ULTIMATE KCET

CRASH COURSE 2026

Botany | Lecture – 01

Sexual Reproduction in Flowering Plants

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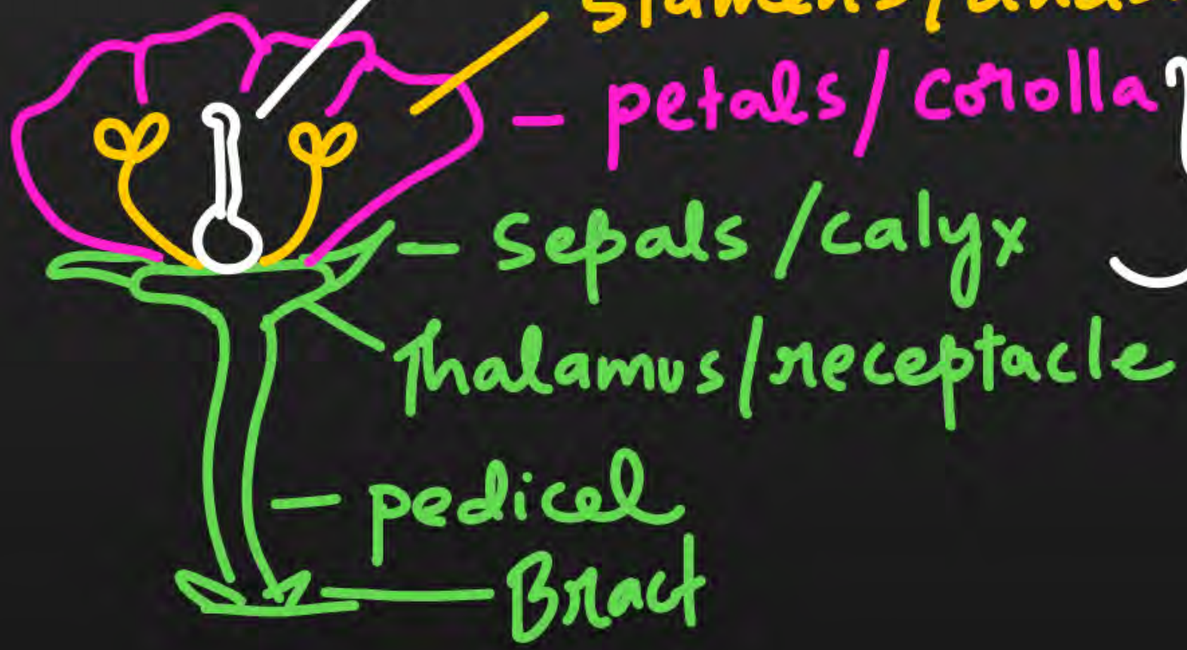
Topics *to be covered*

1. SYNOPSIS
2. QUESTIONS KCET - 03-04 → easy-medium
3.
4.

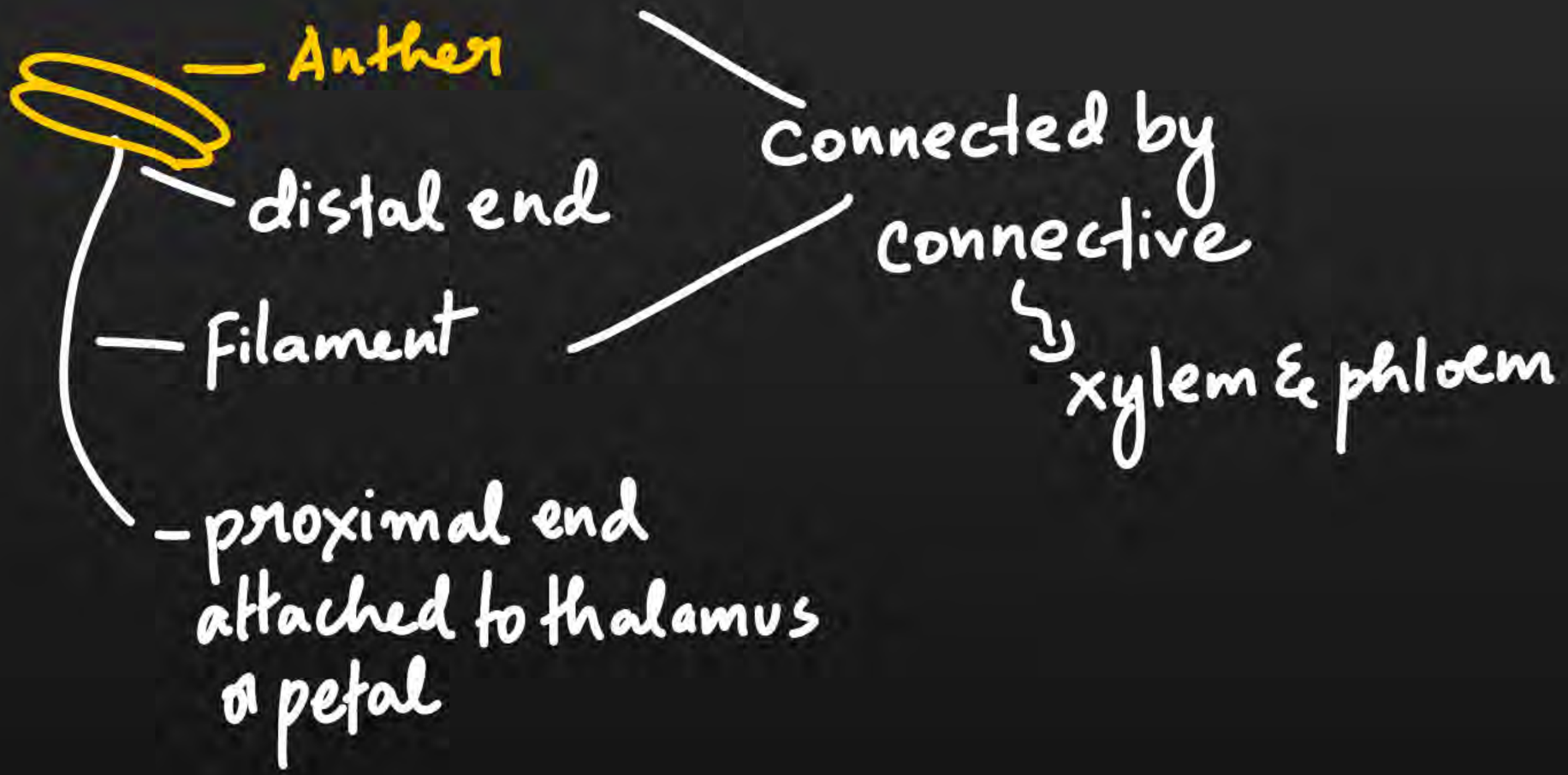
INTRODUCTION

Flower - modified shoot
- nodes present
- Calyx, corolla, pistil, stamen are modified leaves.

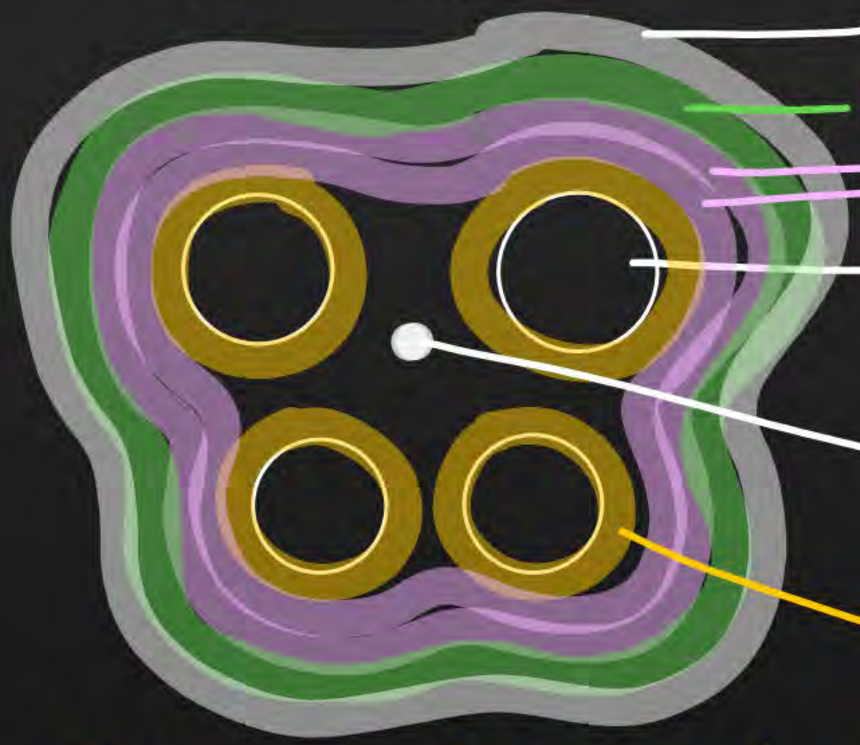
plants → release hormones → structural changes (buds → floral primordia → flower)


pistil / Gynoecium ♀
stamens / androecium ♂
petals / corolla
sepals / calyx
thalamus / receptacle
pedicel
Bract
essential whorl
accessory whorl

ANDROECIUM


Anther
distal end
Filament
proximal end
attached to thalamus
or petal
Connected by
connective
xylem & phloem

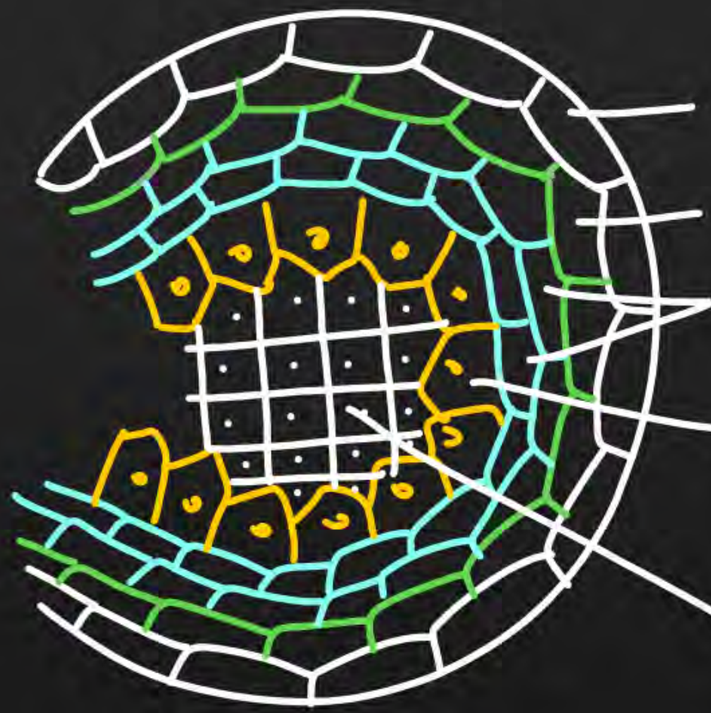
Section of anther



Epidermis
Endothecium
middle layers (ephemeral)
Sporogenous tissue / pollen sac
Connective
Tapetum - nourishment to developing microspores (pollen grains)

protective layers
dehiscence of anthers

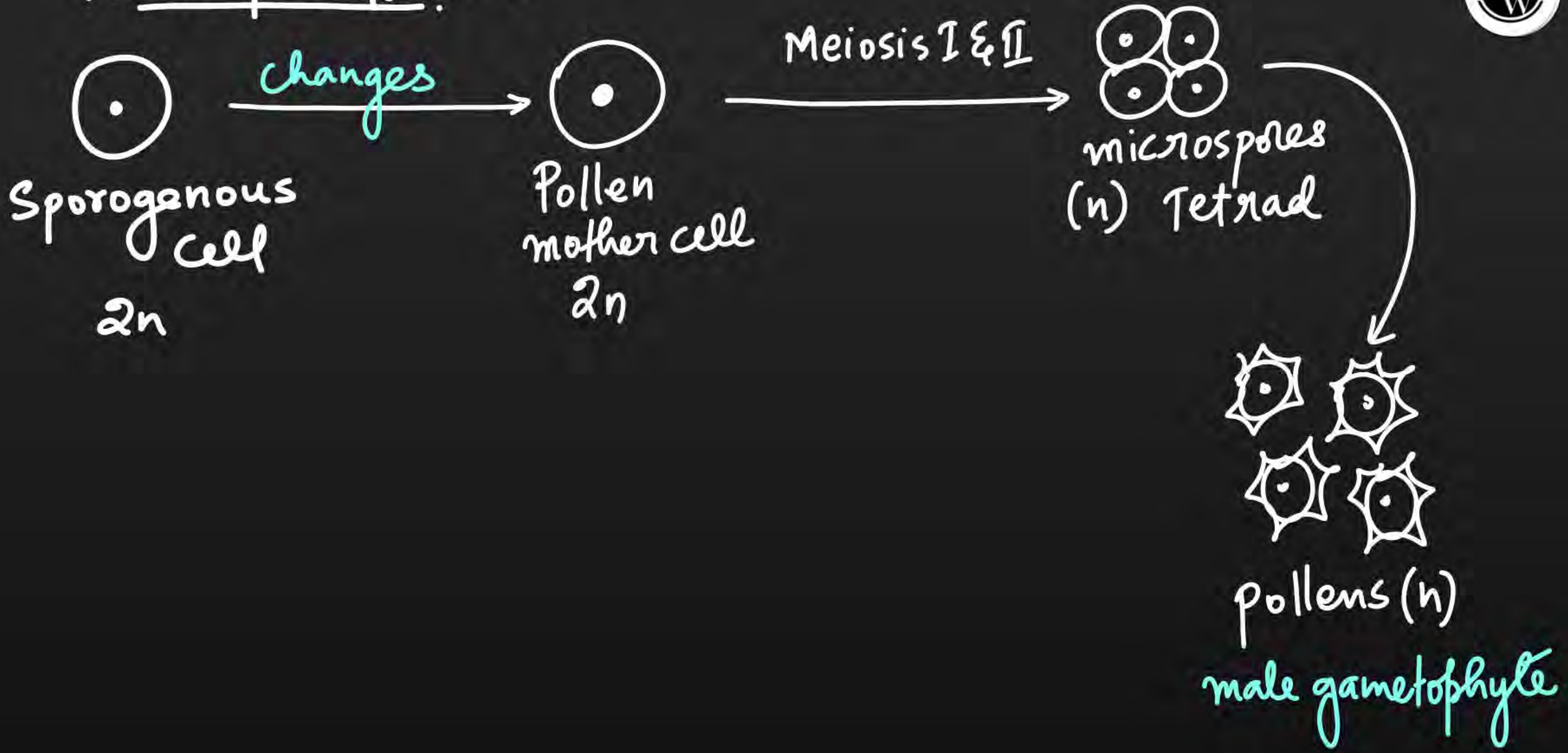
BILOBED; Each lobe has two microsporangia - DITHECOUS;
TETRAGONAL



epidermis
endothecium
middle layers
Tapetum - more than one nucleus
Polyploid condition seen → more than '2n'
Sporogenous tissue → Contributes to form pollen mother cells or microspore mother cells

T.S of immature anther

MICROSPOROGENESIS



microspores
(n)

Exine - Sporopollenin
- discontinuous
- toughest material
- resistant to high temp; acids & alkalis; enzyme
- helps in fossilization of pollens

Intine
- cellulose & pectin

germ pore -
- where exine is absent
- pollen tube comes out of germ pore.

MITOSIS

Vegetative cell
- larger; irregular
- reserve food nucleus

Generative cell
- Smaller; spindle shape
- produces two male gametes by mitosis
- floats in the cytoplasm of vegetative cell

(n) Mature pollen - 2 celled stage

Pollen viability

- few months - Rosaceae, Leguminosae, Solanaceae
- 30 mins - Rice, Grasses, wheat
  - Cereals
  - (Poaceae)

At two celled stage - pollen shed

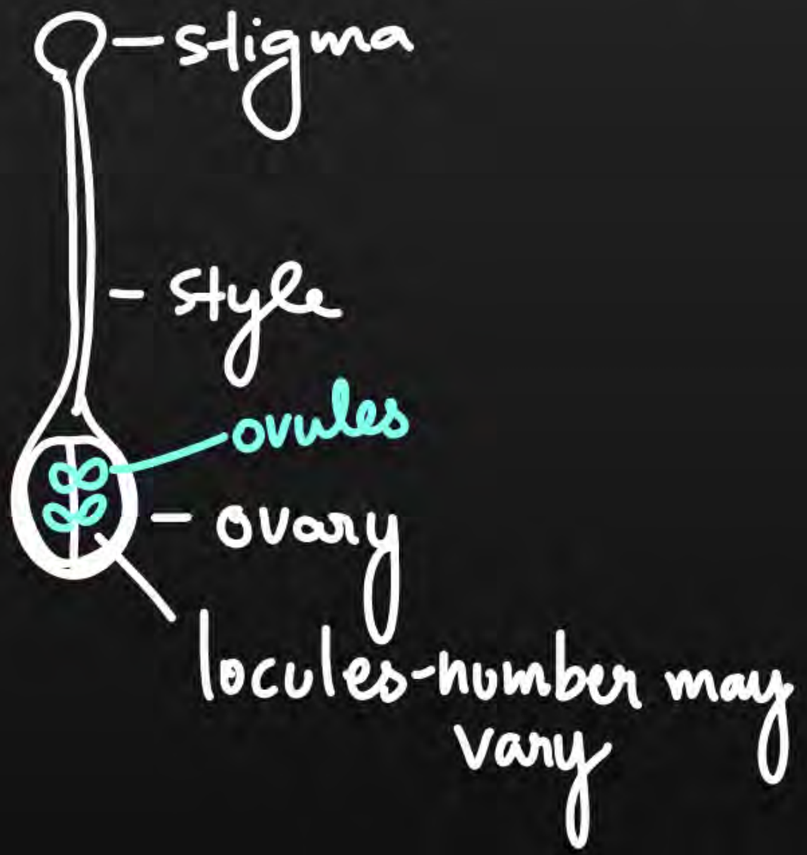
> 60% angiosperms

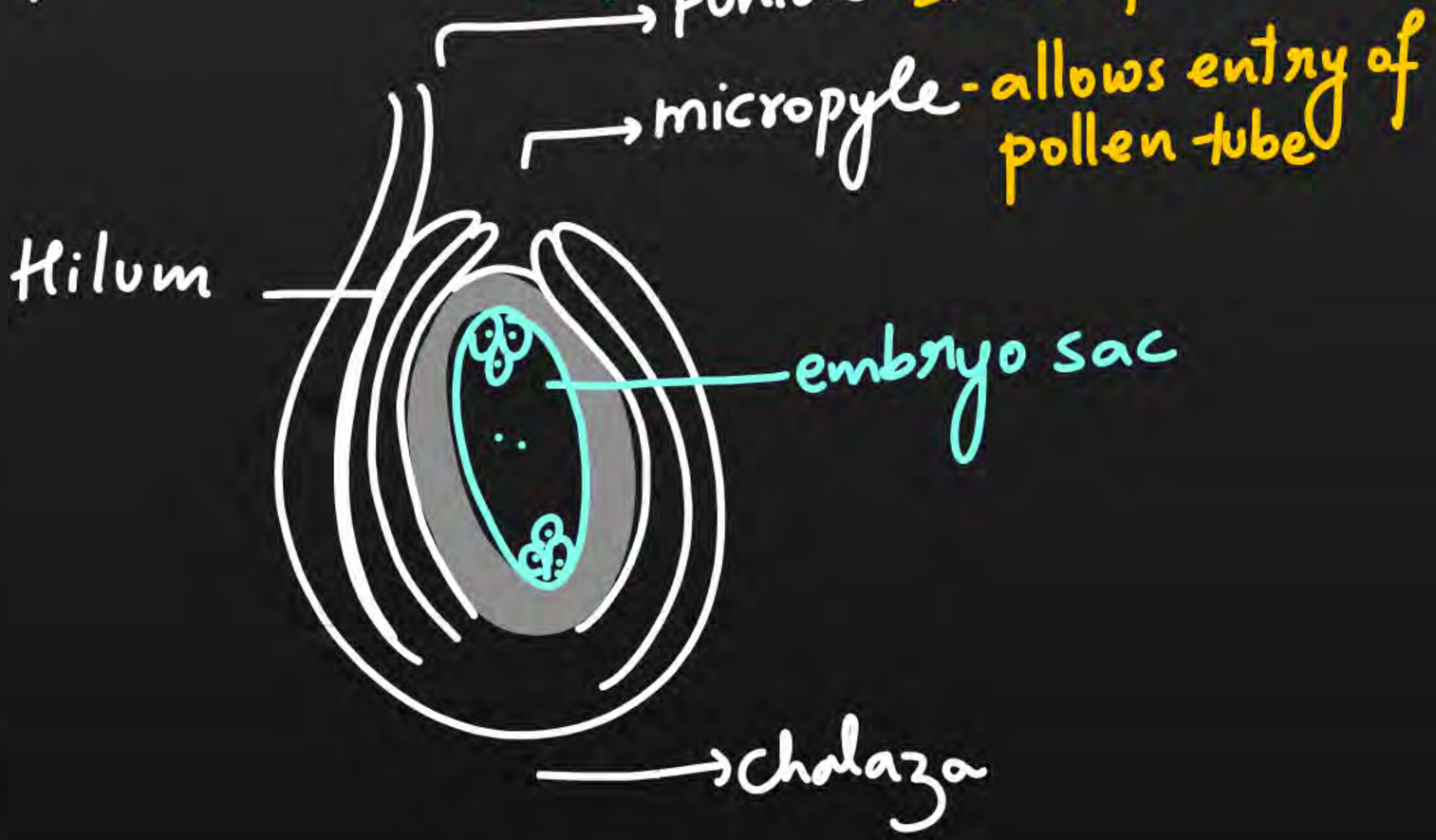
- Pollen allergies - Parthenium (Carrot grass)
- Pollen uses - tablets, syrups, powder
  - food supplements
  - race horses, athletes

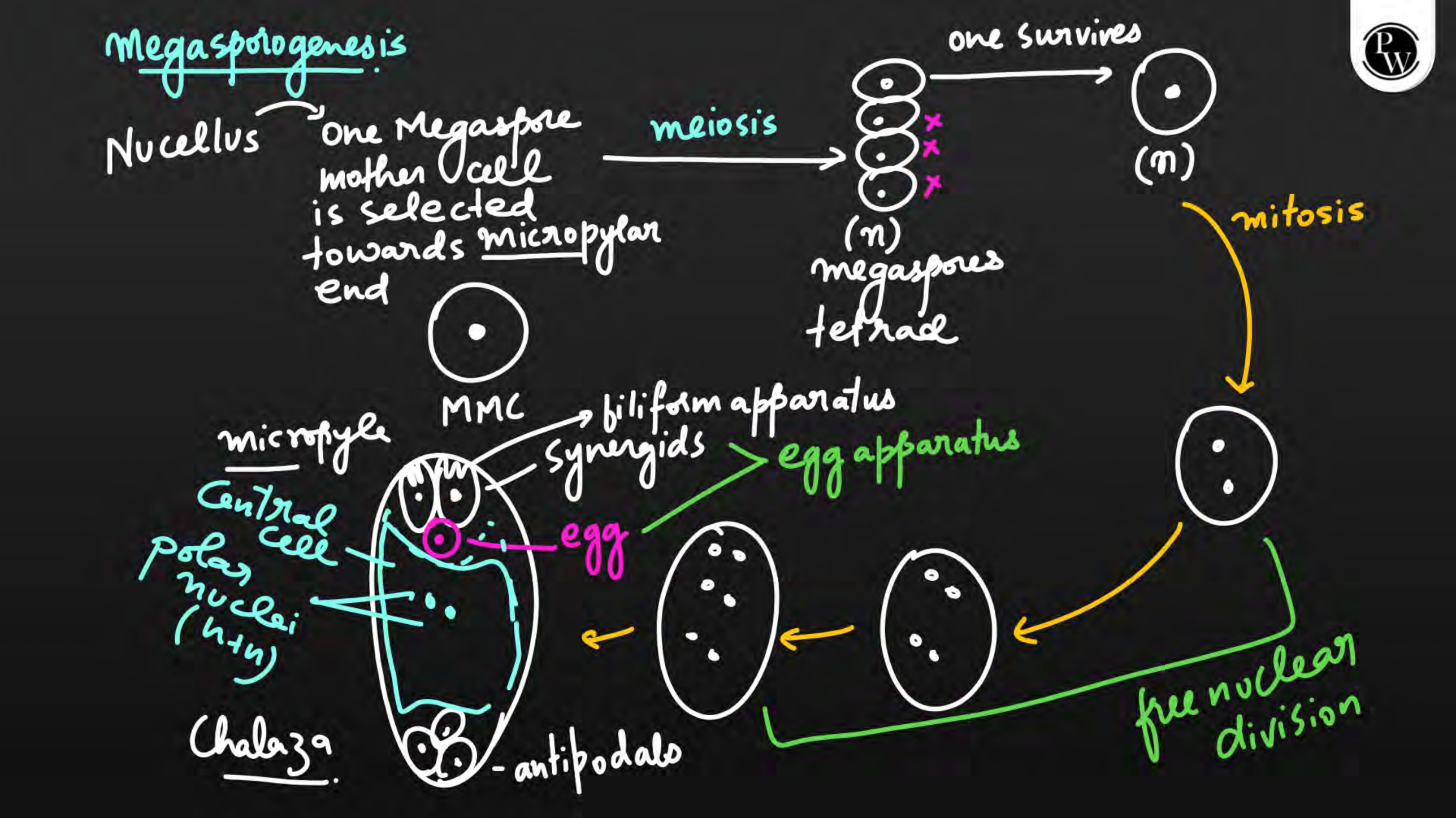
FEMALE REPRODUCTIVE WHORLS

Carpels – free - apocarpous - Michelia, Rose, Lotus

\ fused - syncarpous - Hibiscus, Papaver






Megasporogenesis
Nucellus
One Megaspore mother cell is selected towards micropylar end
meiosis
one survives
(n)
(n) megaspores tetrad
mitosis
MMC
micropyle
filiform apparatus
Synergids
egg apparatus
Central cell
egg
Polar nuclei (4+n)
Chalaza
- antipodals
free nuclear division

Question

PEN

Primary endosperm nucleus is formed by fusion of

A. One polar nucleus and male gamete

B. Two polar nuclei and one male gamete ✓ n + n + n = 3n : Triple fusion

C. Two polar nuclei and two male gamete

D. Ovum and male gamete

Question

female gametophyte (n)

Which pair of the following cells in the embryo sac are destined to change their ploidy after fertilization?

A. Central cell and antipodals

B. Antipodals and synergids

C. Egg cell and central cell

D. Synergids and egg cell

Double fertilization

Syngamy
male gamete + female gamete → zygote (2n)

Triple fusion
- polar nuclei fuses
n + n = 2n
- 2n + n = 3n PEN
male gamete

Question

Which of the following aquatic plant does not show pollination by water?

A. Vallisneria

B. Hydrilla → below H_2O

C. Water hyacinth

D. Zostera

wind/insects

not
→ coloured
- not fragrant
- pollens ribbon shape
mucilagenous
Covering

Question

Which cell of the female gametophyte is involved in the formation of primary endosperm nucleus (PEN) after fertilization?

A. Antipodals
B. Synergids
C. Egg cell
D. Central cell

degenerate after fertilization

→ zygote

Question

In apple, the chromosome number of gametes is 17 . What is the chromosome number in its Primary Endosperm Nucleus (PEN) ?

n = 17

PEN : 3n

3 × 17

A 34

B 68

C 17

D 51

Question

Identify the mismatch.

A. Antipodals – Haploid

B. Zygote-Diploid

C. Synergids – Diploid

D. Primary Endosperm Nucleus-Triploid

Question

Identify the correct order of events in pollen-pistil interaction from the options given below :

I. Release of male gametes into the embryo sac.
II. Deposition of pollen grains on stigma.
III. Entry of pollen tube into embryo sac.
IV. Development of pollen tube
V. Entry of pollen tube into, the Ovule.

A. IV → III → II → I → V

B. II → IV → V → III → I

C. II → IV → III → V → I

D. V → IV → III → II → I

Question

Testa and Tegmen of the seed coat represent

A. Dried Sepals

B. Dried Petals

C. Dried Integuments

D. Diried Tepals

Question

Identify the correct order of steps involved in Artificial hybridization in plants:

A. Rebagging → Artificial pollination → Bagging → Emasculation

B. Bagging → Artificial pollination → Rebagging → Emasculation

C. Artificial pollination .... → Emasculation → Rebagging → Bagging

D. Emasculation → Bagging .... → Artificial pollination .... → Rebagging

to prevent contamination by undesired pollens

in bud condition

skipped in unisexual flower

Question

In some plants, stigma and anther mature at different times because

- A it facilitates self pollination.
- B it facilitates cross pollination.
- C it attracts pollinators.
- D it prevents cross pollination.

- Self incompatibility
- Barrier b/w androecium & gynoecium
- dioecy - papaya, date palm

Question

Now-a-days agricultural practice is expensive to the farmers as they need to purchase hybrid seeds every year. Which of the following strategies can be employed to overcome this problem?

asexual reproduction mimics sexual reproduction

A. Production of Apomictic seeds

B. Parthenocarpy

C. Synthetic seeds

D. Conventional plant breeding

Question

Even in the absence of pollinators, assured seed set will be there in

A. Chasmogamous flowers

B. Geitonogamy

C. Cleistogamous flowers

D. Xenogamy

Question

Select the incorrect statement w.r.t. megaspore mother cell (MMC)

A. It is located in the micropylar region of integument

B. MMC undergoes meiotic division

C. It is a large cell containing dense cytoplasm

D. Generally single MMC is differentiated from ovule

Question

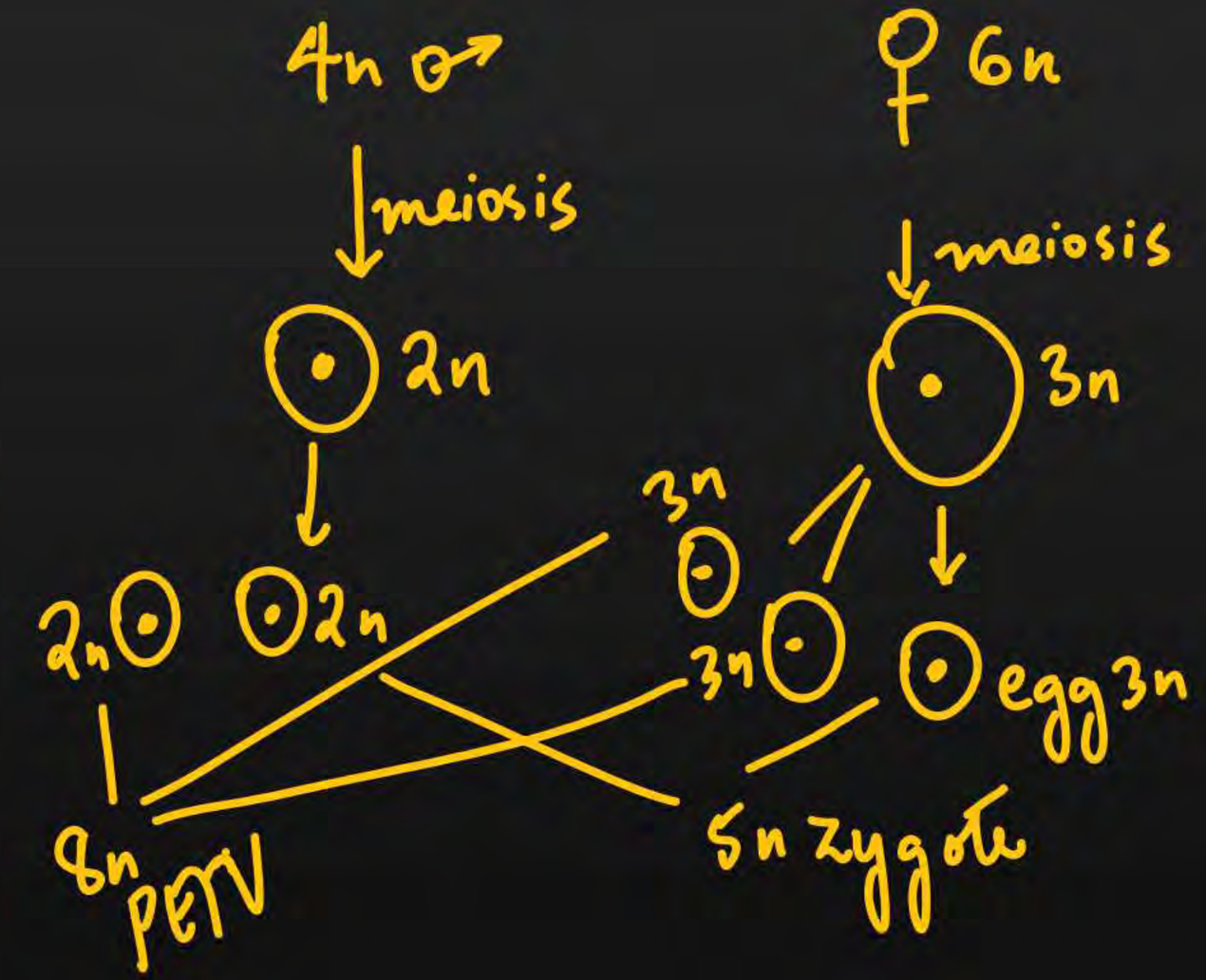
What will be ploidy of PEN and zygote respectively if the cross is made between the tetraploid male plant and hexaploid female plant?

A. $8n, 7n$

B. $6n, 8n$

C. $8n, 6n$

D. $8n, 5n$



Question

During successive type of microsporogenesis, total number of meiotic divisions required to produce 2400 pollens, is

A. 400

B. 600

C. 200

D. 300

1 MMC → 4 pollens

? → 2400 pollens

$\frac{2400}{4}$

Question

Endosperm is completely consumed during embryo development in

non- endospermic

A. Castor, onion and groundnut

B. Onion, beans and peas

C. Rice, wheat and onion

D. Pea, groundnut and gram

Question

Match the followings and choose correct option

	Group A		Group B
(A)	Aleurone layer ii	(i)	without fertilization
(B)	Parthenocarpic fruit (f)	(ii)	Nutrition
(C)	Ovule iv	(iii)	Double fertilization
(D)	Endosperm iii	(iv)	Seed

A. A-(i), B-(ii), C-(iii), D-(iv)

B. A-(ii), B-(i), C-(iv), D-(iii)

C. A-(iv), B-(ii), C-(i), D-(iii)

D. A-(ii), B-(iv), C-(i), D-(iii)

Question

The male gametes of rice plant have 12 chromosomes in their nucleus. The chromosome number in the female gamete, zygote and the cells of the seedling will be, respectively

n = 12

n = 12

2n = 24

2n = 24

A 12,24,12

B 24,12,12

C 12,24,24

D 24,12,24

Question

In majority of angiosperms

A. Egg has a filiform apparatus

B. There are numerous antipodal cell

C. Reduction division occurs in the megaspore mother cell

D. A small central cell is present in that embryo sac

Question

Pollination in water hyacinth and water lily is brought about by the agency of

A. Water

B. Insects or wind

C. Birds

D. Bats

Question

Which one of the following fruits is parthenocapic?

fruit formation → no fertilization → no seeds

A. Jackfruit

B. Banana

C. Brinjal

D. Apple

Question

Non-albuminous seed is produced in

A. Maize

B. Castor

C. Wheat

D. Pea

Question

Geitonogamy involves

A. Fertilization of a flower by the pollen from another flower of the same plant

B. Fertilization of a flower by the pollen from the same flower

C. Fertilization of a flower by the pollen from a flower of another plant in the same population

D. Fertilization of a flower by the pollen from a flower of another plant belonging to a distant population.

Question

An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is

A. Cuticle

B. Sporopollenin

C. Lignin

D. Cellulose

Question

Even in absence of pollinating agents seed setting is assured in

A Commelina

B Zostera

C Salvia

D fig

Question

Nucellar polyembryony is reported in species of

A. Citrus

B. Gossypium

C. Triticum

D. Brassica

Question

In angiosperm, functional megaspore develops into

A. Embryo sac ✓

B. Ovule : megasporangium.

C. Endosperm

D. Pollen sac

Question

Select the incorrect statements:
(i) All aquatic plants use water for pollination
(ii) Pollen grains are protected from wetting by a mucilaginous covering in most of the water pollinated species.
(iii) In Vallisneria, female flowers remain submerged in water and the pollen grains are released inside the water
(iv) Pistil has the ability to recognise the pollen whether it is of right type or of wrong type

A ii, iv

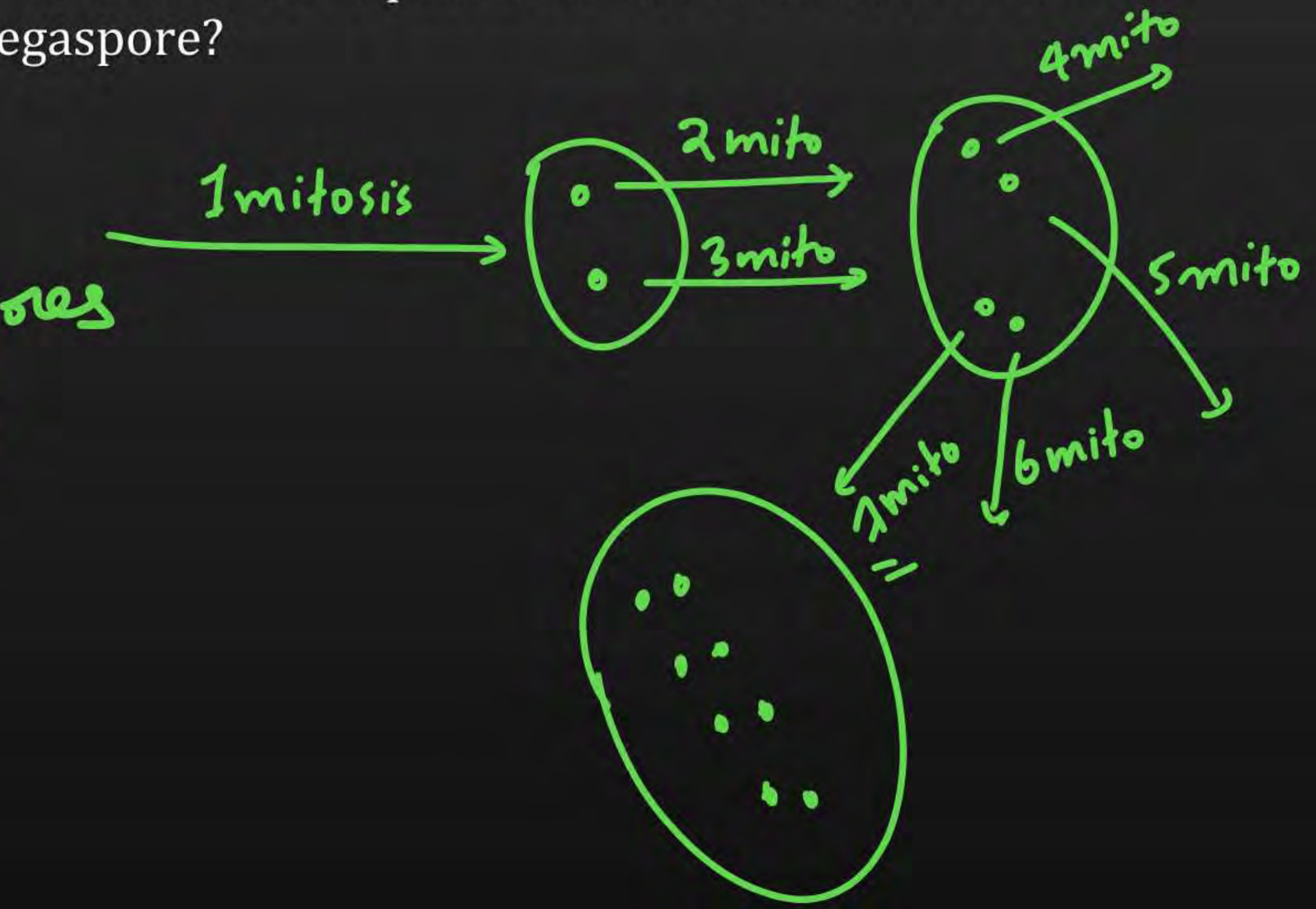
B i, ii, iv

C iii, iv

D i, iii

Question

How many meiotic and mitotic divisions are required for the formation of female gametophyte from functional megaspore?



A. 1, 2

B. 0, 2 ✗

C. 0, 3 ✗

D. 1, 7

Question

The pollen grains of anemophilous flowers are:

A. Large, hairy and sticky

B. Small, light weight and non-sticky

C. Attractive with fragrance and sticky

D. Small, light weight and sticky

Question

Identify the labelled parts in the given diagram and select the correct option:

		A	B	C	D	E
A	1	Scutellum	Endosperm	Pericarp	Coleorhiza	Coleoptile
B	2	Scutellum	Endosperm	Pericarp	Plumule	Radicle
C	3	Pericarp	Endosperm	Scutellum	Radicle	Plumule
D	4	Endosperm	Scutellum	Pericarp	Coleoptile	Coleorhiza

Question

Which of the following facilitates the entry of oxygen and water into the seed during germination?

A. Hilum

B. Micropyle

C. Funicle

D. Integument

Question

Which of the following statements are true
(i) Production of unisexual flowers prevent selfpollination.
(ii) Pollen release and stigma receptivity are always synchronised.
(iii) Many insects may consume pollen or nectar without bringing about pollination.
(iv) pomixis is a form of sexual reproduction that mimics asexual reproduction.

A ii, iv

B i, iii, iv

C i, iii

D All of the above

Question

In 60% Angisoperms pollen grains are shed at

A. One celled stage

B. Three cell stage

C. Three nuclei stage

D. Two celled stage

Question

How many and what type of male gametes are produced by the male gametophyte of in angiosperms-

A. One, multi cilliated

B. Two, biciliated

C. Two, multi ciliated

D. Two, non motile

Question

A obligatory relation between a flower and a pollinating agent is best exemplified by -

A Cocos

B Salvia

C Yucca

D Avena

. Amorphophallus - Safe place for laying eggs

Question

The mature seeds of plants such as gram and peas, possess no endosperm, because

A these plants are not angiosperms

B there is no double fertilization in them

C endosperm is not formed in them

D endosperm gets used up by the developing embryo during seed development

Question

Choose incorrect statement -

A. Several hormonal & structural changes are initiated which lead to redifferentiation and further development of the floral primordium.

B. Inflorescences are formed which bear the floral buds and then the flower

C. In the flower male and female reproductive structures, the androecium and the gynoecium differentiate and develop

D. None of these

Question

pollens

Male gametophyte in angiosperms produces

A single sperm and two vegetative cells

B three sperms

C two sperms and a vegetative cell

D single sperm and a vegetative cell

Question

An ovule generally has ___ embryo sac formed from a ___ through ___ division

(A) Single, equational

(B) Single, reductional

(C) Four, meiotic

(D) Four, mitotic

Question

Pollination in water lily occurs by-

A Water

B Wind

C Insects

D Both 2 and 3

Question

Production of unisexual flowers on a plant assures prevention of-

A. Autogamy only

B. Autogamy and geitonogamy

C. Geitonogamy only

D. Autogamy and Xenogamy

Question

When pollen grains of a flower of a plant pollinate the stigma of flower of another plant, it is called

A Geitonogamy - Same plant → Maize, Cucurbits

B Xenogamy -

C Autogamy - Same flower

D Dichogamy - Stamens & pistil mature at diff. times

Question

Fusion of a male gamete with the central cell in the embryo sac of an angiosperm is called

A Apomixis

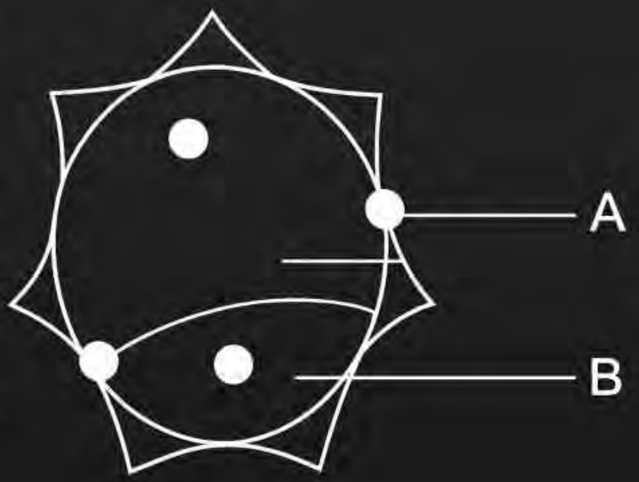
B Double fertilization

C Triple fusion

D Syngamy

Question

Which of these options is true in the context of the above diagram of pollen grain?



A. 'A' is a vegetative cell with abundant food reserve and 'B' is a generative cell which forms male gametes

B. 'A' is a generative cell which forms male gametes and 'B' is a vegetative cell which produces pollen tube

C. 'A' is a vegetative cell which gives rise to male gametes and 'B' is a generative cell which produces pollen tube

D. 'A' is a generative cell which rise to pollen tube and 'B' is a vegetative cell which forms male gametes

Thank You