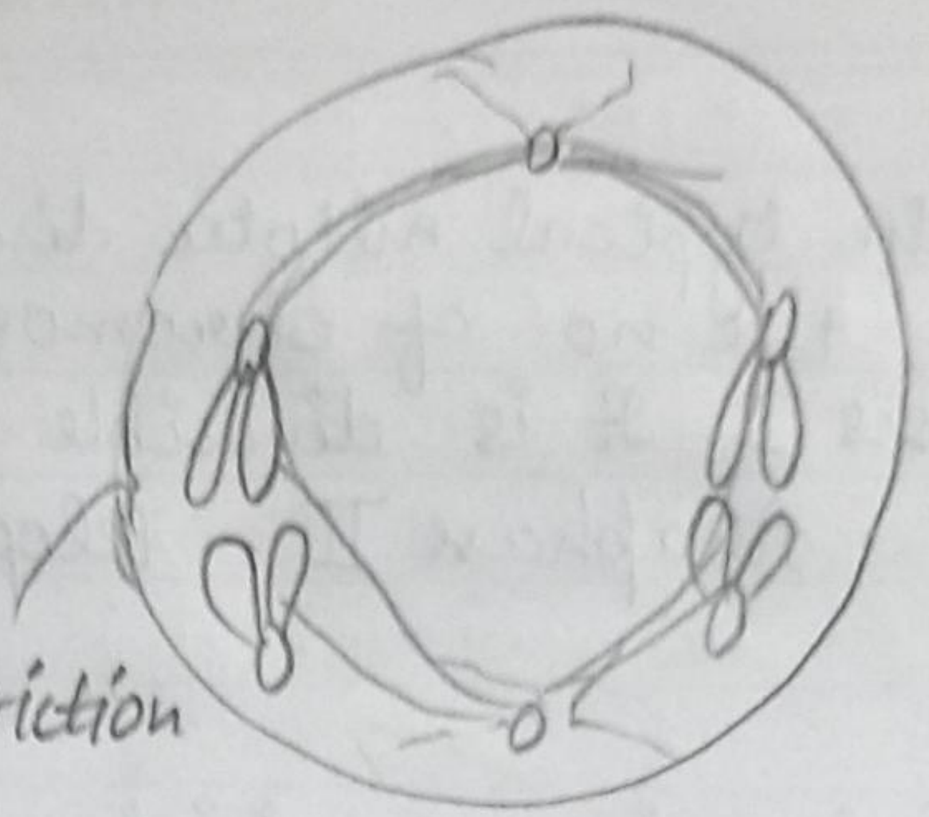
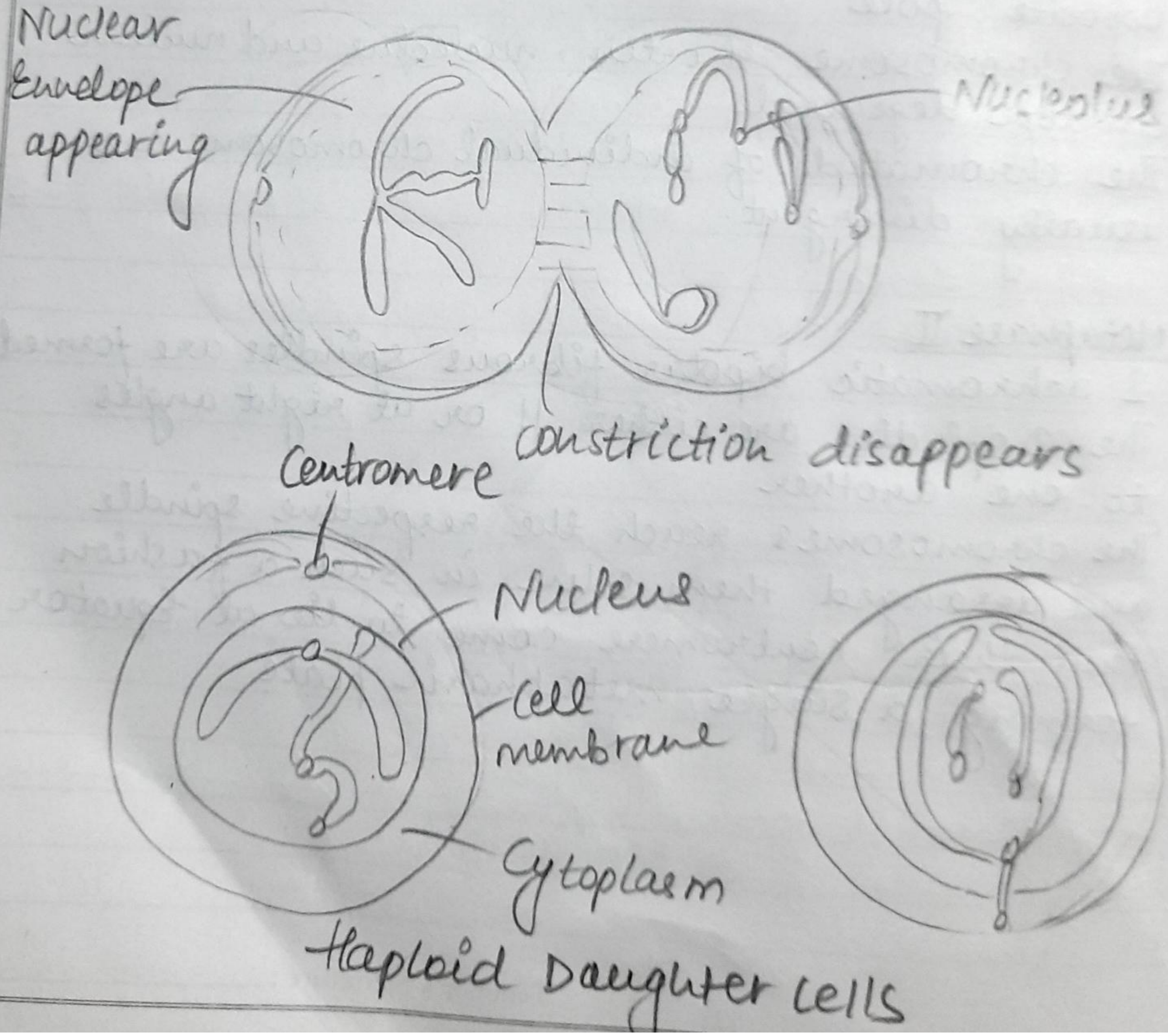


Anaphase II



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(3) Anaphase II

(i) The centromere of each chromosomes devides into two.

(ii) Each chromatid has one centromere.

(iii) The 2 chromatid separate completely and are known as daughter chromosome.

(iv) The daughter chromosome more towards their respective poles along the path of chromosomal fibres.

(v) At the end of Anaphase II : four group of chromosome are produced.

(4) Telophase II

(i) Chromosome elongate very much

(ii) A nucleolus reappears

(iii) Nucleus membrane develop

(iv) Familiar of four haploid nuclei.

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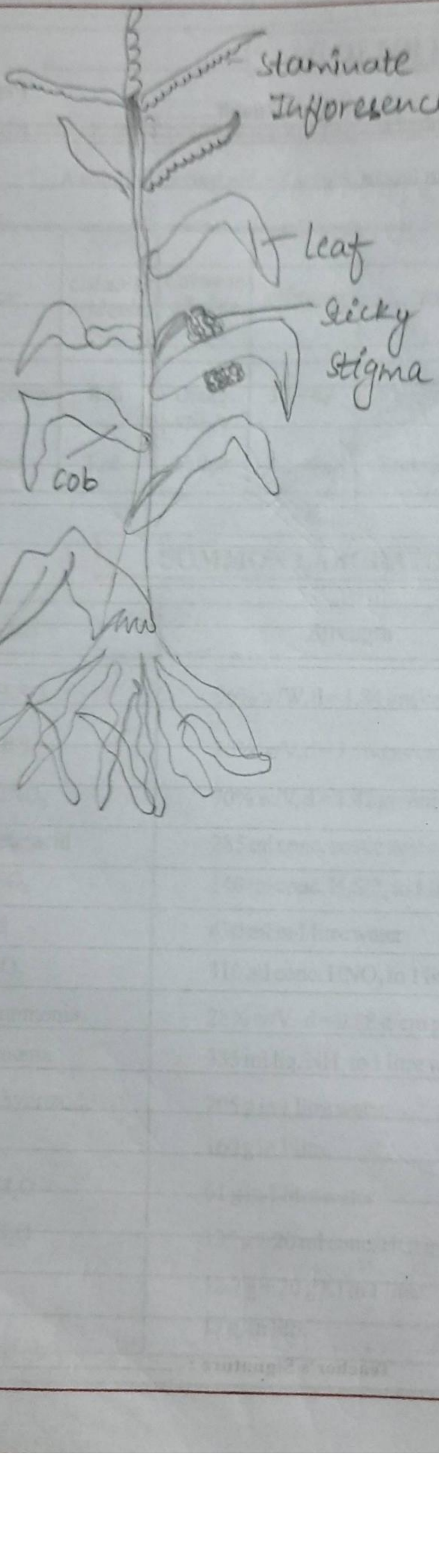
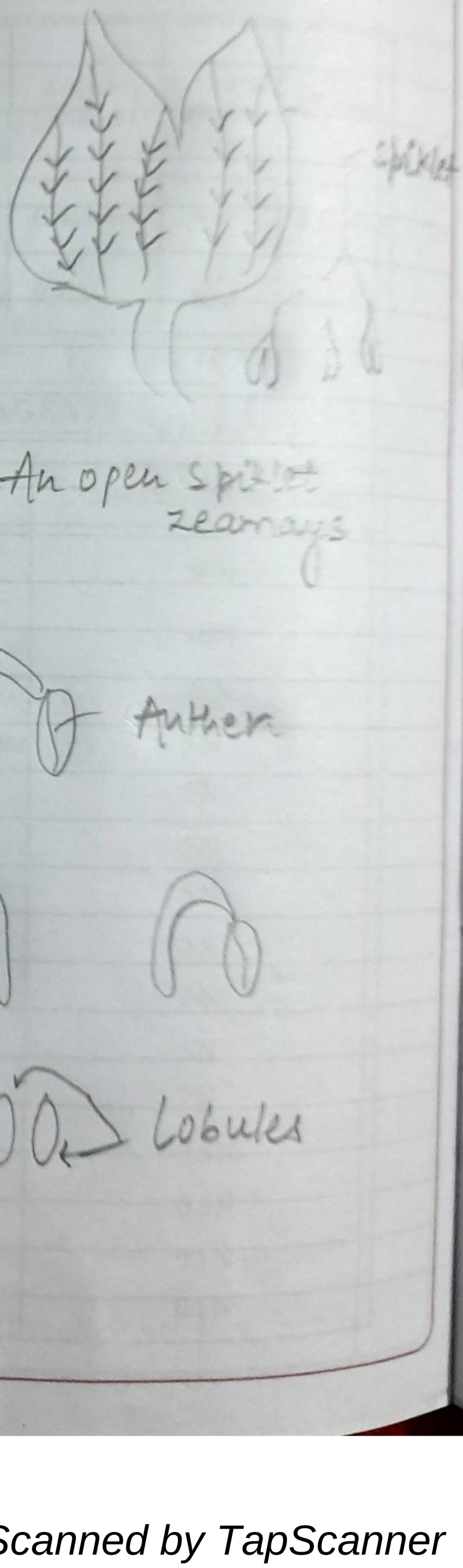
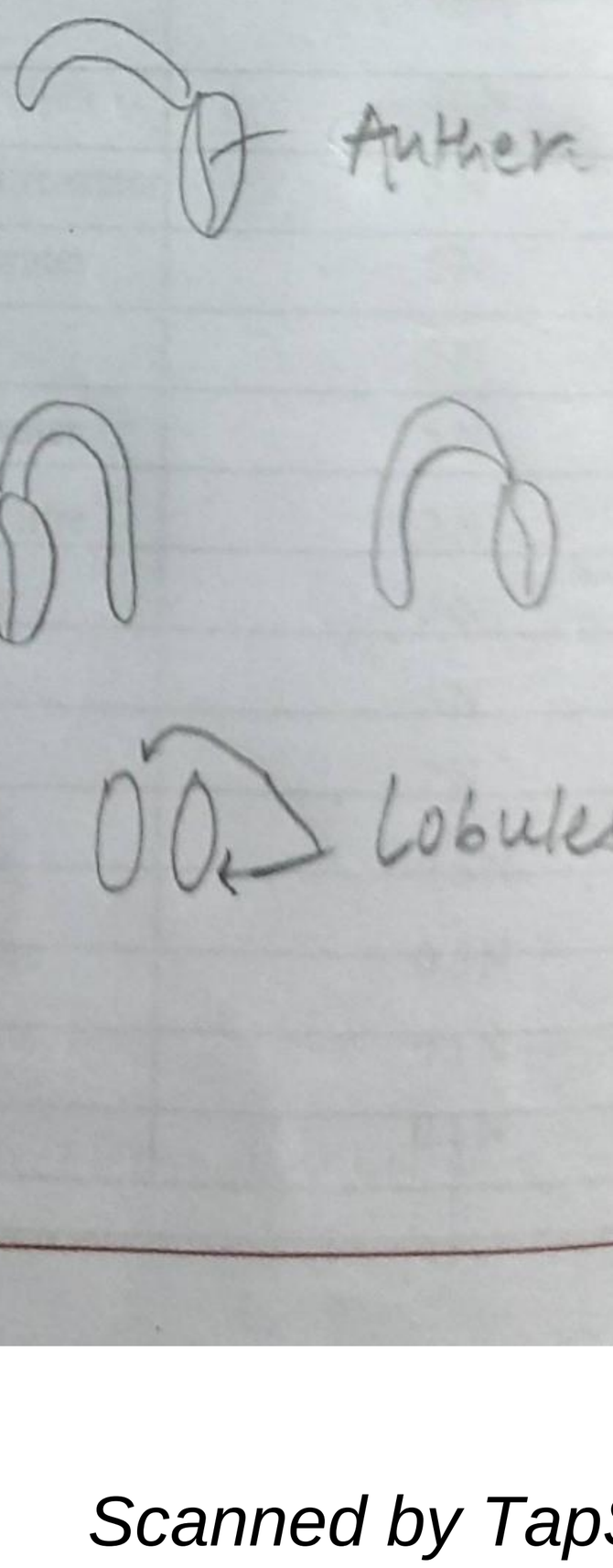




An open spikelet zea mays



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Experiment No..... Experiment Result..... Page No.

Experiment 13

AIM: Study of flowers adapted to pollination by different agents (wind, insect, bird)

Requirement: Lining material, model of maize, Ricinca sunflower, saliva, ficus (Anjir) Notebook, Pencil, Rubber etc.

Observation: Observe the above model and note the various adaptations which are helpful to the plant for pollination with wind or by insect.

Adaptation of the plants to wind pollination:-

1. **Anaemophilly (wind pollination)**
It is a type of cross pollination involving transfer of pollen grains from the mature anther to the stigma of another flower through the agency of wind. The adaptation of anaemophilly are:

The flowers are devoid of showery bract and other floral rats, like calyx and corolla.

Flowers colourless, nectarless, odourless stamens are numerous and excorted (projected outside (corolla tube)

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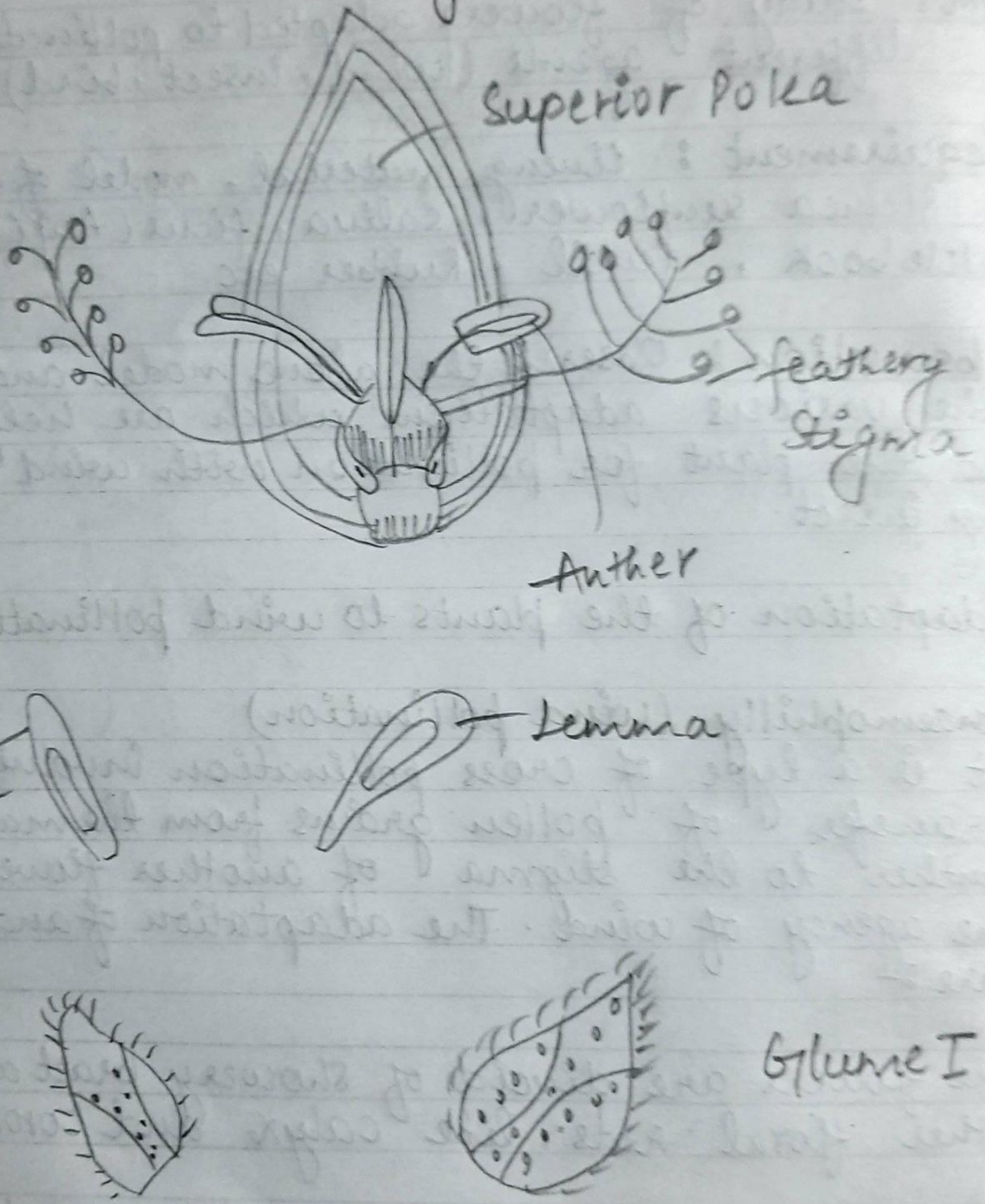

A typical gram flower w/o Inferior Palea showing Anaemophilly charakristics

flower small in conspicious.

In monoecious male flowers are more abundant.

1. Grasses :
It mainly belong to families cyperaceous (cyperus) and germinate under service glumaceae
In grasses flowers may be unisexual (maize, calex) or bisexual [oats, wheat, rice etc]

2. Zeamays :
It is main component of monoecious, deicious beare 2 types It is in florescence.

[a] Staminate Inflorescence →
Panicle of spikes, each spikelat is 2-flowered enclosed by two gametes

[b] Female Inflorescence →
It is called cob enclosed by large no. of green bracts or spathes, inflorescence auxilary causing in the axels of lower leaves on main stem.

Adaptations of Plant to insect Pollination :-

1. Small, inconspicious flowers become prominent by grouping eg. capitulum, umbel, spadix etc.

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Experiment No..... Experiment Result..... Page No.

2. Flower ~~after~~ should have pleasent fragnance (odour)
3. Stigma are inserted and sticky
4. Stamen and stigma are involued.
5. In some cases pollen is edible on attraction of insects for food eg:- Rose, poppy etc.

Sativa
It is cultivated ornamental ~~Bee~~ because plant belonging to family Labidae It shows specialised floral mechanism for pollination The flower have a filiffed calyx and corolla. A landing platform two protandrous stamen attached to the corolla ~~boot~~ helix. Only one lobe of anther infertile whereas the lower lobe is sterile activities plate lay side by side and block the path of insect. Brightly coloured calyx and corolla lower top of corolla as well as bottom top all act as a landing platform, protanctrous stamens with lower mechanism, pollen grains in pollen kit presence of nectar glands help in pollination by insect.

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

Sunflower

In Sunflower cross pollenation occur with the help of insects (honey bee) In fact Sunflower is a group of flowers forming the inflorescence. It has got ray florels on the malgins and disc florals in the centre that make the individual flower. This type of inflorescence is known as Capitulum or head.

Adaptations of Plant to bird Pollination

1. The ornithophilous flower secrete abundant watery nectars or have edible parts
2. Ornithophilus flowers are usually bright coloured (red, yellow, orange, blue)
3. The floral parts are commonly leathery.
4. In some cases, the corolla is funnel shaped.
5. Scent or fragrance is often absent

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Experiment No..... Experiment Result.....

Conclusion/Result

The flower which are pollinated by wind are small, inconspicious, not showy, colourless, nectarless, odourless. They are economical, energy thrift while the flower which are pollinated by birds and insects are aid in attracting them for pollination. They spend a large amount of energy to accomplish these structures.

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

Experiment 14

AIM To study and prepare a temporary mount of onion root tip to study mitosis.

Requirements

Onion bulb, conical flask / bottle, corked tube, petri dish, scissors, forceps, needles, methyl alcohol, acetic acid, hydrochloric acid, aceto carmine, distilled water, spirit lamp, microscope, slides, coversleps, blotting paper etc.

Procedure

1. Take medium size bulb of onion and trim off the old roots from its base by means of a sharp blade.

2. Place the onion on a conical flask full of water with its base touching the water keep it for a week to grow the roots.

3. Cut 5 mm off the tip of roots and put them into a tube containing a mixture of 1:3 acetic acid and methanol keep for an hour. This process is called fixation.

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

4. Remove 2 or 3 root tips and hydrolyse them by warming to 60°C in 1N Hydrochloric acid for 15 mnts.

5. Remove the root tips and wash them thoroughly in water.

6. Place a drop of aceto ceramic on a slide. Put one hydrolysed root tip in a drop and Place a coverslip on the root.

7. Gently Squash the root by tapping the coverslip with the blunt end of a pencil until cells separate and Spread out into a very thin layer

8. Gently warm the slide over a flame for few Seconds.

Observe first under the low power of microscope to locate the dividing cells Examine different stages of mitosis under high power of microscope.

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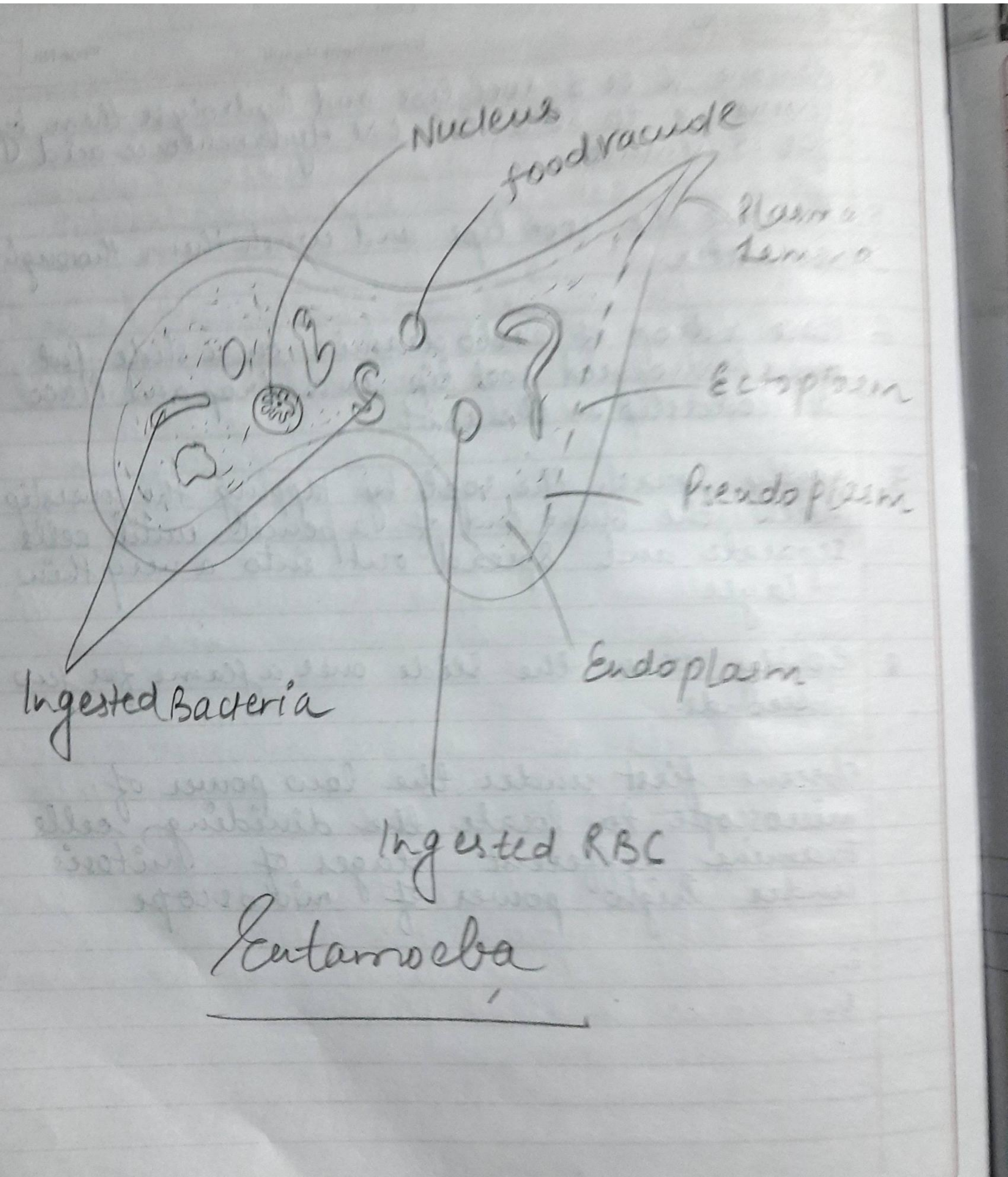

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

Experiment 15

AIM: To identify common disease causing organism like Ascaris, Entamoeba, Ringworm.

Required: Preserved specimens or charts or permanent slides of Ascaris, Entamoeba, ringworm.

1] Ascaris (The Giant Interstitial worm)

Ascaris lumbricoides is an edoparasites of small intestine of human beings, more common in children. It makes its entry through eating soil infected with eggs of Ascaris. The worm ingests semi digested food of the host with the help of sucterial pharynx. It respires anaerobically (20-40 cm in female and 15-30 cm long in males)

Symptoms :- Ascaris cause the disease called Ascariasis. The major symptoms of the disease are :-

(i) Abdominal discomfort, calic pain, caused by the obstruction of intestinal passage by large number of adult worms.

The patient may also suffer from impaired

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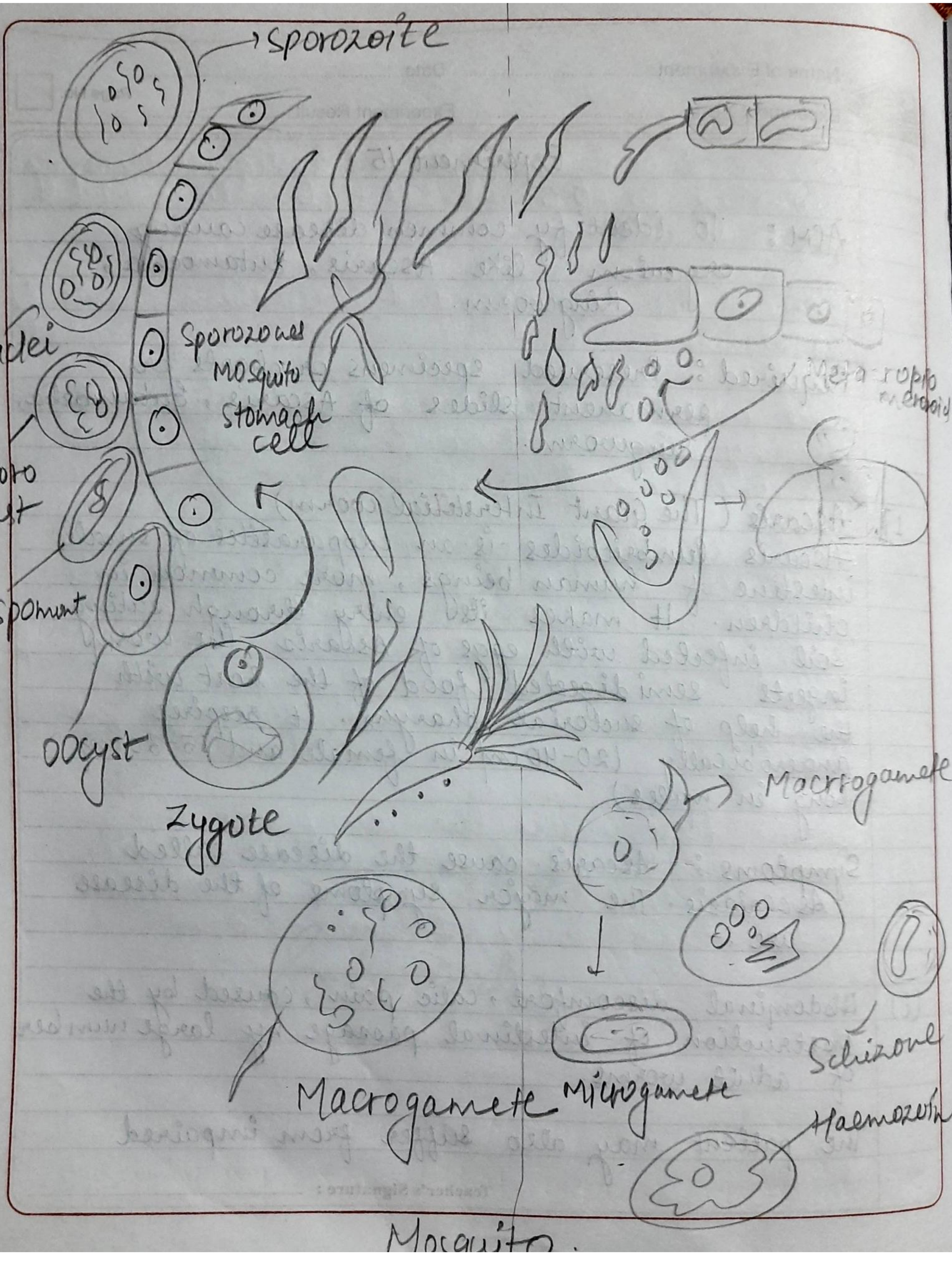

Mosquito.

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digestion, diarrhoea and vomiting due to the toxins produced by the parasite.

Body growth is retarded and mental efficiency is affected in cases by children.

In short, symptoms include :-
Irregular bowels, occasional vomiting and anaemia.

Control

1. Disposal of human faeces by underground sewage System
2. Washing of fruits and vegetables by potassium permagnate
3. Protection of food from dust and flies
4. By not eating soil.

2] Entamoeba (Entamoeba histolytica)

Entamoeba lies in the large intestinal and lower part of small intestine of human being The microscopic organism lives in 18-25 cm in length and is coberned by semipermeable plasalemma. It posses single nucleus, surrounded by clear cytoplasm. There are no. of food vacuoles and cytoplasm is differentiated into cytoplasm and

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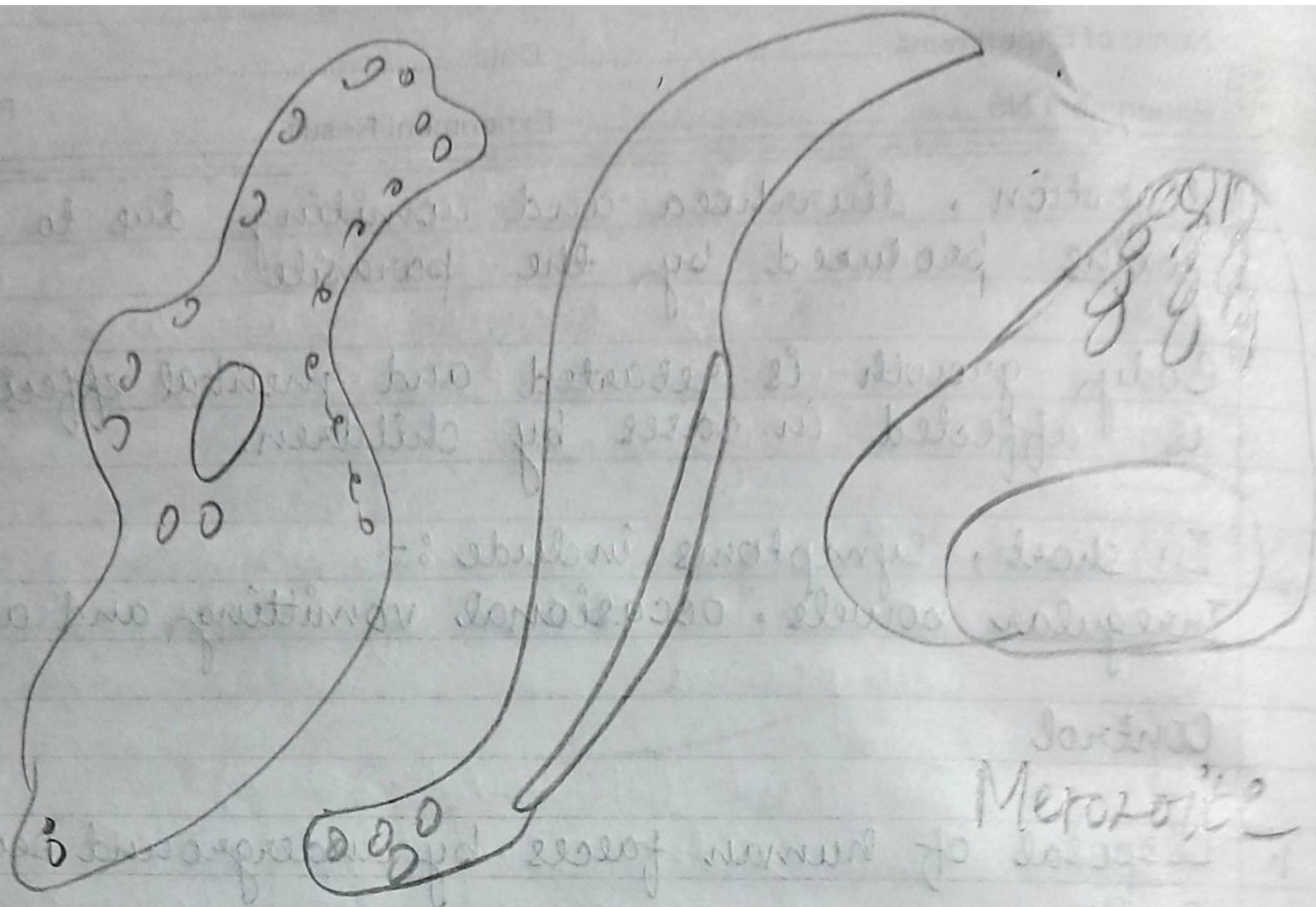

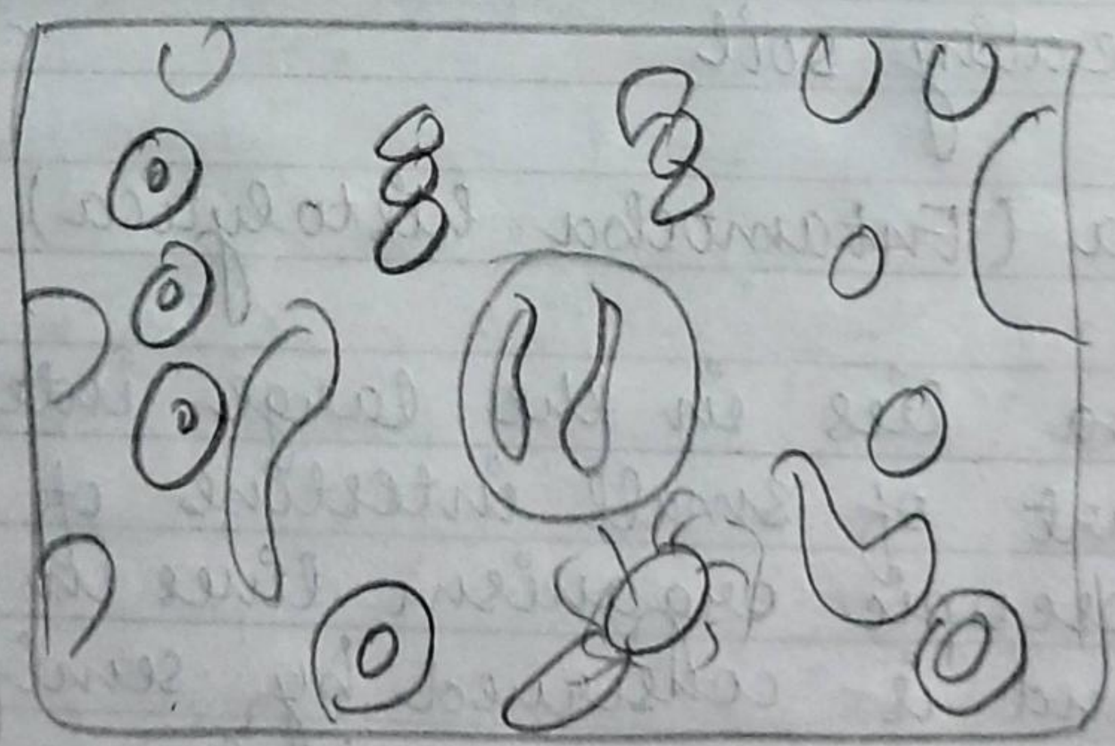

A photomicrograph of a blood smear showing RBC that contain Privax Parasite

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endoplasm

Symptoms

- Patient passes out loose motion and blood with watery stool
- Severe gripping pain in abdomen and spains, exhaustion and nervousness.
- In chronic disease large tumor like lemons are formed in the sub mucosal of large intestine.
- Slight enlarged line with pain.

Control

- Purification of water by boiling.
- Elimination of source by contamination
- Washing vegetables

3] Ring Worm

It is a group of fungal disease caused to the skin, nails, hairs etc by different species of these genera feeding on keratin of skin of human being namely microspores, epidermophyton, & trichophyton, collectively

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

called as dermatophytes

Control measures

1. Personal cleanliness is most important
2. washing of hands with germicide soaps.
3. Taking bath regularly keeps the skin clean.
4. Hairs should be keep clean by frequent washing.

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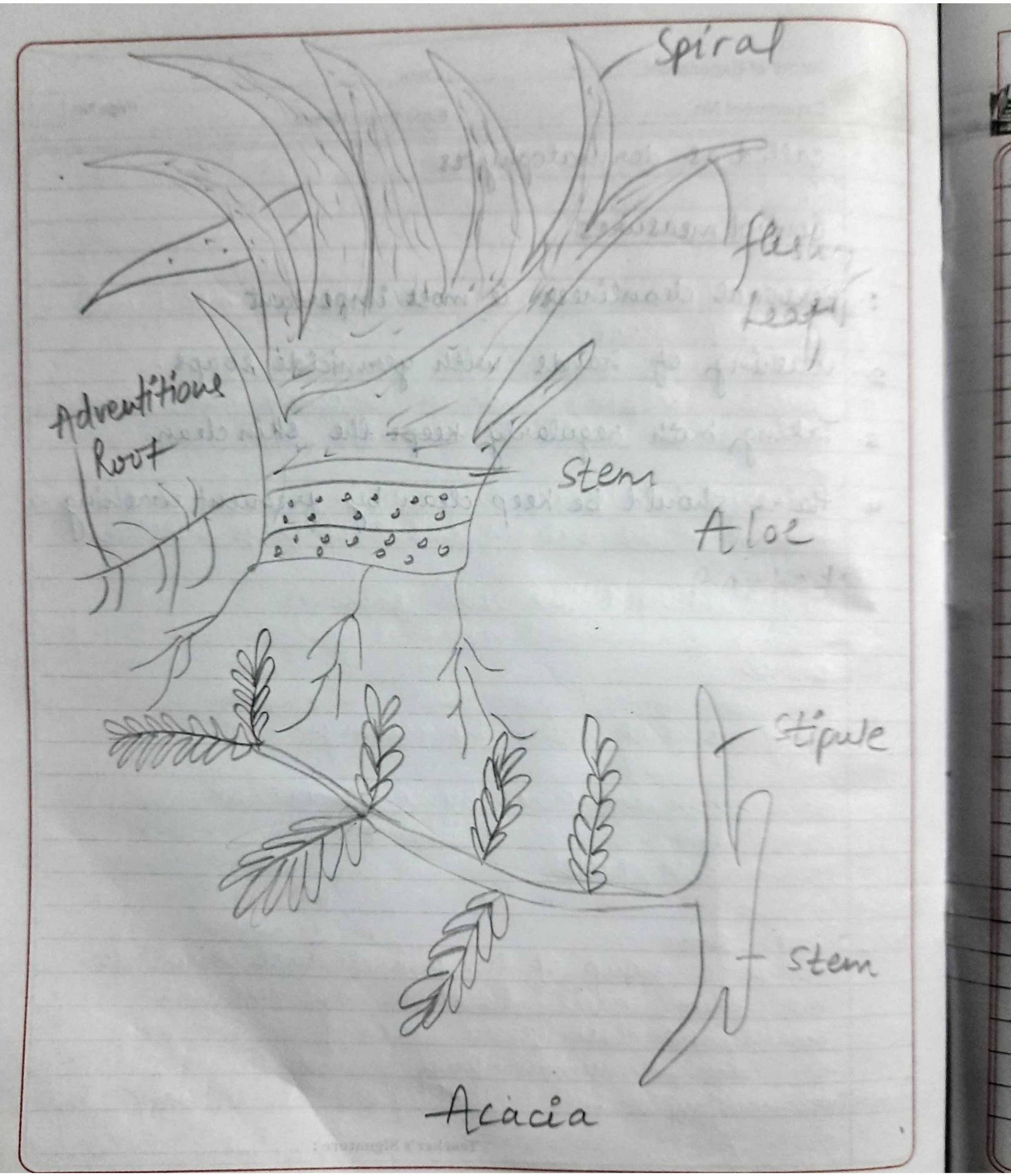

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Experiment No..... Experiment Result.....

Experiment 16

AIM: To study two plants and two animals found in xeric condition. Comment upon their morphological adaptations.

A. To study the morphological adaptation in xerophytic plants.

Requirements: Living or preserved specimen or charts of Aloe, opuntia, Calotropis, Acacia, Zizephus.

Observations

1. Aloe →

- It is a mild or cultivated shrub
- Stem is underground Rhizome
- Leaves are thick, succulent and arid in nature
- Leaf surface is smooth and shining
- Presence of mucilage in leaves

2. Opuntia →

- It is mild and cultivated shrub
- Stem is flat, branched and succulent
- Extensive Surface - fodder root System
- Leaves are small, fleshy, Caudices appear in rainy seas

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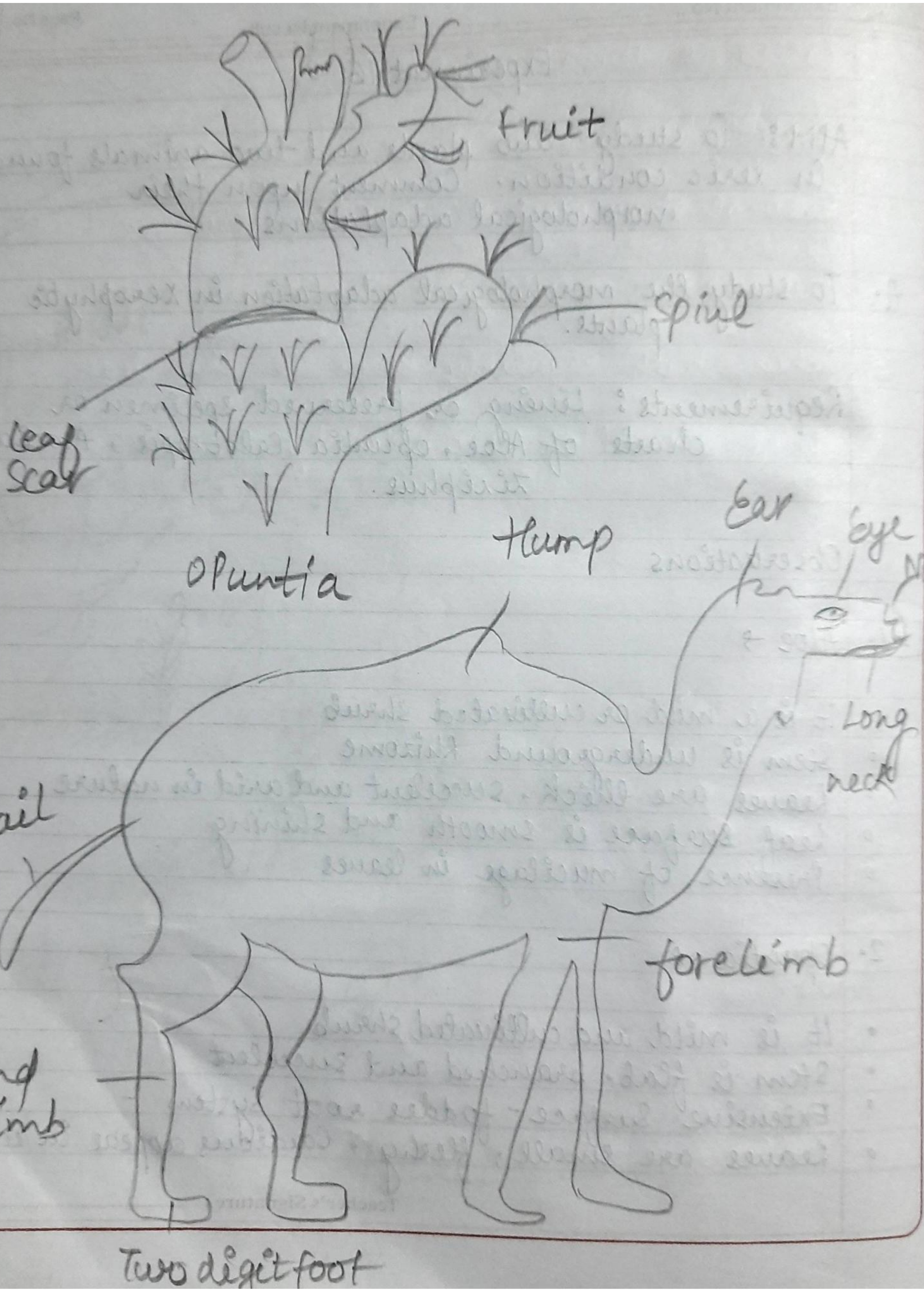

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o Presence of brittles a hardened hairs

[B7] To study morphological adaptations in animals in xeric condition.

Requirement → Charts or models of camel, phython, hedgehog and scaly antena

Observations

1. Camel →

→ It is a prominent animal of scaly deserts

→ The hump of Camel contain reserves of food in the form of fat, which is metabolised to form water and heat.

→ It conserve water by concentrating its urine.

→ Eyes and nostrils bear heavy hairs to protect entering of dust particles.

2. Phython (Ajgar)

→ It is found in wild, dry sand and rocky areas or inside barrow or hanging from tree

→ It is the largest reptile 8-10m in length and 15-20cm in

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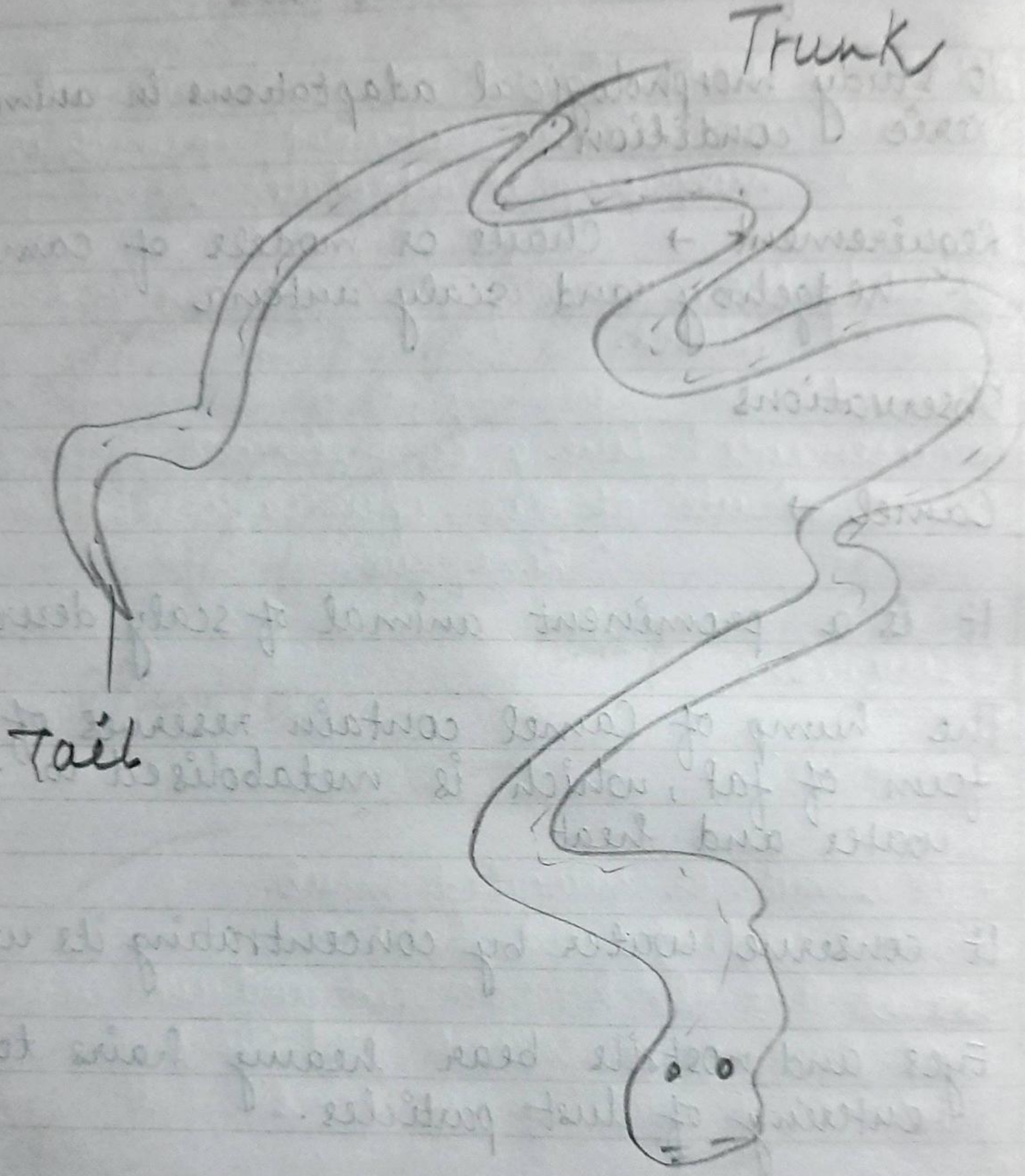

Phython (Ajgar)

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Name of Experiment..... Date.....

Experiment No..... Experiment Result..... Page No.

breadth.

→ Body is cylindrical, grew brown in colour with real black spot

→ Presence of prehensile tail

→ Head is distinct.

→ Claw like specie representing vestigial ~~~~ hind limbs occur on the side of cloacea.

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