PERIYAR INSTITUTE OF DISTANCE EDUCATION (PRIDE)

PERIYAR UNIVERSITY

SALEM - 636 011.

B.Sc. CHEMISTRY

SECOND YEAR

ALLIED PRACTICAL – II : BOTANY

Prepared by :
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ALLIED PRACTICAL – II : BOTANY

Model Question Paper

Time :3Hours Max.marks : 100marks

Practical : 90marks

Record : 10marks

1.Refer A and B to their families giving reasons(Diagrams not nessary)
-14 marks

2.Identify the plant,family and morphology of the parts used for C,D,E,F and G
-15 ,,

3.Cut transverse sections of H and I.stain and mount in glycerine.identify giving reasons.

Draw diagrams.Submit the slides for valuation. -24 ,,

4.Write critical notes on J,K,L,M,N and O.Draw diagrams. -30 ,,

5.Comment on the set up P. -07 ,,

Question No: A

Family Identification-Reasons:

Family—FABACEAE

Characteristic features:

-pulvinate leaves(swollen leaf base) are present flowes bracteate, bracteolate, bisexual, complete, irregular, zygomorphic, perigynous and cyclic -corolla shows three kinds of petals.one standard petal,two wing petals and two keel petals-that is, **papilionaceous corolla** -descendingly imbricate aestivation of petals -10 stamens, diadelphous (9)+1

-**monocarpellary, unilocular**, superior ovary with many ovules on **marginal placentation.** long and bent style with hairy stigma.

-**legume** type of fruit Based on these features the plant belongs to the family-**FABACEAE**

Systematic position:

Class	:	Dicotyledonae
Sub-class	:	Polypetalae
Series	:	Calyciflorae
Order	:	Rosales
Family	:	Leguminasae
Sub-Family	:	Fabaceae

Commonly given plants:

i.Clitoria ternatea - ,, Tamil-Sangu poo

ii.Pongamia glabra - ,, -Punga maram

iii.Crotalaria verucosa - ,, -Kilugiluppai chedi

iv.Tephrosia purpurea - ,, -Kaattu kolingi

v.Sesbania grandiflora - ,, -Agathi.

Family:Caesalpineaceae

Reasons for identification:

-bracteate,pedicellate,complete,irregular,zygomorphic,bisexual pentamerous,slightly perigynous flowers.

-5 petals,free,ascendingly imbricate aestivation,one **posterior odd petal irregular**

-**10 stamens,free**,all stamens aer not fertile,generally three staminodes.

-**monocarpellary,**superior or slightly inferior ovary,unilocular with many ovules on **marginal placentation**.

-straight or curved hairy long style

-legume type of fruit.

Based on the above characters the plant belongs to the family **Caesalpiniaeace.**

Systematic position:

Class	--	Dicotyledonae
Sub-class	-	Polypetalae
Series	-	Calyciflorae
Order	-	Rosales
Family	-	Leguminosae
Sub- family	-	Caeslpiniaceae

Commonly given plants;

i.Caesalpinia pulcherrima ,, - Tamil-Mayil kondrai

ii.Cassia auriculata ,, - Aaavarai

C.tora ,, - Tagarai

C.siamea ,, - Manja konnai

iii.Delonix regia ,, - Vada narayan

iv.Tamarindus ,, - Puli

Family:MIMOCEAE

Reasons for identification:

The given plant shows the following features:

- presence of pinnately compound leaves
- bracteate,actinomorphic,bisexual,hypogynous,complete,tetraor pentamerous flowers,generally small flowers
- spike or cymose head or racemose
- many stamens,or 4 to 10 free,filaments longer than corolla,dithecous, basifixed anthers
- monocarpellary,unilocular,superior ovary with many ovules on marginal placentation,long style,shortly stalked ovary
- lomentum fruit

Based on the above features the given plant belongs to the family **Mimoceae** Systematic position:

Class ---Dicotyledonae

Sub-class --Polypetalae

Series --Calyciflorae

Order --Rosales

Family ---Mimoceae

Commonly given plants for the practicals:

i.Albizzia lebbak Tamil –Vaagai

ii.Mimosa pudica Tamil -Thottal sinungi

iii.Samanea saman ,, -Thoongu moongi maram

Family-RUBIACEAE:

Reasons for identification:

The given material shows the following features-

- **interpetiolar** or intrapetiolar stipules
- bracteate, complete, regular, actinomorphic, tetramerous or pentamerous flowers **epigynous flowers**
- 4 or 5 Petals, **Gamopetalous** corolla,regular,tubular corolla
- 4 or 5 **stamens, epipetalous**, alternipetalous,inserted near the mouth of corolla tube
- bicarpellary,syncarpous, **inferior**, bilocular ovary,many ovules on axile placentation,simple style,bifid stigma

Systematic position-

Class - Dicotyledonae

Sub-class - Gamopetalae

Series - Inferae

Order - Rubiales

Family - Rubiaceae

Common plants for practical-

i.Ixora coccinea - Tamil –Idli poo

ii.Morinda coreia - ,, -Nuna

iii.Oldenlandia umbellata ,, -Saaya ver chedi

Family-LAMIACEAE:

Reasons for identification-

The given plant shows the following features-

- generally herb plants

-quadrangular stem

- scented or aromatic plants-opposite leaves

- plants covered with epidermal hairs
- **verticillaster (**Leuacus) or thyrsus (ocimum)inflorescence
- bracteate,complete,zygomorphic,bisexual,hypogynous flowers
- persistent bilipped calyx
- 5 petals,bilipped,2/3 or 4/1**,bilabiate corolla** ,gamopetalous corolla
- **4 stamens**,epipetalous,**didynamous(2+2)**
- bicarpellary,syncarpous,superior,bilocular later tetralocular ovary one ovule in each locule on axile placentation.
- **gynobasic style**,bilobed stigma
- fruit-schizocarpic 4 nutlets

Systematic position-

Class - Dicotyledonae
Sub-class - Gamopetalae
Series - Bicarpellatae
Order - Lamiales
Family - Lamiaceae

Common plants for the practicals-

i.Leucas aspera -- Tamil -Thumbai
ii.Ocimum sanctum - ,, -Tulasi
iii.Anisomeles malabarica ,, -aruva sadachi or kaluthai thumbai

Family-ARECACEAE

Reasons for identification-

The given plant shows the following features-

- pinnately compound leaves
- large sheathing leaf base
- **spadix inflorescence** with large spathe
- sessile**, unisexual**, actinomorphic, trimerous flowers, hypogynous, monoecious or dioecious
- tepals 6,3+3, polyphyllous, persistent, leathery, valvate or imbricate aestivation
- Male flower:
- 6 stamens 3+3,epiphyllous,dithecous,dorsifixed
- Female flower:

- 3 carpels, tricarpellary, syncarpous, superior, trilocular with one ovule in each locule on axile placentation, short style, stigma small trilobed
- druupe fruit

Based on these features the given plant belongs to the family Arecaceae

Systematic position -

Class - Monocotyledonae

Sub-class - Calyciflorae

Family - Arecaceae

Plants for the practicals -

i.Cocos nucifera - Tamil -Thennai

Q.No.2.Identify the plant,family and morphology of the parts used.

Plant	Common name/ Tamil name	Family	Morphology of the art used
1.Annona sqamosa	Custard apple-Seetha pazam	Annonaceae	Friut
2.Arachis hypogea	Ground nut	Fabaceae	Seed
3.Dolichos biflorus	Hoese gram-Kollu	Fabaceae	Seed
4.Cicer arietinum	Bengal gram – kondai kadalai	Fabaceae	Seed
5.Pisum sativum	Pea-Pattani	Fabaceae	Seed
6.Phaseolus mungo	Black gram –Ulundu	Fabaceae	Seed
7.Abrus precatorius	Crab's eye – kundri mani	Fabaceae	Seed
8.Phaseolus radiatus	Green gram-Pacchai payaru	Fabaceae	Seed
9.Tamarindus indica	Tamarind-Puli	Caesalpineaceae	Fruit
10.Acacia concinna	Soapnut-Sihaikai	Mimoceae	Fruit
11.Coffea Arabica	Coffee	Rubiaceae	Seed
12.Ocimum sanctum	Basil-Tulsi	Lamiaceae	Leaf
13.Mentha viridis	Mint-Pudina	Lamiaceae	Leaf
14.Phoenix sylvestris	Date-Paereecchai	Arecaceae	Fruit
15.Areca catechu	Betal nut-Paakku	Arecaceae	Nut

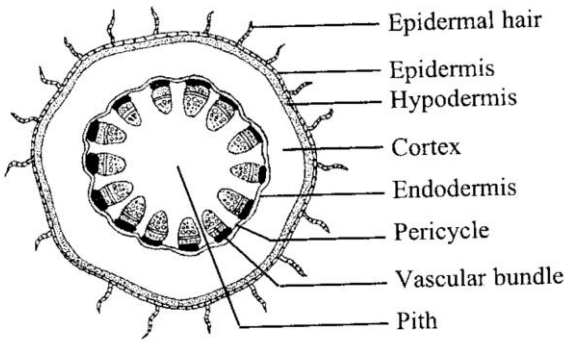
16.Cocos nucifera Coconut-Thennai Arecaceae Endosperm

Q.No.Study of Transverse sections:

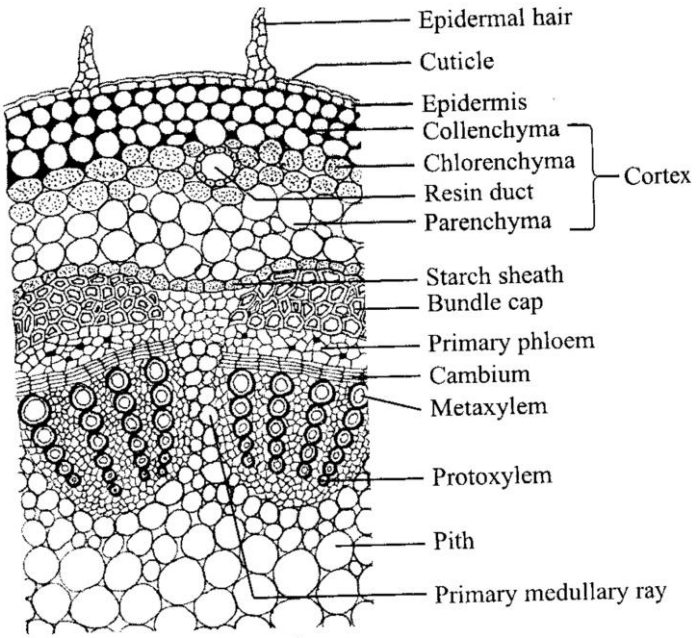
Primary Dicot Stem:

Reasons for identification:

- Vessels are noticed in the xylem -Angiosperm
- vascular bundles are conjoint,collateral and endarch protoxylem -Stem
- presence of distnct pericycle and endodermis
- vascular bundles are arranged in a ring and presence of well developed cortex and pith -Dicot stem
- secondary xylem and secondary phloem absent



Ground plan



A sector enlarged

-Young Dicot Stem

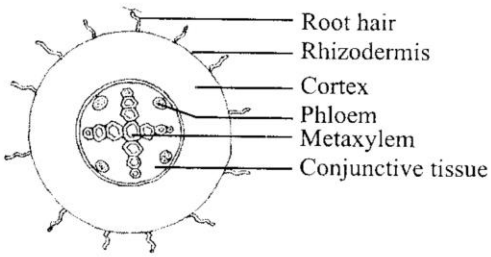
Primary Dicot Root:

The following features are noticed in the section;

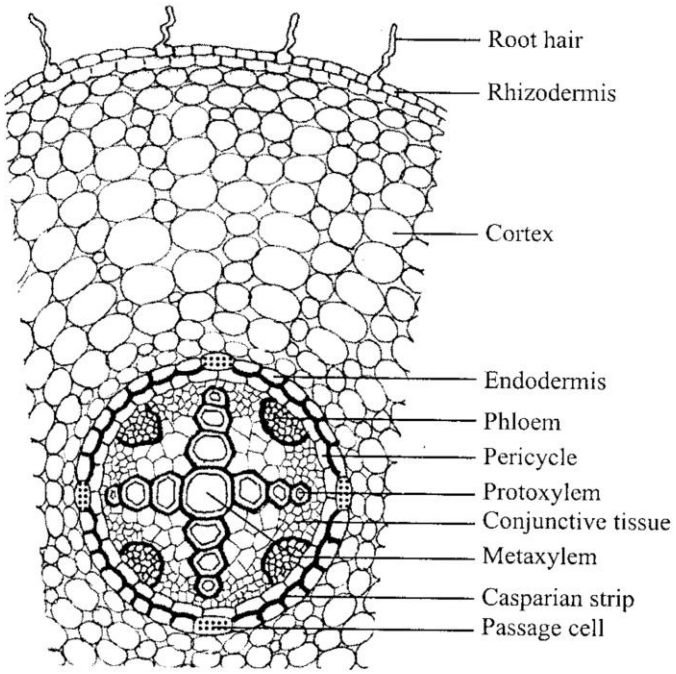
1. vessels are noticed in the xylem
2. presence of unicellular root hairs
3. presence of undifferenciated massive parenchymatous cortex
4. vasclur bundles are arranged in a radial manner
5. protoxylem is exarch

All the above features show that it is a Root

6. Tetrarch condition
7. absence of pith
8. absence of secondary tissues



Ground plan



A sector enlarged

shows that the given material is **Young Dicot Root**

Dicot Leaf:

The following features are noticed in the section

-expanded portion of the material

-presence of mesophyll tissue

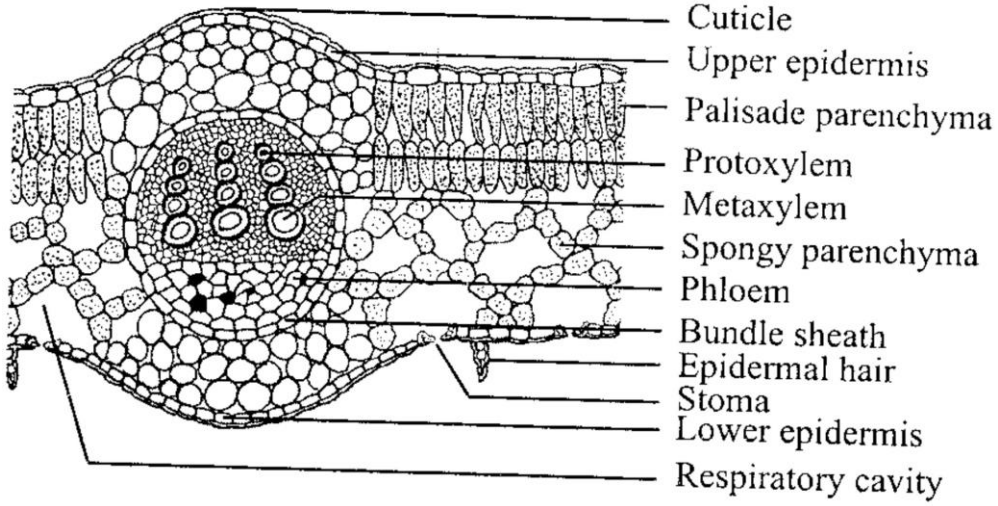
-presence of bundle sheath

-presence of lower and upper epidermis

-clear distinction of mesophyll into palisade and spongy parenchyma

-presence of stomata on the lower epidermis

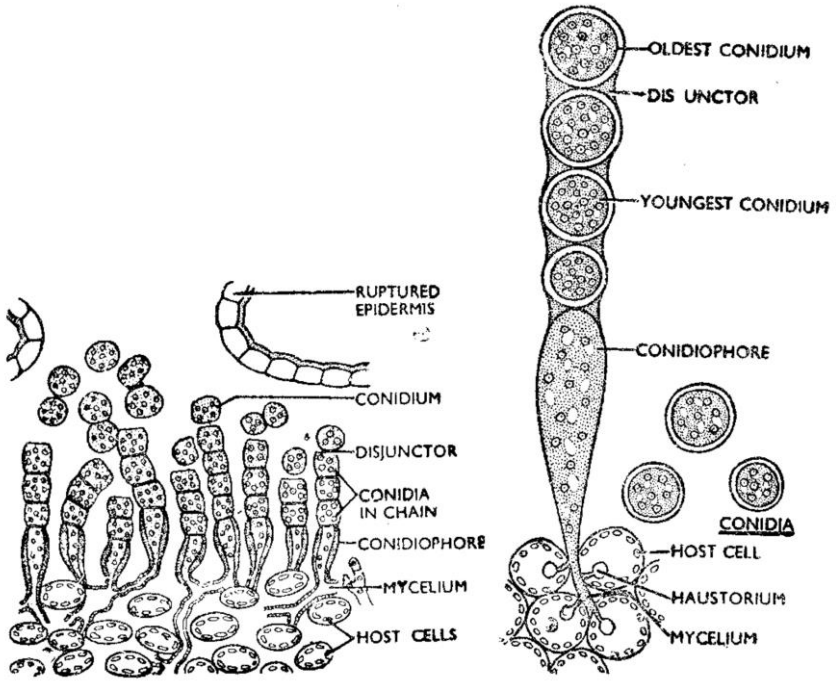
All the above features show that the given material is the **Dicot Leaf**



Infected leaf showing Albugo-conidial stage

Reasons for identification;

- the section shows intercelluar,branched coenocytic and multinucleate mycelium
- from the mycelium many erect conidiophores are noticed
- the multinucleate elongated conidiophore bears chains of conidia at its distal end in basipetal manner
- each conidium is multinucleate and globose
- conidia are separated from each other by a sterile intercalary disc

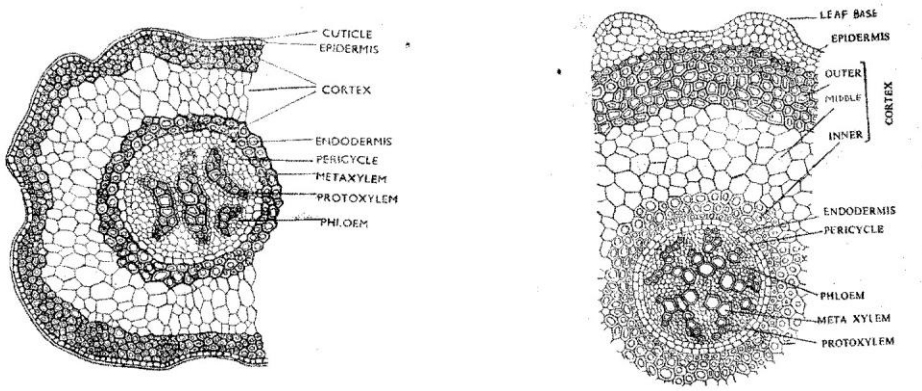


All the features shows that the given material is a leaf showing **Albugo-conidial stage**

Lycopodium-stem T.S.

The section shows the following features:

- vessels are absent in the xylem
- epidermis,cortex,endodermis,pericycle and stelar regions are noticed
- single layered epidermis with cuticle is noticed
- cortex is differenciated into outer sclerenchymatous, middle parenchymatous and inner sclerenchymatous
- presence of single layered endodermis
- the stele is plectostele



Based on these characters the given material is Pteridophyte-

Lycopodium stem

Cycas –corolloid root:

The material shows the following features in t,s.

-absence of vessels in the xylem

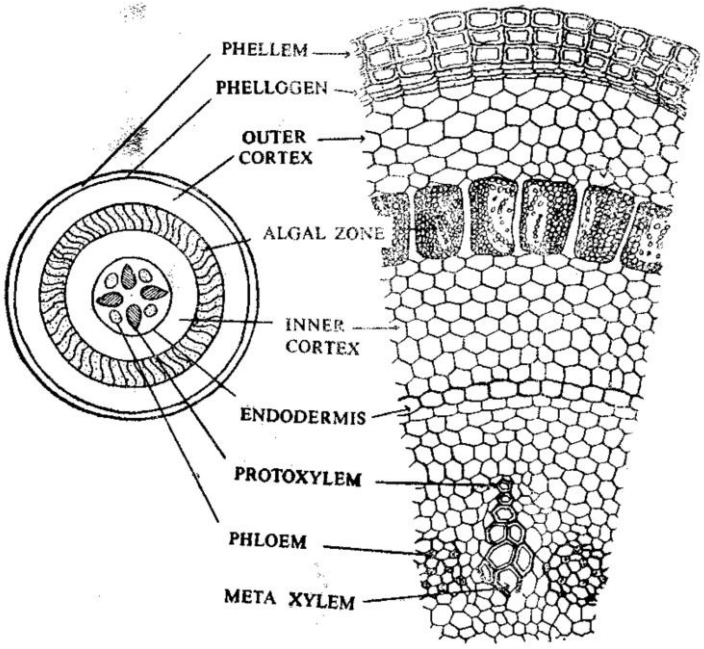
-exarch nature of protoxylem

-clear disdinction of epidermis,cortex,endodermis,pericycle and stele

-xylem strands are triarch and exarch

-presence of algal zone in the cortex

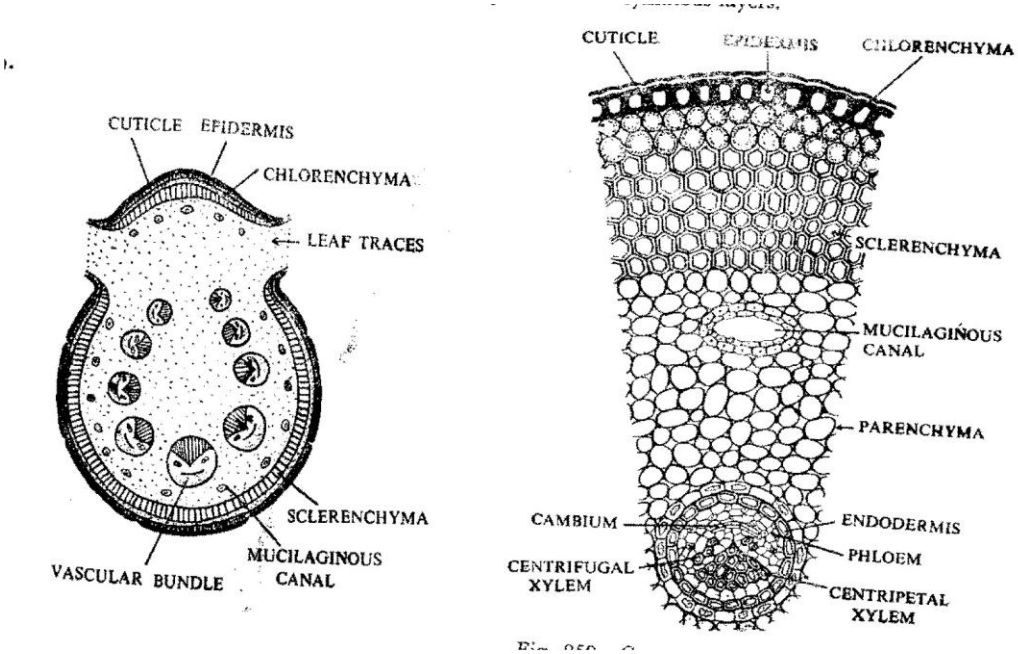
These features confirms it of a Gymnosperm and **Cycas corolloid root**



Cycas rachis T.S.

The following features are noticed in the section:

- outermost is a thck cuticle which is followed by uniseriate epidermis
- stomata are present in the epidermis
- hypodermis is differenciated into chlorenchymatous and sclerenchymatous regions
- numerous mucilaginous canals are present in the ground tissue
- many vascular bundles are arranged in the form of 'U' or omega shaped
- each vascular bundle is having centripetal and centrifugal xylem
- vascular bundles are conjoint,collateral and open.



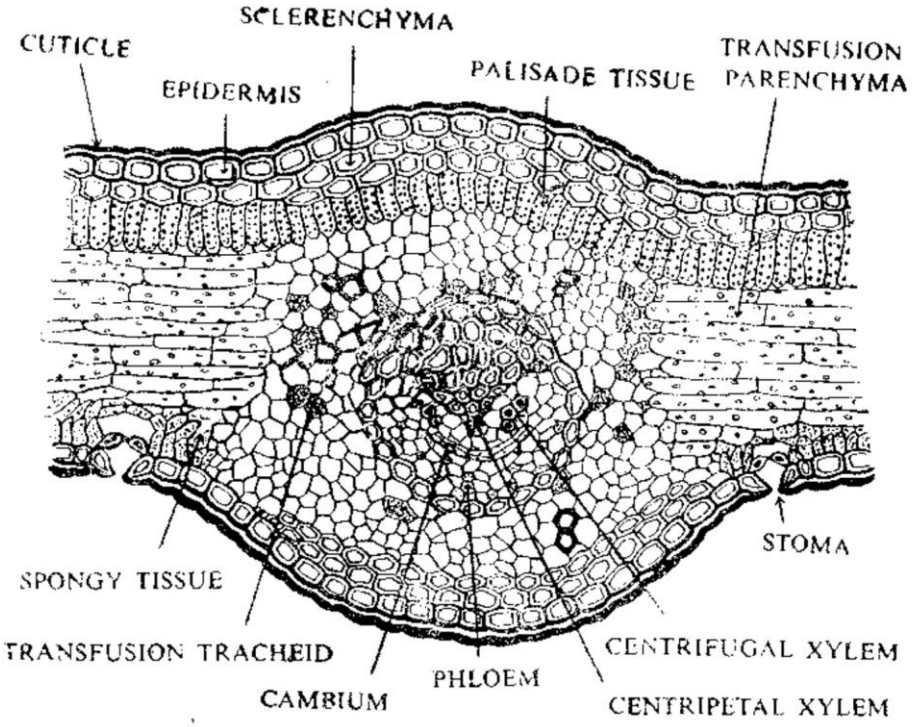
Hence, the given material is **Cycas corolloid root**

Cycas leaflet T.S.

The following features are noticed in the section

- dorsiventral and hypostomatic
- upper epidermis is continuous and thick walled covered by cuticle
- below the epidermis 2-3 layered sclerenchymatous hypodermis is noticed
- mesophyll is differentiated into palisade and spongy parenchyma
- the central part of the leaflet is constituted by transversely placed flattened,narrow lumened
  parenchymatous transfusion tissue
- vascular bundle has bundle sheath
- centripetal and centrifugal xylem are present in the xylem region
- phloem lies towards lower side
- sunken stomata are present in the lower epidermis

These features are the characteristic of **Cycas leaflet**



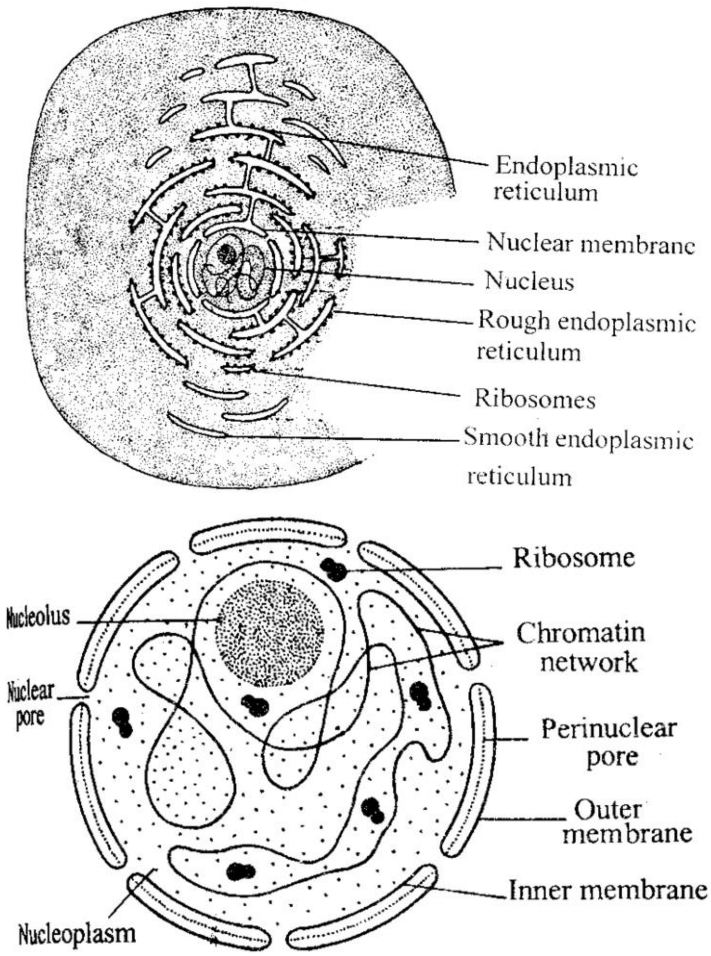
Q.No. 4. SPOTTERS :

CYTOLOGY:

PHOTOGRAPHS:

NUCLEUS:

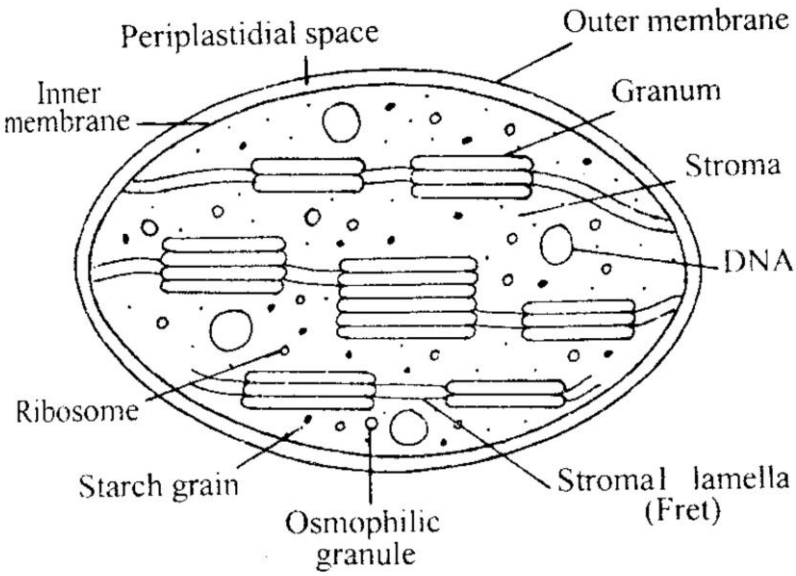
- the parts of a well defined nucleus are nuclear membrane,nucleoplasm,nucleolus and chromatin fibres.
- nuclear membrane is double layered (ie).outer and inner membrane
- nuclear membrane is interupted by nuclear pores
- the space between two memranes is perinuclear space
- inner to nuclear membrane is present nucleoplasm
- nucleoplasm is homogenous transparent and granular
- nucleoplasm contains organic and inorganic substances like nuclic acids,proteins,enzymes and minerals
- a large,spherical,dense and granular body nucleolus is present in the nucleoplasm
- nucleolus contains several enzymes and phosphoproteins
- nucleoplasm contains many thread like elongated and coiled structures known as chramatin fibres



-main role of nucleus is its in heredity

ENDOPLASMIC RETICULUM:

- E.R is a network of membrane bound cavities,vesicles and tubules,distributed throughout the cytoplasm
- it is the cytoskeleton of of the cell
- it extends from nucleus to the margin of the cell
- small granules ribosomes are noticed on the E.R. and this type is called rough endoplasmic reticulum
- some E.R. without ribosomes called smooth endoplasmic reticulum
- E.R. mainly performs the function of transport,mechanical support and site of protein synthesis



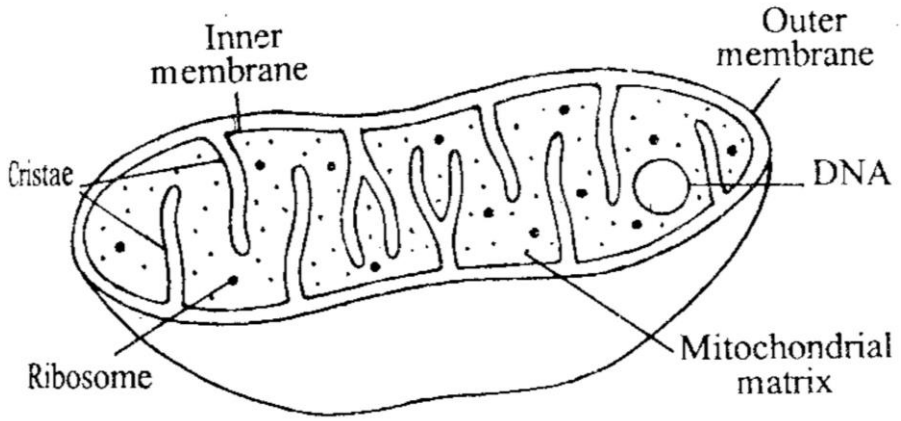
CHLOROPLAST:

- chloroplast has double membrane envelope outer and inner
- the space enclosed by the two membranes is periplastidial space
- the membranes enclose a protenioceous matrix called stroma
- the matrix is colloidal,transparent and contains starch grains,osmophilic granules,ribosomes and D.N.A. molecules
- in the matrix there are many closed flattened sacs called thylakoids
- thylakoids are arranged one above the other in the form of a stack of coins to constitute a Granum
- a granum has 10-100 thylakoids
- thylakoids contain pigments namely chlorophylls and carotenoids
- the grana of the chloroplast are interconnected by tubules known as fret
- chloroplasts involve in photosynthesis

MITOCHONDRION:

- mitochondria are double membrane bound organelle found in cytoplasm
- known as ‘power house’ of a cell
- the space between two membranes is called outer chamber and filled with a fluid
- the space enclosed by the membranes inside is the inner chamber
- inner chamber is filled with mitochondrial matrix

- mitochondrial matrix contains lipids,proteins,circular D.N.A.,70 S ribosomes
- the inner membrane shows many infoldings called cristae
- cristae have many granules called elementary particles or F1 particles or oxysomes or electron transport particles ETP
- the particles of the outer membrane are stalkless whereas the particles of the inner membrane are stalked
- each stalked particle consists of a base,stalk and a head
- the F1 particles contains enzymes ATP synthetase
- the mitochondrial matrix contains many enzymes of Kreb's cycle
- mitochondria main role is in Respiration.

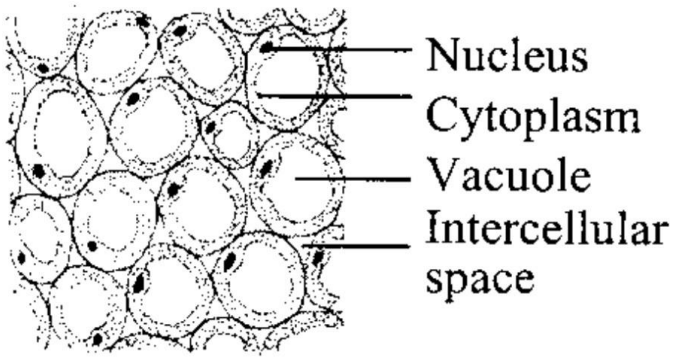


ANATOMY:

Permanent slides:

Parenchyma:

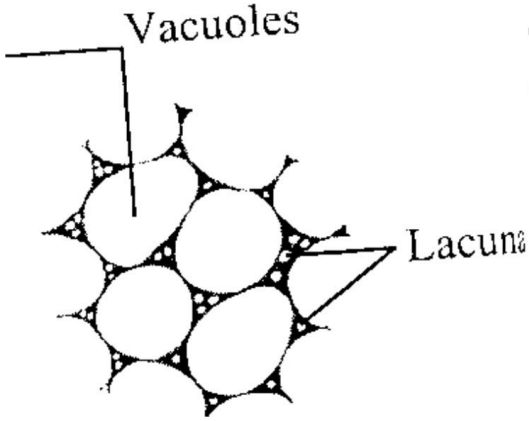
i. parenchyma is a living tissue made up of thin walled cells
ii. the cell wall is thin and made up of cellulose and pectic materials
iii. intercellular spaces are noticed
iv. it has nucleus,cytoplasm and vacuole.
v. it performs various functions like storage,assimilation etc



Parenchyma tissue

Collenchyma:

i. collenchyma is a living tissue
ii. they are polygonal in cross section
iii. the cell wall is unevenly thickened
iv. the thickenings are confined to corners of cells
v. cell wall contains high amount of hemicellulose and pectin
vi. collenchyma performs the function of mechanical

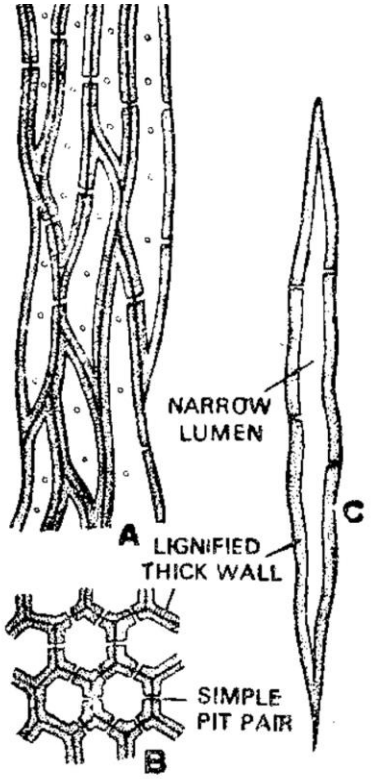


Sclerenchyma:

i. it is a simple permanent dead tissue
ii. cells have lignified secondary walls
iii. protoplast is absent
iv. fibres are very long and narrow with pointed ends
v. in t.s. they are polygonal with narrow lumen
vi. secondary wall is thickened with lignin

vii. the walls are having simple pits

viii. they are supporting tissue and provide mechanical strength.



Stone cell;

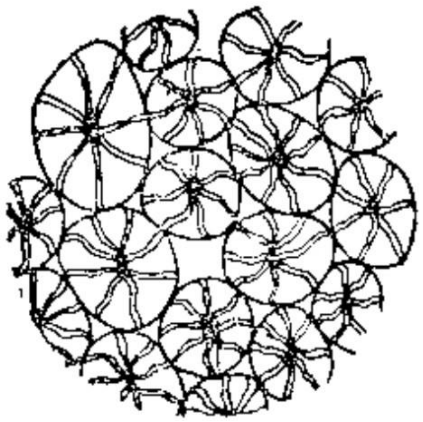
i. it is a kind of sclerenchyma tissue

ii. they are dead cells

iii. the cells are shorter and isodiametric .The cell wall is very thick with lignin.

iv. lumen is very much reduced.The pits may be simple or branched

v. it gives rigidity to the organ



Xylem:

i. xylem is a complex permanent tissue

ii. xylem is made up of four kinds of cells-tracheids, vessels, xylem fibres and xylem parenchyma

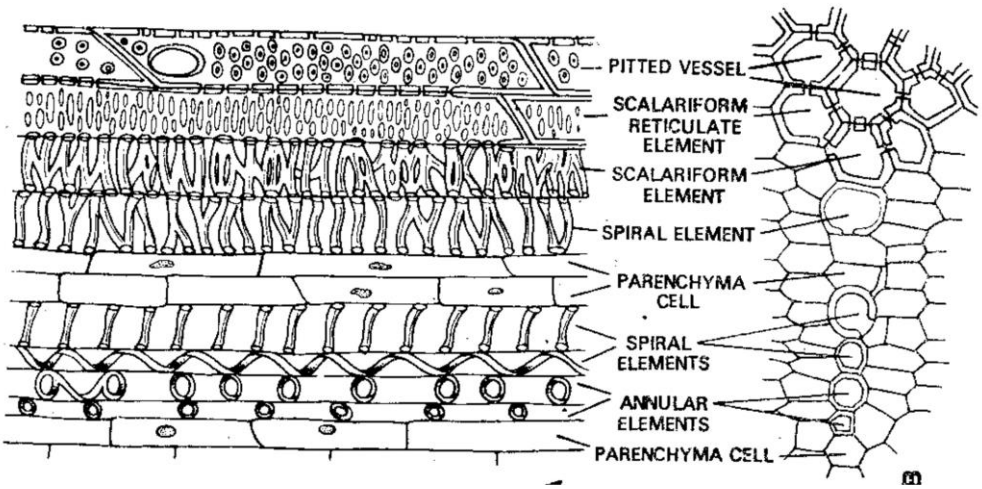
iii. tracheids are elngated with tapering ends and with broad lumen and arranged one above the other. Cell wall thickening like annular, spiral, sclariform, reticulate and pitted are noticed

iv. vessels are perforated at the end walls with wide lumen. The secondary wall thickenings are annular, spiral, scalariform, reticulate or pitted

v. scalariform fibres in xylem are called xylem fibres

vi. xylem parenchyma is the only living tissue in xylem

vii. xylem is mainly responsible for the conduction of water and minerals



Phloem:

i. phloem is a complex permanent tissue

ii. it is composed of four kinds of elements namely, sieve elements, companion cells, phloem parenchyma and phloem fibres

iii. sieve elements are elongated and their end walls are transverse or oblique with many pores

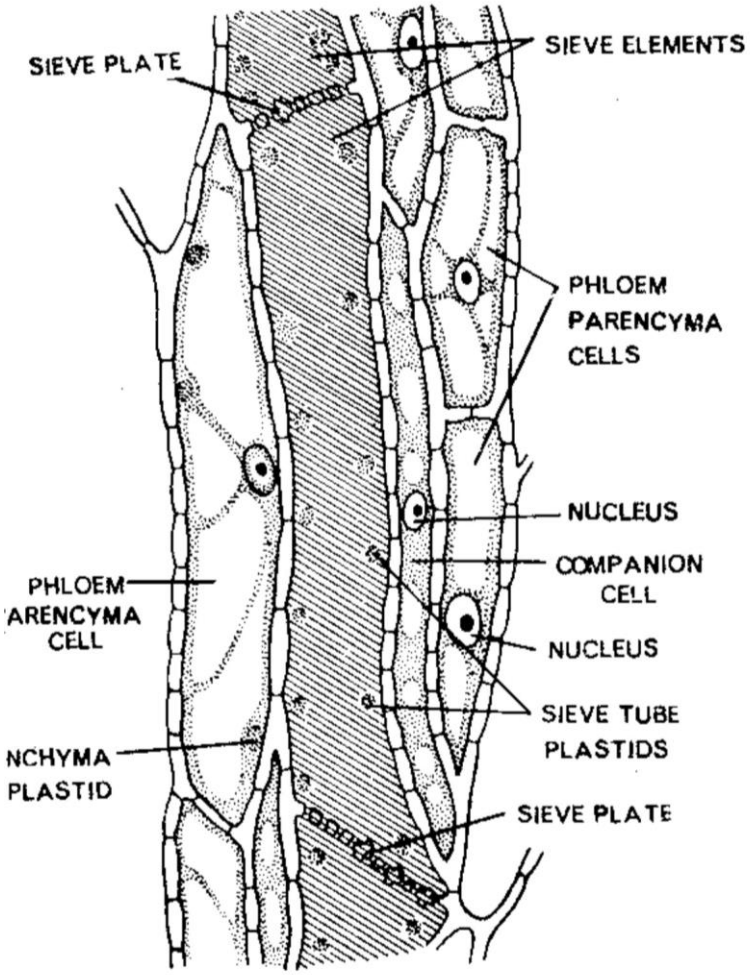
iv. the end wall with many pores is called sieve plate

v. sieve elements are arranged one above the other.The conduction food materials takes place through cytoplasmic strands.

vi. companion cells are thin walled, elongated and associated with sieve elements. They have dense cytoplasm and prominent nucleus

vii. parenchyma cells associated with phloem are phloem parenchyma. They are living.

viii. phloem fibres are the only non-living tissue noticed in phloem

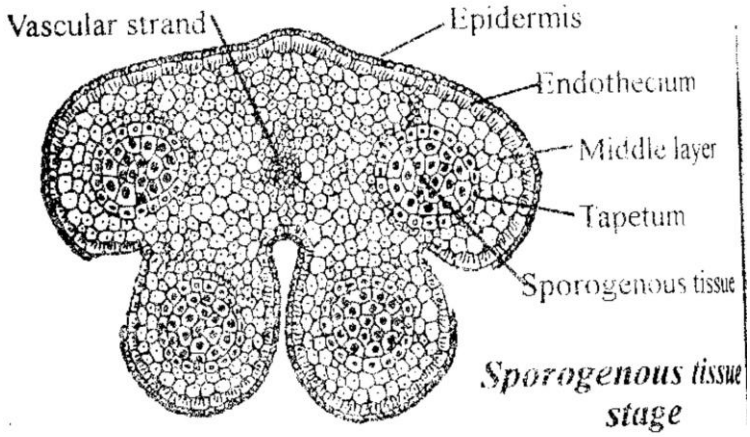


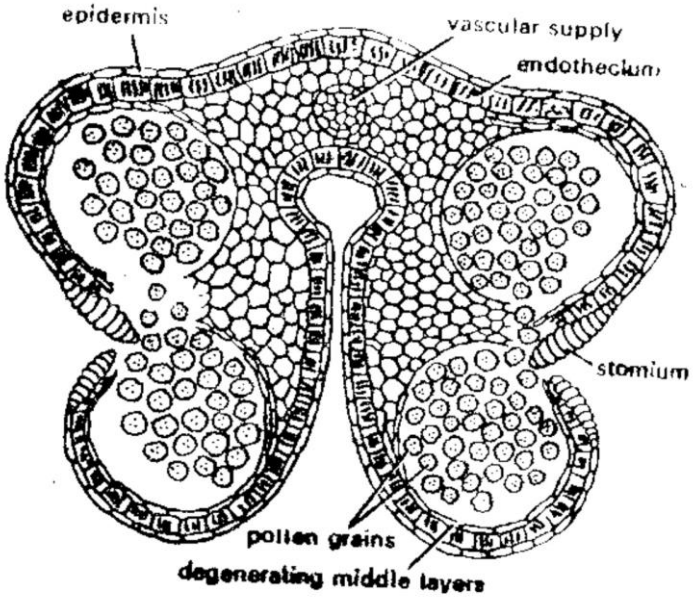
EMBRYOLOGY;

Permanent slides

Young Anther t.s.

1. outermost single layered epidermis is noticed
2. inner to epidermis is present the layers like endothecium,middle layers,and tapetum
3. endothecium is single layered with radial thickenings
4. inner to endothecium is 3 to 4 layered middle layers
5. inner to middle layers is present a single layered nutritive tissue tapetum
6. tapetum encloses a mass of sporogenous tissue





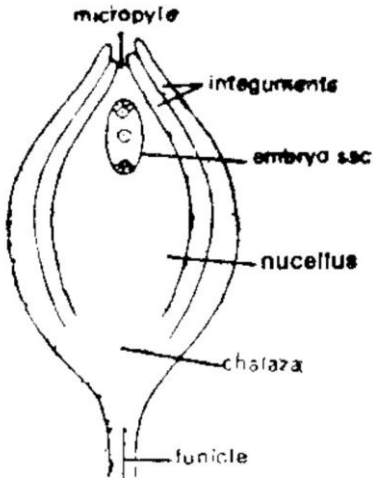
Mature Anther T.S.

1. outermost single layered epidermis is present
2. inner to epidermis is present is present a single layered endothecium
3. below the endothecium dis organized middle layers and tapetum are noticed
4. pollen grains in tetrad or free condition are noticed in the locule
5. epidermis may be in a dehised condition

Ovule

Orthotropous ovule

1. ovule is straight in nature
2. the funicle,chalaza,micropyle all lie in a straight line

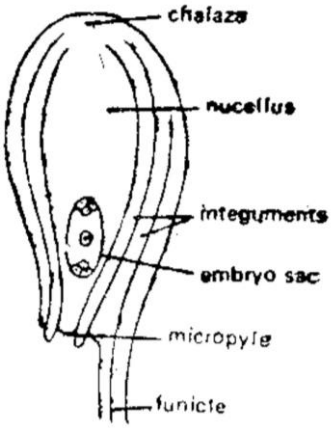


Anatropous ovule

1.ovule is inverted in nature

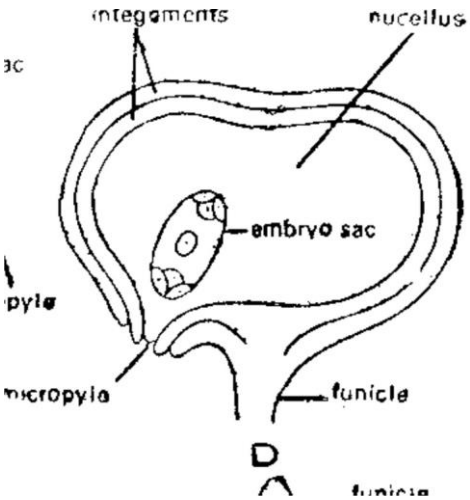
2.micropyle comes nearer to the funicle and hilum

3.chalaza is at the opposite end of the ovule



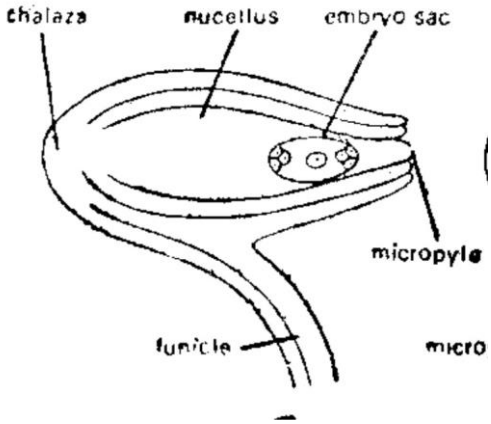
Campylotropous ovule

1. ovule is curved
2. the micropyle and funiculus lie in parallel lines



Hemianatropous

1. the micropyle and chalaza are at right angles to the funicle
2. ovule is ‘T’ in shape



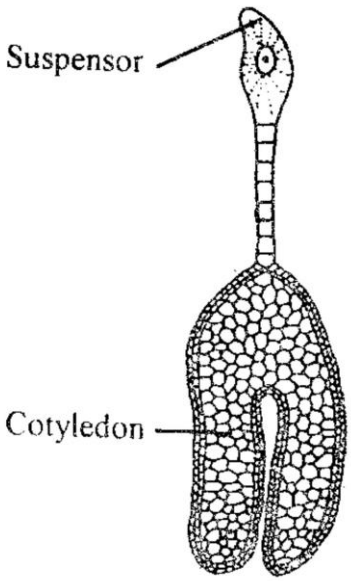
Ovule-structure

- externally two integuments are noticed-outer and inner integument
- an opening formed by the integuments is the micropyle
- integuments enclose a tissue nucellus
- stalk of the ovule is called funicle
- opposite end of the micropyle is chalaza
- in the nucellus is present embryo sac

- in the embryo sac,the cells facing micropyle is called the egg apparatus
- egg apparatus is having an egg cell and two synergids
- oposite to egg apparatus is present antipodals inside the egg apparatus
- in the centre of the embryo sac is present secondary nucleus

Mature Dicot embryo

- mature dicot embryo consists of a short axis and two cotyledons
- each cotyledon appears on either side of the cotyledon
- the terminal part of the axis in between the cotyledons is called plumule
- radicle is noticed on the opposite side of the plumule
- suspensor of 2-6 cells is noticed below the cotyledons



Mature embryo

ALGAE:

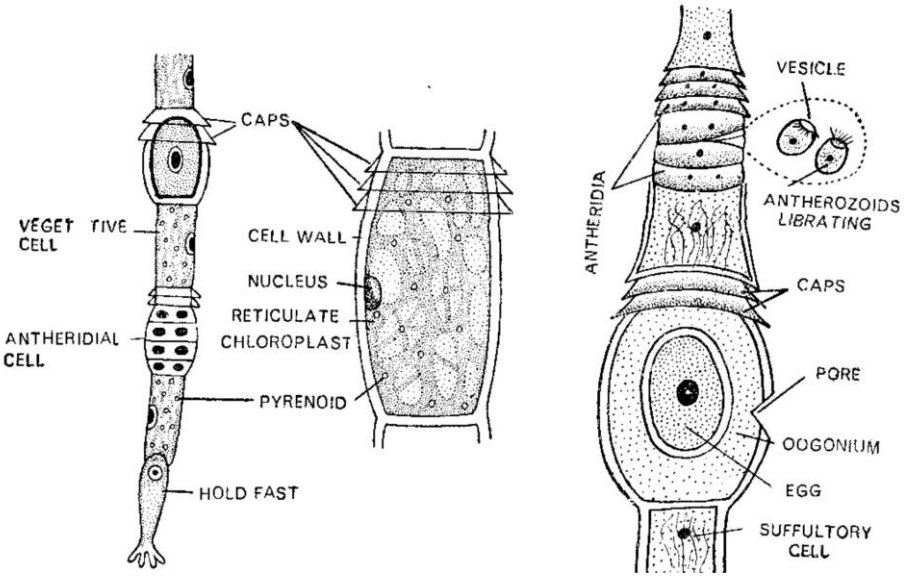
Permanent slide

OEDOGONIUM

Slide showing vegetative filament

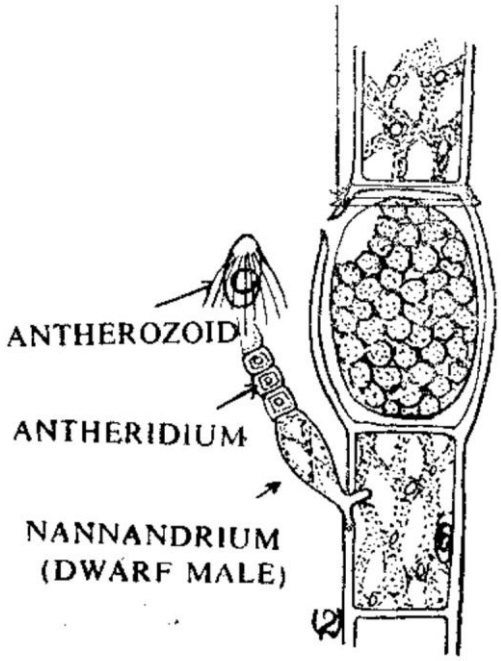
- the filaments are unbranched and cells are arranged one above the other
- apical cell is rounded and the basal cell is rhizoidal
- each cell is cylindrical,elongated and possesses a firm two layered cell wall
- each cell has a nucleus,a chloroplast and a central vacuole

- chloroplast is large,reticulate and cylindrical with many pyrenoids
- some cells are have ring like caps and these cells called cap cells



Slide showing nannandrium:

- on the wall of supporting cell or on oogonium a filamentous dwarf male or nannandrium is present
- nannandrium has two cells lower basal cell and an upper antheridial cell
- from each antheridial cell single antherozoid is produced

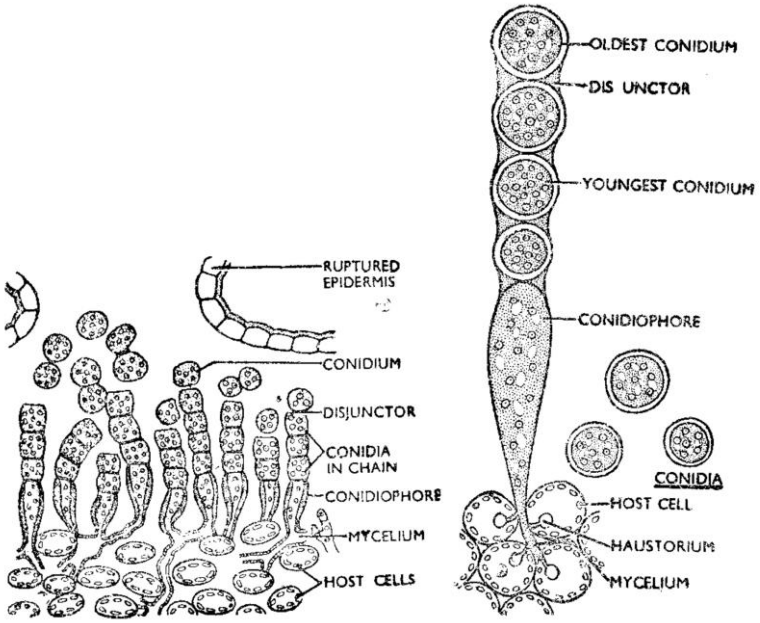


FUNGI:

Albugo

Slide showing conidia

- from the mycelium many erect conidiophores arise
- each conidiophore is multinucleate elongated with swollen thin-walled distal end
- the lower part of conidiophore is thick walled
- the conidiophore produce chain of conidia at its distal end in basipetal manner
- each conidium is multinucleate
- in conidial chains the conidia are separated by separation discs

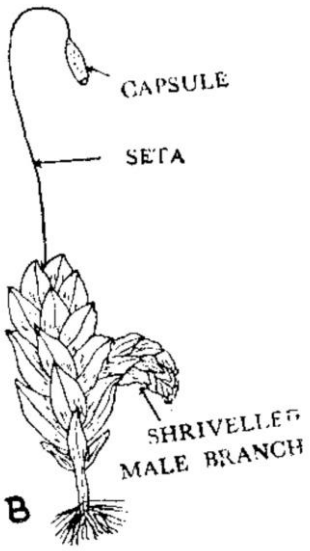


BRYOPHYTE

Funaria[macroscopic]

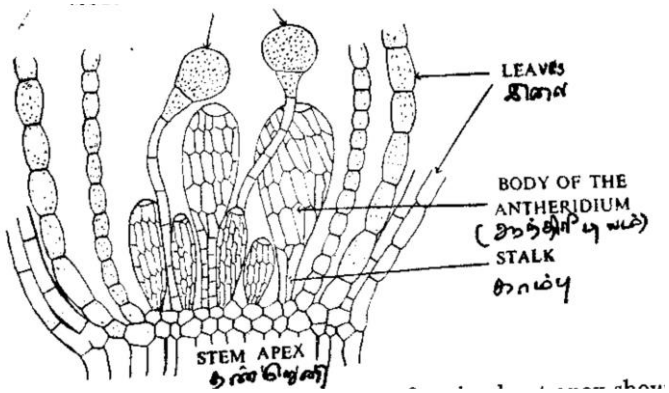
Gametophyte[macroscopic]

- plantbody differentiated into‘stem ‘and ‘leaves ‘
- rhizoids arise in tuft at the base of stem
- leaves are arranged spirally
- each leaf is entire, sessile and has a midrib
- sporophyte may be attached on the gametophytic plant



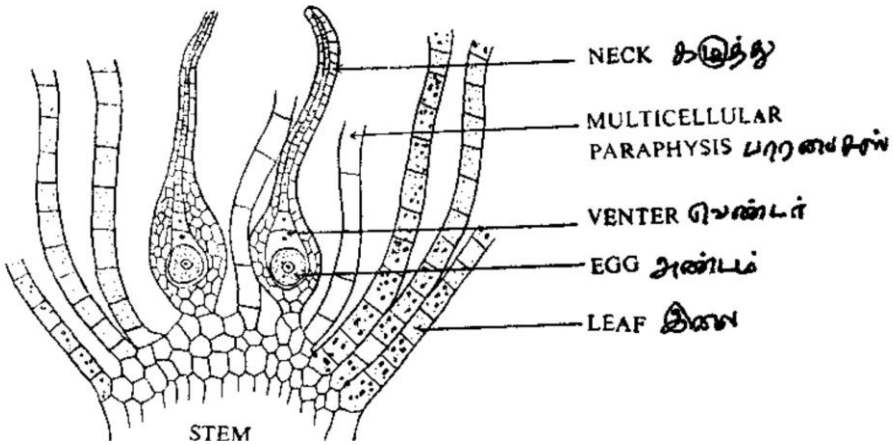
Funaria[slide showing antheridial head]

- at the apex of the main axis expanded convex disc is present
- the disc is occupied by antheridia in clusters called as “male flower”
- in between antheridia multicellular hairs called paraphyses are noticed.The apical cells of the paraphyses are globose in nature
- both antheridia and paraphyses are surrounded by large leaves known as perichetial leaves
- each antheridium is club shaped having a stalk and body
- stalk is massive and multicellular
- antheridiumhas a single layered jacket
- apex of anthridium is closed by 1-2 colourless opercular cells with thin wall
- single layered jacket encloses androcytes



Funaria[slide showing archegonial head]

- archegonia are noticed in clusters,intermingled with archegonia are paraphyses
- archegonia are stalked the stalk is massive
- the matured archegonium is a multicellular,stalked structure with a broad venter and a narrow neck
- the wall of the venter is double layered
- the neck consists of six longitudional rows of cells surrounding a central canal
- neck has 6-9 obliquely placed neck canal cells and venter has a venter canal cell and one egg cell
- paraphyses are multicellular,simple and filamentous

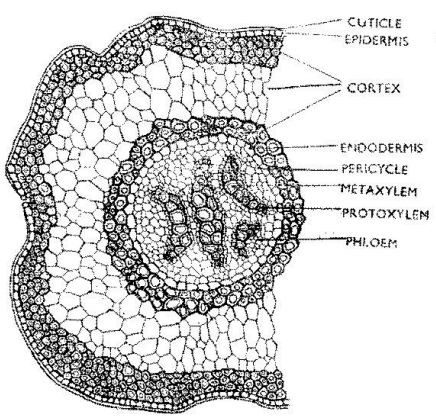


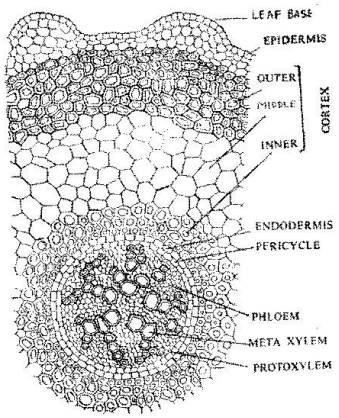
PTERIDOPHYTE:

Lycopodium[slide showing stem t.s]

- the superficial layer is epidermis,it is one cell thick with highly cutinised outer wall
- a broad cortex is present below epidermis which is differentiated into outer and inner sclerenchymatous and middle parenchymatous
- next to cortex is single layered endodermis,it shows radial thickenings
- one or two layered parenchymatous pericycle is present below the endodermis
- central portion of stem is occupied by asingle stele,it has xylem and phloem

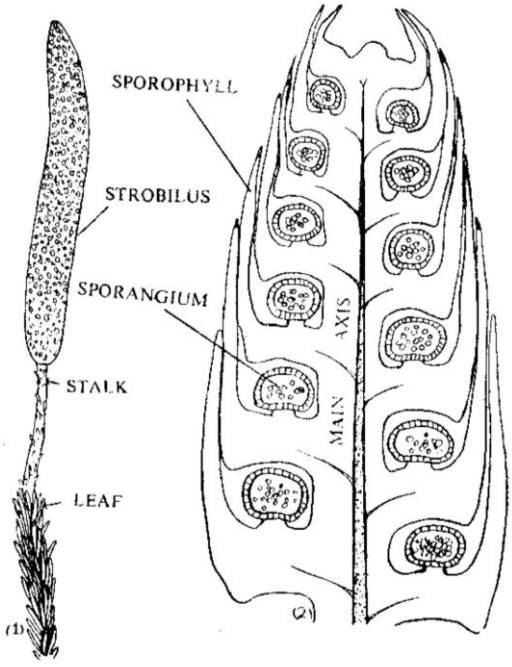
- xylem arranged in parallel bands(L.clevatum),xylem in star shaped fashion(L.serratum) mixed protostele(L.serratum)





Lycopodium [slide showing cone l.s]

- sporangia are borne singly.Cone has a long central axis on which large number of sporophylls are borne.Sporangia are borne on adaxill or upper surface on sporophyll
- each sporangium is more or less reniform and nonseptate with a short broed base
- large number of uniform sized and shaped spores are noticed in each sporangium
- the shape of sporangia and shape of sporophyll varies

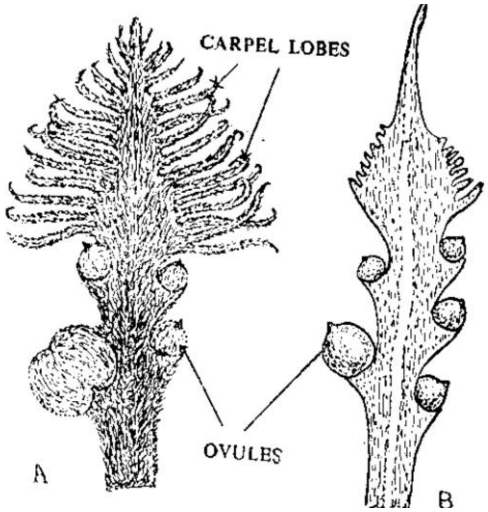


GYMNOSPERM

CYCAS

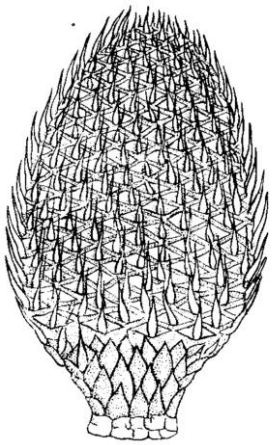
Megasporophyll[macroscopic]

- megasporophyll is a female structure
- megasporophyll is leaf like and made up of two parts-the upper part is pinnately
- lobed or entire leaf like,the lower part is stalk like bearing two lateral rows of ovules



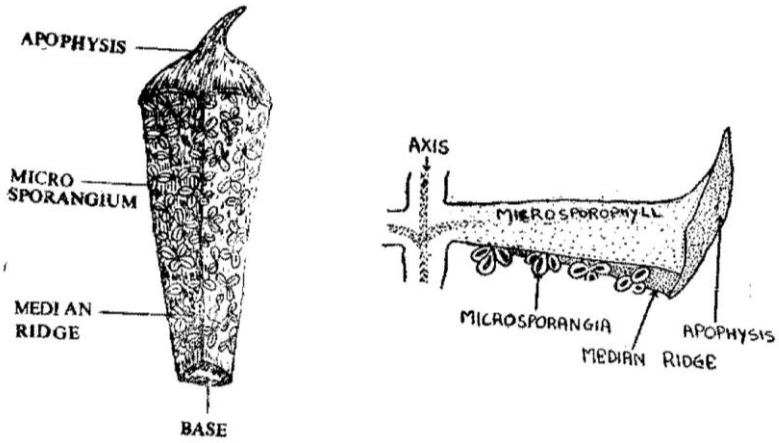
Cycas-male cone entire[macroscopic]

- male cone is conical in shape
- male cone consists of many microsporophylls arranged spirally on a central axis
- each microsporophyll is wedge shaped
- each microsporophyll has a basal narrow sterile part and a flattened fertile upper part



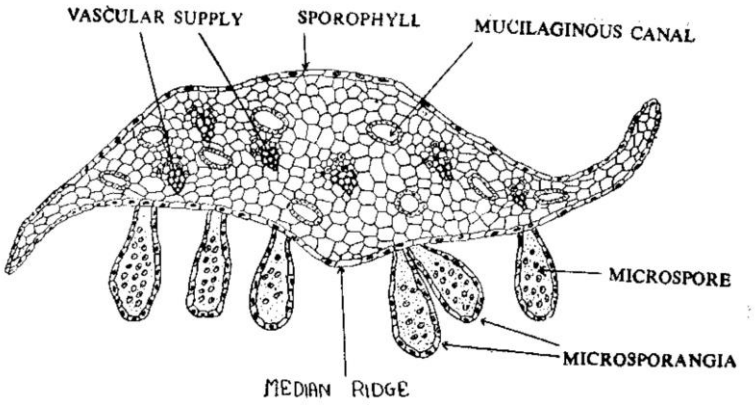
Cycas-microsporophyll entire[macroscopic]

- microsporophyll is wedge shaped having a basal narrow sterile part and a flattened fertile upper part
- the expanded fertile part terminates into a sterile conical beak like structure called apophysis
- the microsporophyll bears microsporangia in groups of 3-5 forming sori
- the sori are attached on the lower side of microsporophylls on both the sides of median ridge



Cycas—[slide showing t.s of microsporophyll]

- a group of sporangia are noticed on abaxial side
- the body of sporophyll consists of compactly arranged parenchymatous cells together with several mucilaginous canals and vascular strands
- each microsporangium contains sporogenous cells surrounded by a tapetum and 4-7 wall layers

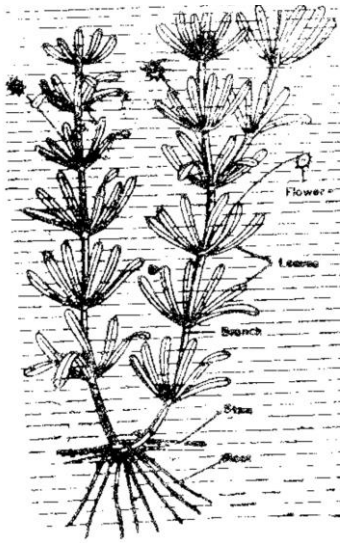


ECOLOGY

Hydrophyte:

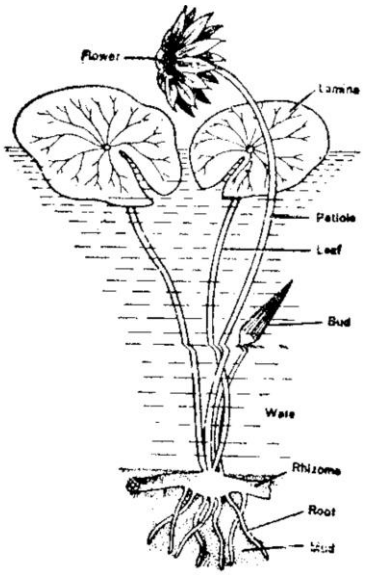
Hydrilla

- it is a rooted submerged hydrophyte
- stem is very long,weak and bears nodes and internodes
- leaves are thin and arranged in whorl phyllotaxy



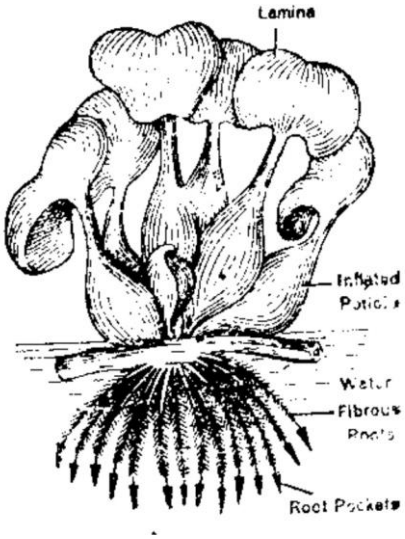
Nymphaea

- it is a rooted aqatic plant with floating leaves
- leaves have very long petiole and broad lamina
- leaves float on the surface of water
- prostrate rhizome with roots remain inside the mud



Eichhornia

- it is a free floating aqatic plant
- it has no contact with soil
- from the short,horizontal thickened rhizome develop many fibrous roots towards the lowerside
- roots have root pockets
- many leaves develop on stem at a common point
- the leaves have swollen petiole
- the swollen petiole is filled with air and helps in floatation



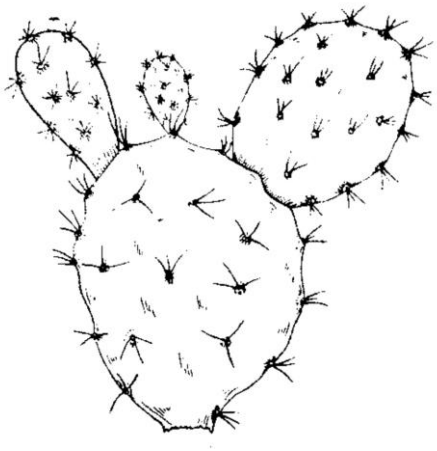
XEROPHYTE

Opuntia

-it is a phylloclad

-the aerial stem is modified into green,flat,succulent leaflike structure(=phylloclad)

-leaves are reduced into spines



Q.No5. Spotter-Physiology Set up

Thistle & Funnel Experiment

Aim:

To demonstrate the phenomenon of osmosis

Materials required:

Beaker,thistle funnel,sheep's bladder,thread,water and sugar solution,stand

Procedure:

The broad mouth of the thstle funnel is tied up with sheep's bladder.Thistle funnel is filled up with concentrated sugar solution.The initial level of the sugar solution in the stem of the funnel is marked.The funnel is dipped into a beaker containing water in such a manner that the mouth portion is inside the water.The funnel is fixed in a stand.The experiment is allowed to stand for sometime.

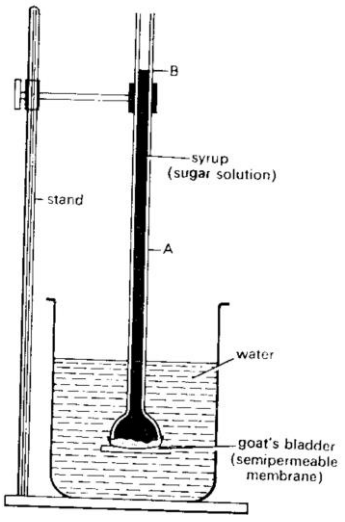
Observation:

Level of sugar solution rises in the stem of the funnel.

Conclution:

The rise in the thistle funnel is due to the entry of water from the region of its higher concentration(beaker),to its lower concentration(thistle funnel) throuh the membrane.

The membrane allows water alone (solvent) not solute,it acts as semi permeable membrane.The movement of solvent from the region of its higher concentration to its lower concentration is known as osmosis.



Test tube and funnel experiment:

Aim:

To demonstrate that oxygen is evolved during photosynthesis

Materials required:

A beaker,funnel,test tube,twigs of Hydrilla(hydrophyte),water,thread.

Procedure:

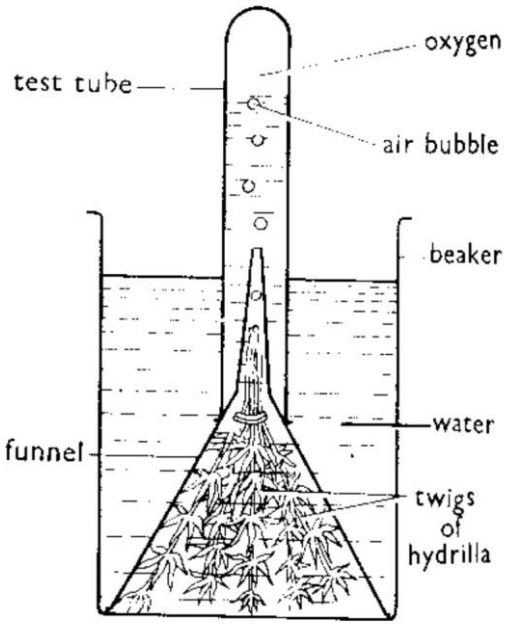
Twigs of hydrilla plant are inserted into the stem of the funnel in such a way that they spread in the wide mouth.Beaker is filled with water.The funnel is then completely immerced in water.A test tube filled with water is inverted over the stem of the funnel.The test tube is fully filled with water.The experiment is placed in sunlight.

Observation:

Air bubbles come out from the cut ends of the plant,escape upwards through the stem of the funnel and collect in the tube.A burnt match stick is introduced into the test tube.

Conclution:

The burnt matchstick indicates the presence of oxygen.Oxygen comes from the photosynthesising plant placed under water.The evolution of oxygen takes place due to photolysis of water during photosynthesis.



Ganong's light screen experiment:

Aim:

To demonstrate that light is necessary for photosynthesis

Materials required:

Ganong's light screen apparatus,a twig of potted plant,iodine.

Procedure:

Take a potted plant and make its leaves destarched by keeping it in dark for one or

two days.Fix a leaf of this plant in between Ganong's light screen.Keep the whole apparatus in sunlight.Remove the leaf to which the screen has been attached after few hours,and test for starch with the help of iodine.

Observation:

In the region of the cut portion of the metal plate leaf shows positive iodine test.

Result:

The iodine test is positive only in the regions of the leaf exposed to sunlight while on the other hand the unexposed regions show negative iodine test for starch.The photosynthetic product starch is formed only in those region which got sunlight and other factors required for photosynthesis.The negative iodine test is due to the absence of light required for photosynthesis.