Lesson - 1. Asexual and Sexual Reproduction in plants

1. Choose the correct statement from the following
   a) Gametes are involved in asexual reproduction
   b) Bacteria reproduce asexually by budding
   c) Conidia formation is a method of sexual reproduction
   d) Yeast reproduce by budding
2. An eminent Indian embryologist is
   a) S.R.Kashyap b) P.Maheswari c) M.S. Swaminathan d) K.C.Mehta
3. Identify the correctly matched pair
   a) Tuber - Allium cepa b) Sucker – Pistia
   c) Rhizome – Musa d) Stolon - Zingiber
4. Size of pollen grain in Myosotis
   a) 10 micrometer b) 20 micrometer
   c) 200 micrometer d) 2000 micrometer
5. First cell of male gametophyte in angiosperm is
   a) Microspore b) megaspore c) Nucleus d) Primary Endosperm nucleus
7. Match the following

	I	II	III	IV
(a)	Iv	I	ii	iii
(b)	Iii	Iv	i	ii
(c)	Iii	Iv	ii	i
(d)	Iii	I	iv	ii

I)	External fertilization	i)	pollen grain
II)	Androecium	ii)	anther wall
III)	Male gametophyte	iii)	algae
IV)	Primary parietal layer	iv)	stamens

8. Arrange the layers of anther wall from locus to periphery
   a) Epidermis, middle layers, tapetum, endothecium
   b) Tapetum, middle layers, epidermis, endothecium
   c) Endothecium, epidermis, middle layers, tapetum
   d) Tapetum, middle layers, endothecium, epidermis.
9. Identify the incorrect pair
   a) sporopollenin - exine of pollen grain
   b) tapetum – nutritive tissue for developing microspores
   c) Nucellus – nutritive tissue for developing embryo
   d) obturator – directs the pollen tube into micropyle
10. Assertion : Sporopollenin preserves pollen in fossil deposits
    Reason : Sporopollenin is resistant to physical and biological decomposition
    a) Assertion is true; reason is false b) Assertion is false; reason is true
    c) Both Assertion and reason are not true d) Both Assertion and reason are true.
11. Choose the correct statement (s) about tenuinucellate ovule
    a) Sporogenous cell is hypodermal b) Ovules have fairly large nucellus
    c) Sporogenous cell is epidermal d) ovules have single layer of nucellus tissue
12. Which of the following represent mega gametophyte
    a) Ovule b) Embryo sac c) Nucellus d) Endosperm
13. In Haplopappus gracilis, number of chromosomes in cells of nucellus is 4. What will be the chromosome number in Primary endosperm cell?
    a) 8 b) 12 c) 6 d) 2
14. Transmitting tissue is found in
    a) Micropylar region of ovule b) Pollen tube wall
    c) Stylar region of gynoecium d) Integument

15. The scar left by funiculus in the seed is
    a) tegmen b) radicle c) epicotyls d) hilum
16. A Plant called X possesses small flower with reduced perianth and versatile anther. The probable agent for pollination would be
    a) water b) air c) butterflies d) beetles
17. Consider the following statement (s)
    i) In Protandrous flowers pistil matures earlier
    ii) In Protogynous flowers pistil matures earlier
    iii) Herkogamy is noticed in unisexual flowers
    iv) Distyly is present in Primula
    a) i and ii are correct b) ii and iv are correct
    c) ii and iii are correct d) i and iv are correct
18. Coelorhiza is found in
    a) Paddy b) Bean c) Pea d) Tridax
19. Parthenocarpic fruits lack
    a) Endocarp b) Epicarp c) Mesocarp d) seed
20. Majority of plants pollen is liberated at
    a) 1 celled stage b) 2 celled stage c) 3 celled stage d) 4 celled stage

2, 3, 5 Marks Questions

1. What is reproduction?

- Reproduction is a vital process for the existence of a species.
- It brings suitable changes through variation in off springs.
- Plant reproduction is important for the existence of all other organisms.

2. List out two sub-aerial stem modifications with example.

- Runner - Centella asiatica
- Stolon - Mentha, Fragaria
- Offset - Pistia, and Eichhornia
- Sucker - Chrysanthemum.

3. What is layering?

- The stem of a parent plant is allowed to develop roots while still intact.
- When the root develops, the rooted part is cut and planted to grow as a new plant.
- Examples: Ixora and Jasminum.

4. What are clones?

- The individual formed by asexual method is morphologically and genetically identical and are called clones.

5. A detached leaf of Bryophyllum produces new plants. How?

- In Bryophyllum, the leaf is succulent and notched on its margin.
- Adventitious buds developed from these notches and are called epiphyllous buds.
- They develop into new plants forming a root system.
- They become independent plants when the leaf gets decayed.

6. Differentiate Grafting and Layering.

	Grafting	**Layering.**
1.	Two different plants are involved.	Only parent plant is involved.
2.	Parts of two different plants are united artificially to form a new plant. Plant in soil is called stock. The plant used for grafting is called scion.	The stem of the parent plant is allowed to develop roots while still intact. When the root develops, rooted part is cut and planted to grow as new plant.
3.	Ex : Citrus, Mango and Apple	Ex : Ixora

7. "Tissue culture is the best method for propagating rare and endangered plant species"- Discuss.

- Yes. Tissue culture is the best method of propagating rare and endangered plant species.

8. Explain the conventional methods adopted in vegetative propagation of higher plants.

Cutting

- Plant parts like root, stem, and leaf are cut from the parent plant.
- The Cut part is placed in a suitable medium.
- It produces root and grows into new plant.
- Ex : Hibiscus

Grafting

- Two different plants are involved.
- Parts of two different plants are united artificially to form a new plant.
- The Plant in soil is called stock. The plant used for grafting is called scion.
- Ex : Citrus, Mango and Apple.

Types

- Bud grafting
- Approach grafting
- Tongue grafting
- Crown grafting.

Layering

- The stem of the parent plant is allowed to develop roots while still intact.
- When the root develops, rooted part is cut and planted to grow as new plant.
- Ex : Ixora.

Types

- Mound layering
- Air layering.

S.No	Mound layering	Air layering
1.	The lower branch with leaves is bent to the ground and part of the stem is buried in the soil and tip of the branch is exposed above the soil.	The stem is girdled at nodal region and hormones are applied to this region which promotes rooting.
2.	In the buried nodal region root develops and a cut is made in parent plant to separate the buried part.	In the covered nodal region roots develop after 2 – 4 months. Then the branch is removed from the parent plant.
3.	Hormones are not required to promote rooting.	Hormones are applied to promote rooting.

9. Distinguish mound layering and air layering.

S.No	Mound layering	Air layering
1.	The lower branch with leaves is bent to the ground and part of the stem is buried in the soil and tip of the branch is exposed above the soil.	The stem is girdled at nodal region and hormones are applied to this region which promotes rooting.
2.	In the buried nodal region root develops and a cut is made in parent plant to separate the buried part.	In the covered nodal region roots develop after 2 – 4 months. Then the branch is removed from the parent plant.
3.	Hormones are not required to promote rooting.	Hormones are applied to promote rooting.

10. What is Cantharophily ?

- Pollination by beetle is called Cantharophily.

11. List any two strategy adopted by bisexual flowers to prevent self-pollination.

Dichogamy

- In bisexual flowers anthers and stigmas mature at different times.
    - **Protandry** : The stamens mature earlier than the stigmas of the flowers.
    - **Protogyny :** The stigmas mature earlier than the stamens of the flower

Herkogamy

- In bisexual flowers, the stamens and stigmas are arranged different positions.

12. What is endothelium?

- The inner layer of the integument may become specialized to perform the nutritive function for the embryo sac and is called as endothelium or integumentary tapetum.
- Ex : Asteraceae .

13."The endosperm of angiosperm is different from gymnosperm". Do you agree. Justify your answer.

- Yes I agreed.

Endosperm of angiosperm	Endosperm of gymnosperm
It is a triploid tissue.	It is a haploid tissue.
It is formed after fertilization.	It is formed before fertilization
Nourish the developing embryo.	It acts as the female gametophyte and nutritive tissue.

14. Define the term Diplospory.

- A diploid embryo sac is formed from megaspore mother cell without a regular meiotic division is called diplospory.
- Ex : Eupatorium and Aerva.

15. What is polyembryony. How it can commercially exploited?

- Presence of more than one embryo in a seed is called polyembryony.

Commercially exploited

- The seedlings formed from the nucellar tissue in Citrus are found better clones for Orchards.
- Embryos derived through polyembryony are found virus free.

16. Why does the zygote divides only after the division of Primary endosperm cell?

- The priary endosperm cells divides and generate the endosperm tissue which nourishes the zygote.
- So the zygote always divides after the division of Primary endosperm cell.

17. What is Mellitophily ?

- Pollination by Bees is called Mellitophily**.**

18. "Endothecium is associated with dehiscence of anther" Justify the statement.

- Endothecium is a single layer of radially elongated cells below the epidermis of anther wall.
- The cells along the junction of the two sporangia of an anther lobe lack these thickening and this region is called stomium.
- This region along with the hygroscopic nature of endothecium helps in the dehiscence of anther at maturity.

19. List out the functions of tapetum.

- It supplies nutrition to the developing microspores
- It contributes sporopollenin through ubisch bodies thus plays an important role in pollen wall formation.
- The pollenkitt material is contributed by tapetal cells and is later transferred to the pollen surface.
- Exine proteins responsible for rejection reaction of the stigma are present in the cavities of the exine.
- These proteins are derived from tapetal cells.

20. Write short note on Pollen kitt.

- It is an oily layer forming a thick viscous coating over pollen surface.
- Pollenkitt is yellow or orange coloured and is chiefly made of carotenoids or flavonoids.
- It attracts insects and protects damage from UV radiation.
- Pollenkitt is contributed by the tapetum.

21. Distinguish tenuinucellate and crassinucellate ovules.

	Tenuinucellate type	crassinucellate type
1.	The sporogenous cell is hypodermal with a single layer of nucellar tissue.	Ovules with sub hypodermal sporogenous cell.
2.	Normally ovules have very small nucellus.	Normally these ovules have fairly large nucellus.

22. 'Pollination in Gymnosperms is different from Angiosperms' – Give reasons.

Gymnosperms	Angiosperms
Direct pollination	Indirect pollination
In gymnosperms the pollens are deposited directly on the exposed ovules.	In angiosperms the pollens are deposited on the stigma of the pistil.

23. Write short note on Heterostyly.

- Some plants produce two or three different forms of flowers.
- They are different in length of stamens and style.
- Pollination will take place only between organs of the same length.

24. Enumerate the characteristic features of Entomophilous flowers.

- Flowers are generally large.
- If small they are aggregated in dense inflorescence. Ex: Asteraceae flowers.
- Flowers are brightly coloured to attract insects. ex : Poinsettia and Bougainvillea
- Flowers are scented and produce nectar.
- Pollen and nectar are the floral rewards for the visitors.
- Flowers pollinated by flies and beetles produce foul odour to attract pollinators
- In some flowers juicy cells are present which are pierced and the contents are sucked by the insects.

25. Discuss the steps involved in Microsporogenesis.

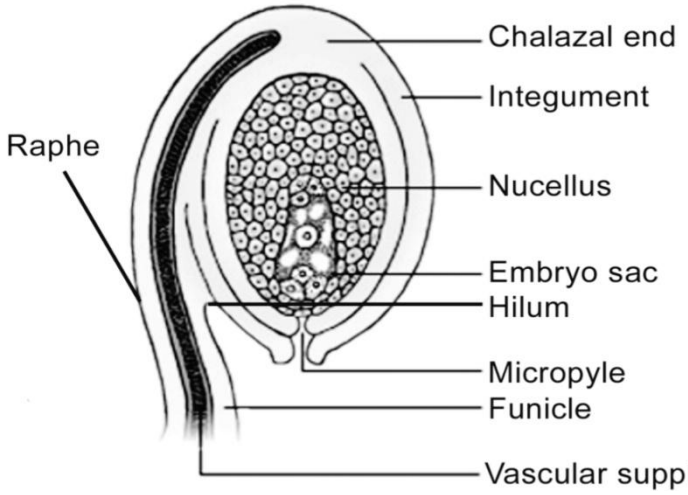
- The formation of haploid microspores (n) from diploid microspore mother cell (2n) by meiosis is called Microsporogenesis.

The steps involved in Microsporogenesis

- The primary sporogeneous cells directly mitotic divisions to form sporogenous tissue.
- The last generation of sporogenous tissue functions as microspore mother cells.
- Each microspore mother cell divides meiotically to form a tetrad of four haploid microspores.
- Microspores soon separate free in the anther locule and develop into pollen grains.
- All microspores in a microsporangium remain held together called pollinium.
- Ex: Calotropis.

26. With a suitable diagram explain the structure of an ovule.

- Ovule is also called megasporangium.
- It is protected by one or two covering called integuments.
- A mature ovule consists of a two parts
  - Stalk
  - Body
- The stalk or the funiculus is present at the base and attaches the ovule to the placenta.
- The point of attachment of funicle to the body of the ovule is known as hilum.
- The funicle is adnate to the body of the ovule forming a ridge called raphe.
- The body of the ovule is made up of a central mass of parenchymatous tissue known as nucellus.
- It has large reserve food materials.
- The nucellus is enveloped by one or two protective coverings called integuments.
- Integument encloses the nucellus except at the top and forms a pore called micropyle.
- The ovule with one integument said to be unitegmic or two integuments are said to be bitegmic.
- The nucellus, the integument and the funicle meet at the basal region of the ovule is called as chalaza.
- The micropylar end of the nucellus contains large oval, sac-like structure called embryo sac or female gametophyte.
- It develops from the functional megaspore formed within the nucellus.
- The inner layer of the integument may become specialized to perform the nutritive function for the embryo sac and is called as endothelium or integumentary tapetum.
- Ex : Asteraceae



27. Give a concise account on steps involved in fertilization of an angiosperm plant.

- The fusion of male and female gamete is called **fertilization**.
- Fertilization in angiosperms is double fertilization.

Events of fertilization

- Germination of pollen to form pollen tube in the stigma
- Growth of pollen tube in the style
- Direction of pollen tube towards the micropyle of the ovule
- Entry of the pollen tube into one of the synergids of the embryo sac.
- Discharge of male gametes
- One male gametes fuses with the egg to form Zygote – Syngamy.
- Second male gamete fuses with the polar nuclei and forms the primary endosperm nucleus (PEN) this phenomenon is called double fertilization.

28. Differentiate the structure of Dicot and Monocot seed.

	Dicot seed.	**Monocot seed.**
1.	The seed encloses two cotyledons	The seed encloses single cotyledon
2.	Coleoptile are absent	Coleoptile are present
3.	coleorhiza are absent	coleorhiza are present
4.	Scutellum is absent	Scutellum is present
5.	Suspensor is long	Suspensor is short
6.	Ex : Cicer arietinum	Ex : Oryza sativa

29. Give a detailed account on parthenocarpy. Add a note on its significance

- Formation of fruit from the ovary without fertilization is called parthenocarpic fruits.
- They fruits does not have true seeds.
- Ex : Banana, Grapes and Papaya.

Types of Parthenocarpy

- Genetic Parthenocarpy
- Environmental Parthenocarpy
- Chemically induced Parthenocarpy.

Significance parthenocarpic fruits

- The seedless fruits have great significance in horticulture.
- The seedless fruits have great commercial importance.
- They are useful for the preparation of jams, jellies, sauces, fruit drinks.
- High proportion of edible part is available in parthenocarpic fruits due to the absence of seeds.

30. What is endosperm? Explain the types.

- The primary endosperm nucleus (PEN) divides immediately after fertilization into an endosperm.
- Depending upon the mode of development three types of endosperm in angiosperms they are
  - Nuclear endosperm
  - Cellular endosperm
  - Helobial endosperm

Nuclear endosperm

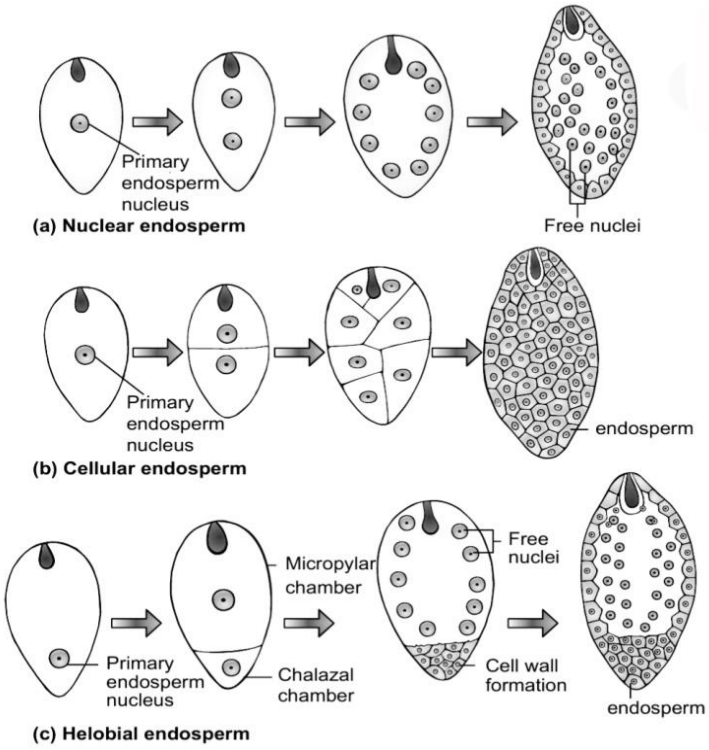
- Primary Endosperm Nucleus undergoes several mitotic divisions without cell wall formation.
- Thus a free nuclear condition exists in the endosperm.
- Ex : Coccinia, Capsella, Arachis

Cellular endosperm

- Primary endosperm nucleus divides into 2 nuclei and it is immediately followed by wall formation.
- Subsequent divisions also follow cell wall formation.
- Ex : Adoxa, Helianthus, Scoparia

Helobial endosperm

- Primary Endosperm Nucleus moves towards base of embryo sac and divides into two nuclei.
  - large micropylar chamber.
  - small chalazal chamber.
- The nucleus of the micropylar chamber undergoes several free nuclear division.
- The chalazal chamber may or may not divide.
- Ex : Hydrilla, Vallisneria.



Additional Questions

31. How do dioscorea reproduce vegetatively ?

- Dioscorea reproduces vegetatively by means of bulbils.

32. Write short notes on approach grafting.

- Both the scion and stock remain rooted.
- The stock is grown in a pot and it is brought close to the scion.
- Both of them should have the same thickness.
- A small slice is cut from both and the cut surfaces are brought near and tied together and held by a tape.
- After 1-4 weeks the tip of the stock and base of the scion are cut off and detached. and grown in a separate pot.

33. Enumerate the advantages of conventional methods of propagation

- The plants Produced genetically uniform.
- Plants are produced quickly.
- Some plants produce little or no seed. The seeds produced do not germinate.
- Plants can be produced in a short period.
- More economic propagation
- Ex : Solanum tuberosum.
- Grown a new plant with the same desirable characters.

34. Name the cell which divides to form male nuclei.

- Generative cells of microspore.

35. How does pollination occur in bee orchid?

- In Bee orchid (ophyrus) the morphology of flower is similar to female wasp (colpa).
- Male wasp mistakes the flower for female wasp, and tries to copulate.
- This pseudocopulation helps in pollination.

36. What is microsporogenesis ?

- The formation of haploid microspores (n) from diploid microspore mother cell (2n) through meiosis is called Microsporogenesis.

37. Differentiate secretory and invasive tapetum.

Secretory tapetum (parietal / glandular / cellular)

- The tapetum retains the original position and cellular integrity and nourishes the developing microspores.

Invasive tapetum (periplasmodial)

- The cells loose their inner tangential and radial walls and the protoplast of all tapetal cells coalesces to form a periplasmodium.

38. Tapetum is dual in origin – Justify your answer

- It is the innermost layer of anther wall.
- Tapetum is derived partly from the peripheral wall layer and partly from the connective tissue of the anther locule.
- Thus, the tapetum is dual in origin.

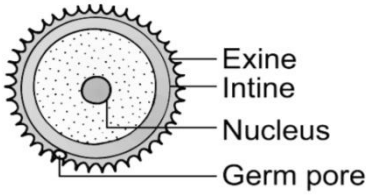
39. Describe pollinium.

- All microspores in a microsporangium remain held together called pollinium.
- Ex: Calotropis.

40. What is stomium ?

- The cells along the junction of the two sporangia of an anther lobe lack these thickenings this region is called stomium.

41. Draw a structure of pollengrains and label its parts.



42. What are the layers of anther wall?

- Epidermis
- Endothecium
- Middle layers
- Tapetum.

43. What is meant by cryopreservation?

- The technique is used to store pollen grains.
- Pollen is preserved in liquid nitrogen (-196^{o}c) in viable condition for prolonged duration. It is called cryopreservation.

44. What do you know about pollen robbers?

- Many visitors consume pollen and nectar and do not help in pollination they are called pollen robbers.

45. Explain the structure of mature anther.

- The mature anther wall consists of the following layers
  - Epidermis
  - Endothecium
  - Middle layers
  - Tapetum.

Epidermis

- It is single layered and protective in function.
- The cells undergo repeated anticlinal divisions to cope up with the rapidly enlarging internal tissues.

Endothecium:

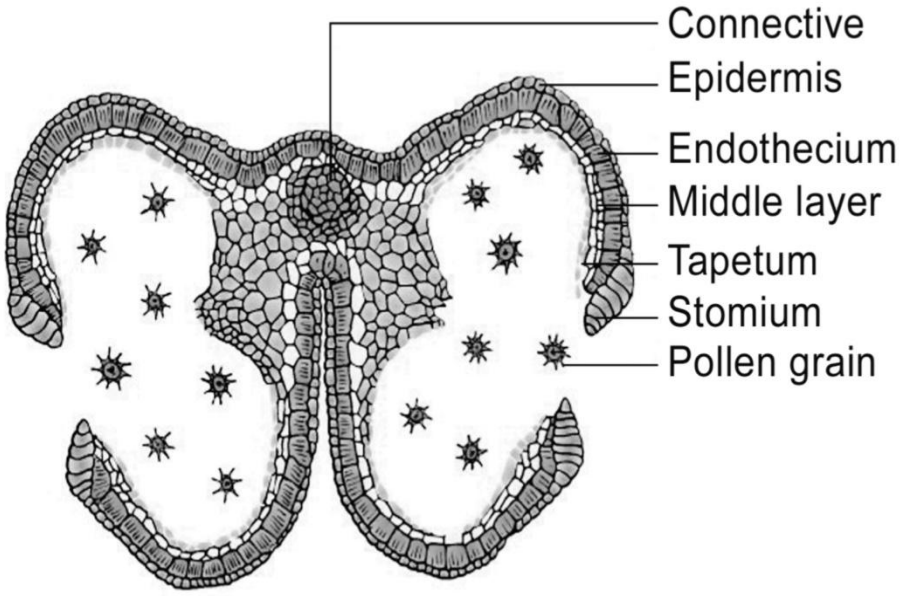
- It is found below the epidermis
- The inner tangential wall develops bands of cellulose.
- The hygroscopic nature of endothecium helps in the dehiscence of anther at maturity.

Middle layers

- Two to three layers of cells next to endothecium constitute middle layers.
- They are generally ephemeral. They disintegrate or get crushed during maturity.

Tapetum:

- It is the innermost layer of anther wall.
- It is derived partly from the peripheral wall layer and partly from the connective tissue of the anther lining the anther locule. Thus, the tapetum is dual in origin
- It attains maximum development at the tetrad stage of microsporogenesis.



46. Differentiate Intine and Exine.

Exine	Intine
Outer layer called exine.	Inner layer called intine
Exine is made up of cellulose, sporopollenin and pollenkitt.	Intine is made up of pectin, hemicellulose, cellulose and callose together with proteins.
Thick walled and not uniform.	Thin walled and uniform.

47. Give short notes on types of ovules.

- The ovules are classified into six main types. they are

Orthotropous

- The micropyle is at the distal end.
- The micropyle, the funicle and the chalaza lie in one straight vertical line.
- Ex : Piperaceae, Polygonaceae.

Anatropous

- The body of the ovule completely inverted.
- The micropyle and funiculus come to lie very close to each other.
- Ex : Dicots and monocots.

Hemianatropous

- The body of the ovule is placed transversely and at right angles to the funicle.
- Ex: Primulaceae.

Campylotropous

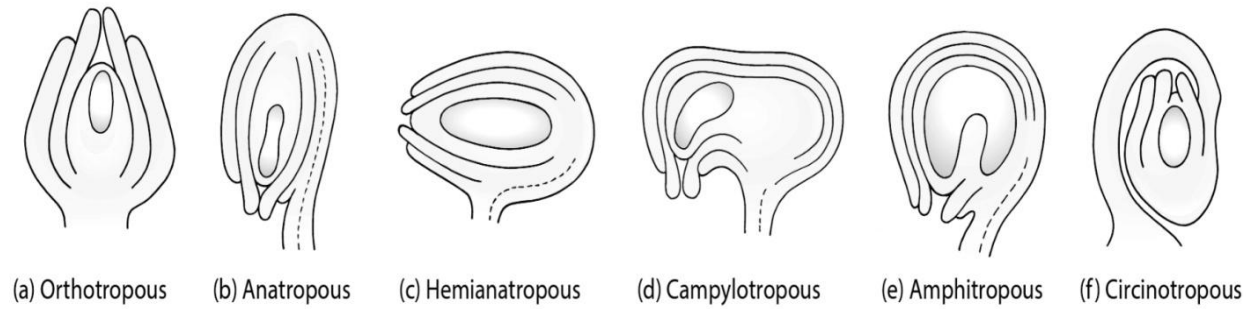
- The body of the ovule at the micropylar end is curved and more or less bean shaped.
- The embryo sac is slightly curved.
- Hilum, micropyle and chalaza are adjacent to one another.
- Ex : Leguminosae

Amphitropous

- The distance between hilum and chalaza is less.
- The curvature of the ovule leads to horse - shoe shaped nucellus.
- Ex : some Alismataceae.

Circinotropous

- Funiculus is very long and surrounds the ovule.
- Ex : Cactaceae.



48. Define : Double fertilization

- In angiosperms, one of the male gametes fuses with the egg to form Zygote.
- Second male gamete fuses with the polar nuclei and forms the primary endosperm nucleus (PEN)
- So, this phenomenon is called double fertilization.

49. What is obturator ?

- The pollen tube after travelling the whole length of the style enters into the ovary locule.
- It is guided towards the micropyle of the ovule by a structure called obturator.

50. Explain the different mode of entry of pollen tube into the ovule.

- There are three types of pollen tube entry into the ovule.

Porogamy

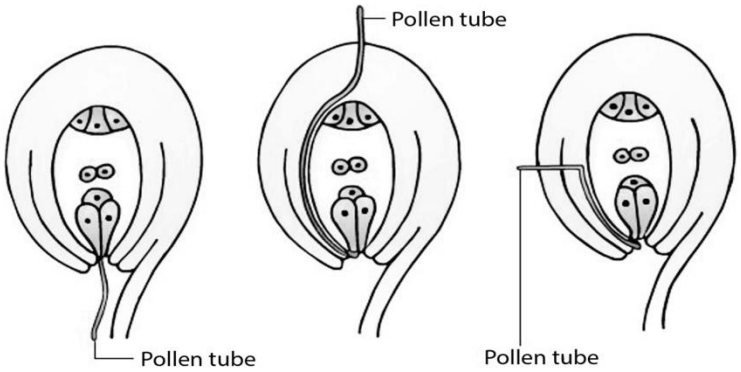
- When the pollen tube enters through the micropyle.

Chalazogamy

- The pollen tube enters through the chalaza.

Mesogamy

- When the pollen tube enters through the integument.



51. Define : perisperm.

- The nucellar tissue is absorbed completely by the developing embryo sac and embryo.
- The remnant of nucellar tissue in the seed is called perisperm.
- Ex : Black pepper and beet root

52. Tabulate post fertilization changes in a flower.

S.NO	Parts before fertilization	Transformation after fertilization
1.	Sepals, petals stamens, and stigma	Usually wither and fall off
2.	Ovary	Fruit
3.	Ovule	Seed
4.	Egg	zygote
5.	Funicle	Stalk of the seed
6.	Micropyle	Micropyle of the seed
7.	Nucellus	Perisperm
8.	Outer integument	Testa (Outer seed coat)
9.	Inner integument	Tegman (Inner seed coat)
10	Synergid cells	Degenerate
11.	Secondary nucleus	Endosperm
12.	Antipodal cells	Degenerate

53. Write the characters of anemophilous plant.

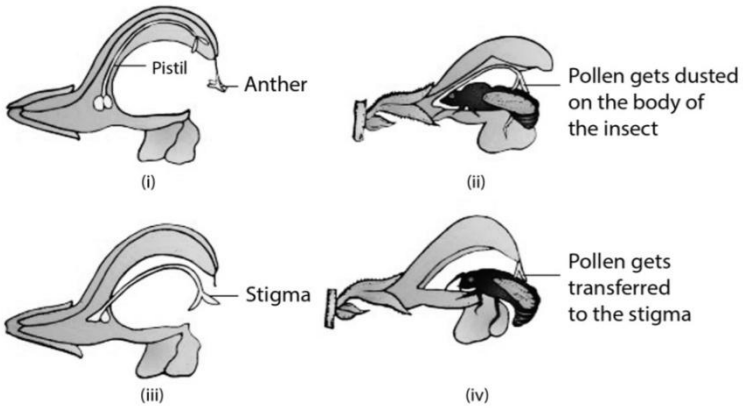
- Flowers in pendulous, catkin like or spike inflorescence.
- The perianth is absent or highly reduced.
- The flowers are small, colourless, not scented, do not secrete nectar.
- The stamens are numerous, filaments are long, exerted and versatile.
- Enormous quantity of pollen grains. compared to number of ovules available for pollination.
- Minute, light, dry pollen easily carried by wind to long distances.

54. Write the functions of endosperm.

- It is the nutritive tissue for the developing embryo.
- The zygote divides only after the development of endosperm.
- Endosperm regulates the precise mode of embryo development.

55. Explain pollination in Salvia (Lever mechanism):

- This flower of salvia is adapted for Bee pollination.
- The flower is protandrous and the corolla is bilabiate with 2 stamens.
- A lever mechanism helps in pollination.
- Each anther has an upper fertile lobe and lower sterile lobe.
- Lower sterile lobe separated by a long connective which helps the anthers to swing freely.
- When a bee visits a flower, it sits on the lower lip which acts as a platform.
- It enters the flower to suck the nectar by pushing its head into the corolla.
- During the entry of the bee into the flower the body strikes against the sterile end of the connective.
- This makes the fertile part of the stamen to descend and strike at the back of the bee.
- The pollen gets deposited on the back of the bee.
- When the bee visits another flower, the pollen is rubbed on stigma. Thus pollination is completed.



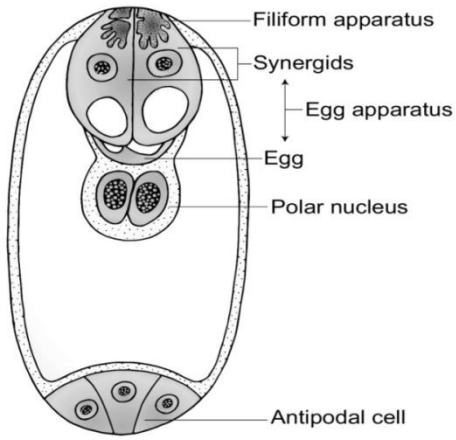
56. Do you think parthenocarpy and apomixis are different process? Justify?

S. No	Parthenocarpy	Apomixis
1.	Fruit may develop from the ovary without fertilization such fruits are called parthenocarpic fruits.	Reproduction does not involve union of male and female gamete is called apomixis.
2.	They do not have true seeds.	Apomixis refers to formation of seeds without fertilization.
3.	Ex : Banana, Grapes.	Ex : Mangifera

57. What is endospermous or ex – albuminous seeds?

- Seeds without endosperms are called non – endospermous seeds.
- Ex : Pea, Groundnut and Beans

58. Draw a structure of embryo sac and label its parts

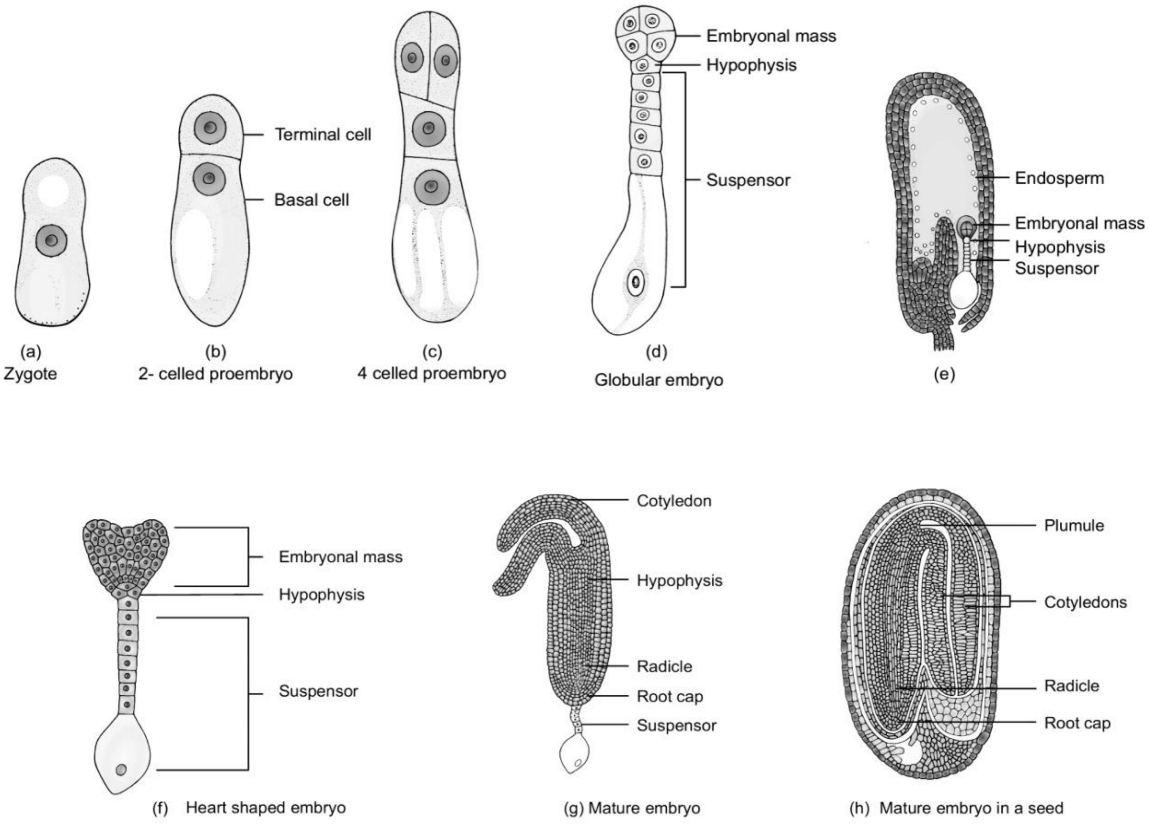


59. Write the parts of mature embryo sac.

- Egg - 1
- Synergids - 2
- Polar nucleus - 2
- Antipodal cells – 3

60. Explain the development of a Dicot embryo.

- The embryo develops at micropylar end of embryo sac.
- The Zygote divides by a transverse division forming upper or terminal cell and lower cell.
- Further divisions in the zygote during the development lead to the formation of embryo.
- Embryo undergoes globular, heart shaped stages before reaching a mature stage.
- The mature embryo has a radicle, two cotyledons and a plumule.



61. Describe about the mature embryo sac.

- The vacuole expands and pushes the nuclei towards the opposite poles of the embryo sac.
- Both the nuclei divide twice mitotically, forming four nuclei at each pole.
- At this stage all the eight nuclei are present in a common cytoplasm.
- Of four nuclei, three nuclei of the micropylar end form an egg apparatus and the fourth one is left free is called upper polar nucleus.
- Three nuclei of the chalazal end form three antipodal cells and fourth one functions as the lower polar nucleus.
- Based on the plant the 2 polar nuclei may remain free
- The egg apparatus is made up of a central egg cell and two synergids.
- Thus, a 7 celled with 8 nucleated embryo sac is formed.

62. Give examples for Helobial endosperm.

- Hydrilla
- Vallisneria.

63. What is Anemophily ?

- Pollination by wind is called Anemophily.

64. What is Hydrophily ?

- Pollination by water is called hydrophily

65. What is Ornithophily ?

- Pollination by Birds is called Ornithophily.

66. What is Chieropterophily ?

- Pollination by Bats is called Chieropterophily.

67. What is Myrmecophily ?

- Pollination by Ants is called Myrmecophily.

68. What is Malacophily ?

- Pollination by Snails is called Malacophily.

69. What is Phalaenophily ?

- Pollination by Moths is called Phalaenophily.

70. What is Psychophily ?

- Pollination by Butterflies is called Psychophily.

71. What is epihydrophily and hypohydrophily ?

Epihydrophily

- Pollination occurs at the water level.
- Ex : Vallisneria spiralis

Hypohydrophily

- Pollination occurs inside the water
- Ex : Zostera marina

72. What is homogamy?

- When the stamens and stigma of a flower mature at the same time are called homogamy.
- Ex : Mirabilis.

73. What is Incomplete dichogamy?

- The stamen and stigma of a flower mature at different time is called dichogamous.

74. Define Cross - pollination.

- The transfer of pollens on the stigma of another flower is called cross-pollination.

75. What is geitonogamy ?

- The pollen deposits on another flower of the same individual plant is called geitonogamy.

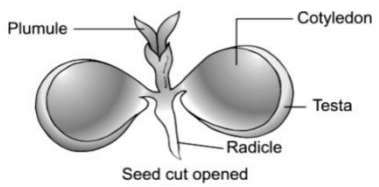
76. What is Xenogamy ?

- Genetically different pollen deposits on another flower of a different plant of the same species is called as xenogamy.

77. What is Herkogamy?

- In bisexual flowers, the stamens and stigmas, are arranged different positions. so self-pollination becomes impossible.
- Ex : Gloriosa superba
- The style is reflexed away from the stamens.

78. Draw a structure of Cicer arientinum (Dicot seed) and label its parts.



79. Describe megasporogenesis.

- The process of development of a megaspore from a megaspore mother cell is called megasporogenesis.
- A single hypodermal cell in the nucellus enlarged and functions as archesporium.
- In some plants, the archesporial cell may directly function as megaspore mother cell.
- In others, it divides transversly form outer primary parietal cell and inner primary sporogenous cell.
- The primary sporogenous cell functions as a megaspore mother cell.
- The megaspore mother cell divides meiotically to form four haploid megaspores.
- Based on the number of megaspores that develop into the Embryo sac, we have three basic types of development: monosporic, bisporic and tetrasporic.
- During megasporogenesis of the four megaspores formed, if only one is functional and forms the female gametophyte . This type of development is called monosporic
- Eg : polygonum
- Out of four megaspores, two are involved in Embryo sac formation. This development is called bisporic.
- Ex : Allium.
- If all the four megaspores are involved in Embryo sac formation. This development is called tetrasporic.
- Ex : Peperomia.

80. What is bisporic embryo sac ?

- Out of four megaspores, two are involved in Embryo sac formation.This development is called bisporic.
- Ex : Allium.

81. What is tetrasporic embryo sac ?

- If all the four megaspores are involved in Embryo sac formation.This development is called tetrasporic.
- Ex : Peperomia.

82. Give short notes on sporopollenin ?

- Sporopollenin is present in the exine of pollen grains.
- It contributed by both pollen cytoplasm and tapetum.
- It is resistant to physical and biological decomposition.