BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

Date: 09/11/2021

Subject: Biology

Topic : Sexual Reproduction in Flowering Plants

Class: Standard XII

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1. A typical angiosperm anther has how many lobes?

   ✗ **A.** 1

   ✓ **B.** 2

   ✗ **C.** 3

   ✗ **D.** 4

   Typical angiosperm anther is bilobed with each lobe having two theca each. So, the angiosperm anther is dithecous. Hence, an anther has two lobes with four theca.

2. Wind pollination is common in which of the following plants?

   ✗ **A.** *Oxalis*

   ✓ **B.** Corn

   ✗ **C.** *Viola*

   ✗ **D.** *Zostera*

   Wind pollinated or anemophilous flowers have:
   (1) Light, non-sticky pollen grains
   (2) Well exposed stamen
   (3) Large feathery stigma that easily traps pollen
   (4) Single ovule in each ovary
   (5) Inflorescence with numerous colourless and nectarless flowers
   Eg- Corn, grasses. Corn flowers have tassles which help in trapping the pollen.

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3. How many meiotic divisions are required for formation of 100 functional megaspores?

- ✔ **A.** 100
- ✘ **B.** 50
- ✘ **C.** 25
- ✘ **D.** 75

Diploid megaspore mother cell undergoes meiosis and gives rise to four haploid megaspores. Three of the four megaspores degenerate and only one megaspore remains functional and develops into an haploid embryo sac or the female gametophyte. So, only 25 meiotic division is required for 100 megaspores. But, for 100 functional megaspores, 100 meiotic divisions are required.

4. What is perisperm?

- ✘ **A.** Remnant of endosperm
- ✔ **B.** Persistent nucellus
- ✘ **C.** Peripheral part of endosperm
- ✘ **D.** Disintigrated secondary nucleus

In black pepper, residual nucellus are present in seeds. This persistent remnants of nucellus is called perisperm.

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5. Which of the following structures facilitates the entry of oxygen and water in the seed?

- ✗ **A.** Hilum
- ✗ **B.** Filiform apparatus
- ✓ **C.** Micropyle
- ✗ **D.** None of these

The entry of oxygen and water in the seed is facilitated by the micropyle. It exists as a pore in the seed coat.

Hilum is the region where the body of the ovule attaches with the funicle. It remains as a scar on the seed coat.

Filiform apparatus present in synergids help in guiding the pollen tube into the synergids. Hence they play a major role before fertilisation.

6. An aggregate fruit develops from:

- ✗ **A.** Multicarpellary syncarpous gynoecium
- ✓ **B.** Multicarpellary apocarpous gynoecium
- ✗ **C.** Complete inflorescence
- ✗ **D.** Multicarpellary syncarpous ovary

Gynoecium with multiple pistils are called multicarpellary. If the pistils are free, they are called apocarpous and if the pistils are fused, it is called syncarpous.
Aggregate fruit develops when each free ovary becomes a fruitlet and remains attached to each other, eg., raspberry, blackberry and strawberry.
Hence, an aggregate fruit develops from multicarpellary apocarpous gynoecium.

7. Transfer of pollen grains from one flower to another flower of the same plant is known as

- ✔ **A.** geitonogamy
- ✘ **B.** autogamy
- ✘ **C.** xenogamy
- ✘ **D.** cleistogamy

Geitonogamy involves the transfer of pollen grains from a male flower to the stigma of another female flower growing on the same plant. Thus, geitonogamy operates only in monoecious plants, i.e., those plants having both the male and female flowers together in different places.

Autogamy refers to the self-pollination in which the transfer of the pollen grain occurs from the anther to the stigma within the same flower.

Cleistogamous flowers are those which do not open at all and hence, the pollen after dehiscence, fall onto the stigma of the same flower.

Xenogamy is the transfer of pollen grains of a flower to the stigma of another flower present on a different plant.

8. Which is most crucial for storage of seeds?

- ✔ **A.** Dehydration and dormancy
- ✘ **B.** Endosperm and water
- ✘ **C.** Least amount of development
- ✘ **D.** Endosperm in large quantity

Dehydration is the removal of water. In dehydration, there is less amount of water. In less amount of water, the seed cannot work and so there is no germination. Dormancy is the time period in which seed temporarily suspended its growth and development due to lack of necessary condition for growing. Dehydration and dormancy of mature seeds are crucial for storage of seeds.

9. Ploidy of endosperm will be ____ if the male and female parents are hexaploid and tetraploid respectively:

✗ **A.** 8n

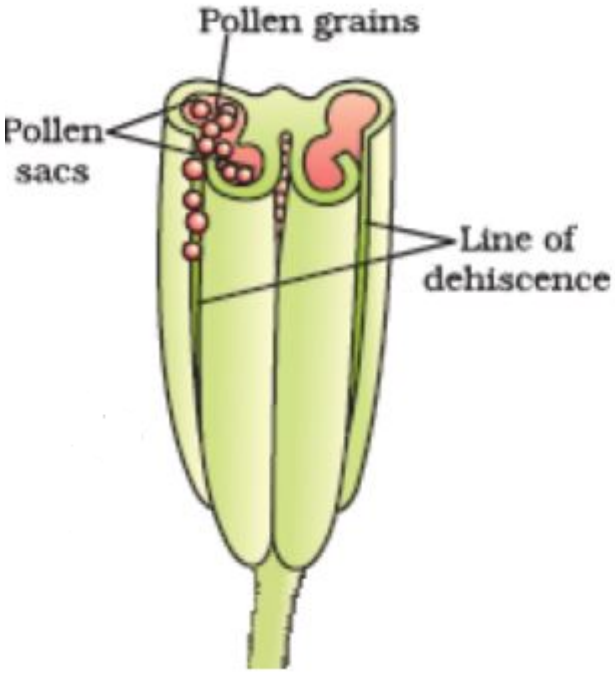
✓ **B.** 7n

✗ **C.** 16n

✗ **D.** 10n

Female plant is tetraploid (4n) so, female gamete and polar nuclei in ovule are diploid (2n). Male plant is hexaploid (6n) so, male gametes are triploid (3n). Endosperm is formed by fusion of two polar nuclei (here 2n) and one male gamete (here 3n). So, endosperm = 2 polar nuclei + 1 male gamete = 2(2n) + 3n = 4n +3n = 7n.

10. Classify the following transverse section of anther into appropriate categories:



✗ **A.** Bilobed, monothecous

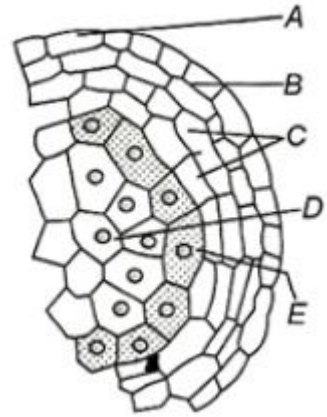
✗ **B.** Unilobed, monothecous

✗ **C.** Unilobed, dithecous

✓ **D.** Bilobed, dithecous

The given anther is a bilobed structure having four microsporangia and two thecae (covering).
A unilobed i.e., having a single lobe anther has a monothecous structure.

11. Identify A to E in the following diagram.



- **A.** A - Tapetum, B - Microspore mother cell, C - Middle layers, D - Endothecium, E - Epidermis
- **B.** A - Epidermis, B - Middle layers, C - Microspore mother cell, D - Tapetum, E - Endothecium
- **C.** A - Middle layers, B - Epidermis, C - Tapetum, D - Microspore mother cell, E - Endothecium
- **D.** A - Epidermis, B - Endothecium, C - Middle layers, D - Microspore mother cell, E - Tapetum

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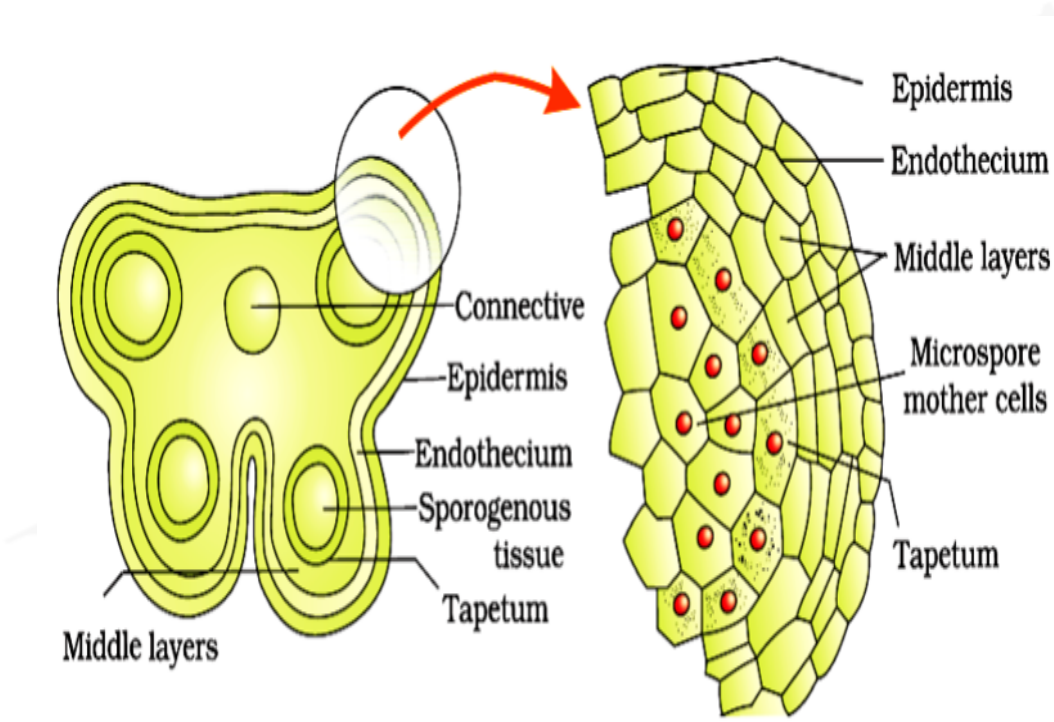
Microsporangium is mainly surrounded by four layers/walls, $i.e.$, epidermis, endothecium, middle layers and tapetum.
(i) Epidermis, endothecium and middle layers are the outer three layers and help in protection and dehiscence of anther to liberate pollen.
(ii) Tapetum is the innermost layer that possesses dense cytoplasm and is in the multinucleate stage and nourishes the developing pollen grain.
(iii) The sporogenous tissue is present in the interior of a microsporangium. Its cells gradually transform into microspore or pollen mother cells. These undergo meiosis and maturation to form pollen grains.

The figure of microsporangium is shown below:

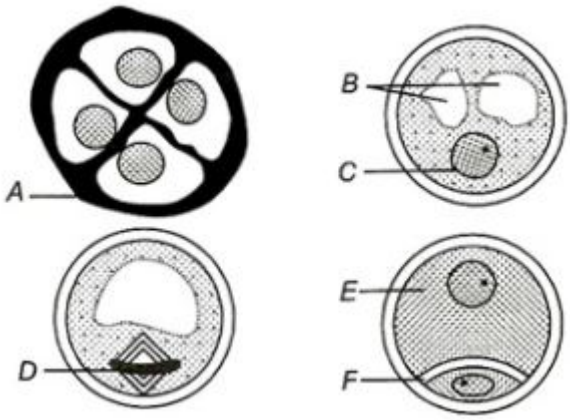


12. Which substance constitutes the outer hard layer of pollen grain?

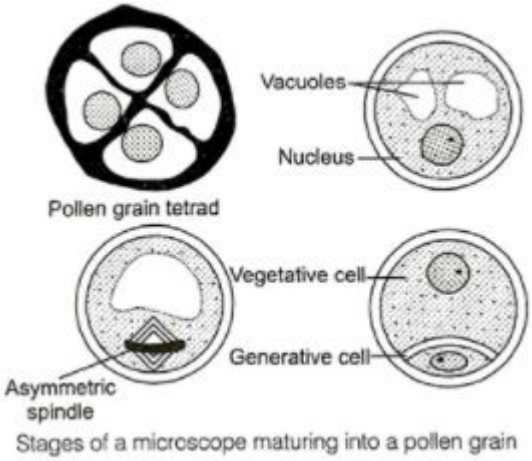
- ✗ **A.** Exine
- ✗ **B.** Intine
- ✓ **C.** Sporopollenin
- ✗ **D.** Cellulose

Outer hard layer of pollen grain or the exine is made up of sporopollenin. It is the hardest organic substance known.
It can withstand high temperatures, strongly acidic and alkaline conditions. There is no known enzyme that can degrade it. So it is highly stable and tough.
Intine is a thin inner coat made of cellulose and pectin.

13. Identify the structures marked A to F in the given diagram.



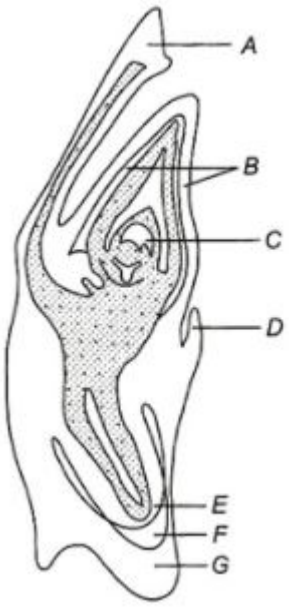
- ✗ **A.** A-Asymmetric nucleus, B-Nucleus, C-Generative cell, D-Vegetative cell, E-Pollen, F-Pollen tetrad
- ✗ **B.** A- Pollen tetrad, B- Pollen, C-Generative cell, D-Vegetative cell, E-Asymmetric spindle, F-Nucleus
- ✓ **C.** A-Pollen tetrad, B-Vacuole, C-Nucleus, D-Asymmetric spindle, E-Vegetative cell, F-Generative cell
- ✗ **D.** A-Vacuole, B-Nucleus, C-Pollen tetrad, D-Vegetative cell, E-Asymmetric spindle, F-Generative cell



Stages of a microscope maturing into a pollen grain

Pollen tetrad (A) is the cluster of four cells formed from pollen mother cell (PMC) during microsporogenesis. Microspore has large vacuoles (B) and nucleus (C) at the initial stage of microsporogenesis. The microspore undergoes cell division with the help of asymmetric spindle (D) resulting in the formation of vegeative cell (E) and generative cell (F). The mature pollen grain has a vegeative cell (E) and a generative cell (F). Hence, the correct option is: A-Pollen tetrad, B-Vacuole, C-Nucleus, D-Asymmetric spindle, E-Vegetative cell, F-Generative cell.

14. In the figure given below, find out coleoptile, shoot apex and epiblast respectively.

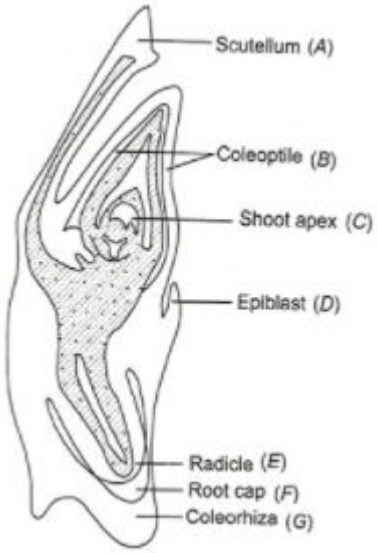


✗ **A.** A, B and C

✓ **B.** B, C and D

✗ **C.** D, F and G

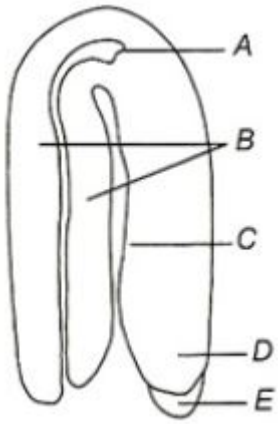
✗ **D.** E, F and G



LS of an embryo of grass

Embryos of monocotyledons possess only one cotyledon. In the grass family, the cotyledon is called scutellum. The portion of the embryonal axis above the level of attachment of scutellum is epicotyl. Epicotyl has a shoot apex (C) and few leaf primordia enclosed in hollow structure-the coleoptile (B). Epiblast is the outgrowth part of cotyledon as shown in D. Hence, B, C and D represent coleoptile, shoot apex and epiblast respectively.

15. Identify the parts labelled from A to E in the following diagram.



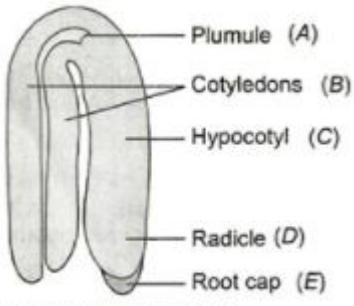
✗ **A.** A - Cotyledons, B - Hypocotyl, C - Plumule, D - Root cap, E - Radicle

✗ **B.** A - Radicle, B - Root cap, C - Plumule, D - Hypocotyl, E - Cotyledons

✗ **C.** A - Hypocotyl, B - Cotyledons, C - Plumule, D - Radicle, E - Root cap

✓ **D.** A - Plumule, B - Cotyledons, C - Hypocotyl, D - Radicle, E - Root cap

The diagram given is the figure of a typical dicot embryo having various important parts. A typical dicotyledonous embryo, consists of an embryonal axis and two cotyledons. The portion of embryonal axis above the level of cotyledons is epicotyl, which terminates with plumule. The portion below the cotyledons is hypocotyl that terminates at its lower end in the radicle. Root tip is covered with the root cap.



A typical dicot embryo

16. Assertion: Pollen grains are well preserved as fossils.
Reason: The outer layer of pollen grains called the exine is made up of sporopollenin.

- ✔ **A.** Both assertion and reason are true and reason is the correct explanation of assertion
- ✘ **B.** Both assertion and reason are true but reason is not the correct explanation of assertion
- ✘ **C.** The assertion is true but reason is false
- ✘ **D.** Both assertion and reason are false

Pollen grains are well preserved as fossils because their outer wall exine is made up of a highly resistant organic material called sporopollenin. Sporopollenin is able to withstand high temperatures and strong acids and alkali. It cannot be degraded by any enzyme known so far.
Therefore, both assertion and reason are true and reason is the correct explanation of assertion.

17. Assertion: Tapetal cells usually possess dense cytoplasm and never more than one nucleus.
Reason: Tapetal cells undergo mitosis which generally involves division of nucleus but cytokinesis does not happen.

- ✘ **A.** Both assertion and reason are correct and the reason is the correct explanation to the assertion
- ✘ **B.** Both assertion and reason are correct but the reason is an incorrect explanation to the assertion
- ✘ **C.** Only assertion is correct
- ✔ **D.** Only reason is correct

Tapetum is the innermost layer of the anther wall. They provide nourishment to developing pollen grains. Its cells called tapetal cells contain dense cytoplasm generally along with more than one nucleus. Hence, the assertion is incorrect.

This polynucleate condition arises since nuclear division is not followed by cytokinesis. Hence, the reason is correct.

18. Study the following statements and choose the correct option.

I - Tapetum nourishes the developing pollen grains.

II - Hilum represents the junction between ovule and funicle.

III - In aquatic plants such as water hyacinth and water lily, pollination is by water.

IV - The primary endosperm nucleus is triploid.

A. I and II are correct but III and IV are incorrect

B. I, II and IV are correct but III is incorrect

C. II, III and IV are correct but I is incorrect

D. I and IV are correct but II and III are incorrect

The innermost wall layer of microsporangium is the tapetum. Cells of tapetum possess dense cytoplasm and multinucleate. Tapetum provides nourishment to the developing pollen grains.

The body of the ovule fuses with the funicle (stalk of ovule) in the region called hilum. Thus, hilum represents the junction between ovule and funicle. It appears as a scar on the seeds.

The primary endosperm nucleus is triploid ($3n$) as it is the product of triple fusion, fusion between the secondary nucleus (formed by two polar nuclei in the central cell) with the nucleus of the male gamete.

In the majority of aquatic plants such as water hyacinth and water lily, the flowers emerge above the level of water and are pollinated by insects or wind as in most of the land plants.

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19. Pollen grains of a beautiful rose plant were used after a month of their release to pollinate a flower of the same species. Which one of the following events do you think will occur?

- ✗ **A.** The pollen will be rejected as it is no longer viable
- ✓ **B.** The pollen grains will germinate
- ✗ **C.** Pollen grains will germinate once an insect visits the flower
- ✗ **D.** None of these

The viability of pollen grains in some members of Rosaceae, Leguminoseae and Solanaceae is maintained for months. Since rose is a member of the Rosaceae family, its pollen grains will germinate even after a month of their release.
Insects are needed for pollination but not for the germination of pollen grains.

20. If a hypothetical microspore mother cell is tetraploid. What will be the ploidy of the microspore?

- ✓ **A.** Diploid
- ✗ **B.** Haploid
- ✗ **C.** Tetraploid
- ✗ **D.** None of the above

The microspore mother cell undergoes meiosis to produce microspores.
If the microspore mother cell is tetraploid (4n), then the microspore produced will have half the chromosome number.
Thus, the microspore will be diploid (2n).