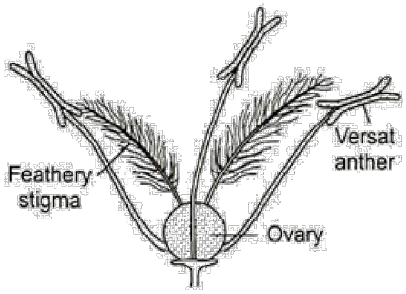
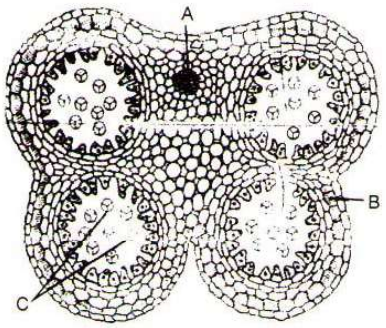
1. Microsporangia develops in to
   a) Pollens b) Microgametes c) Megagametes d) Pollen sacs
2. Pollen grains have ability to tolerate extreme temperatures because of the presence of
   a) Sporopollenin b) Suberin c) Cubin d) Callose
3. An interesting modification of flower shape for insect pollination occurs in some orchids in which a male insect mistakes the pattern on the orchid flower for the female of his species and tries to copulate with it, thereby pollinating the flower. This phenomenon is called
   a) Pseudoparthenocarpy b) Mimicry
   c) Pseudopollination d) Pseudocopulation
4. Petals together form
   a) Corolla b) Gynoecium c) Androecium d) Pistil
5. Cleistogamous flowers
   a) Never open b) Always open
   c) Sometimes they open d) Remain still
6. The diagram (below) depicts a flower with



   a) Air pollination b) Anemophily c) Water pollination d) Hybridization
7. Autogamy stands for
   a) Self-pollination in same flower b) Self-pollination in different flower
   c) Pollination in two flowers d) Division in embryo
8. Inflorescence is
   a) Development of flower b) Distribution of flowers
   c) Arrangement of flower d) All of these
9. The following is the diagram of TS of anther. Identify the parts labelled as A,B and C.

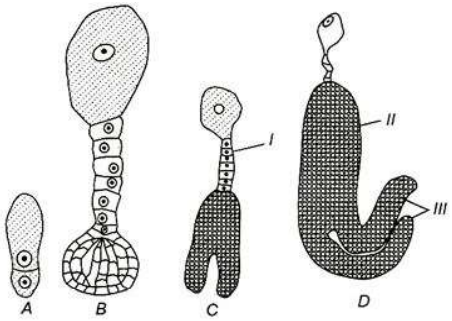


   a) A-Connective, B-Endothecium, C-Pollen grain b) A- Endothecium, B- Connective, C-Pollen grain,
   c) A-Pollen grain, B- Connective, C-Endothecium, d) A- Endothecium, B-Pollen grain, C-Connective,

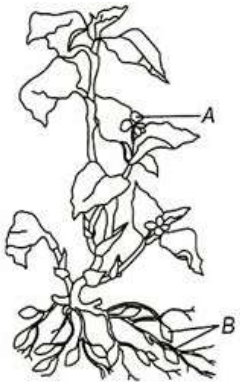
10. Pollens outer layer is called …A… . This is made up of …B… . This is absent on the …C… . Fill in the blanks A,B and C
    a) A-Intine, B-organic compound, C-micropyle b) A-exine, B-sporopollenin, C-germ pore

c) A-exine, B-intine, C-micropyle d) A-micropyle, B-intine, C-exine

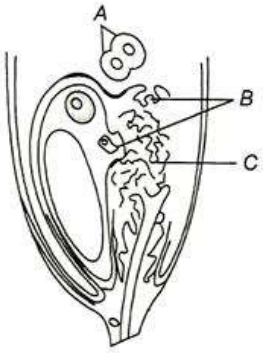
11. "In Western countries a large number of ..... Product in the form of tablets and ..... are available in market. Pollen consumption claimed to increase the ..... of athelete". The words to fill blanks in sequential order are
    a) Pistil, syrup, power b) Stamen, food, sexual urge
    c) Carpel, yoghurt, labido d) Pollen, syrup, performance
12. Identify the different stages in embryogenesis in the given diagram *A*, *B*, *C* and *D*



    a) A-Two celled stage, B-Heart-shaped, C-Globular, D-Mature embryo
    b) A-Two celled stage, B-Mature embryo, C-Heart-shaped, D-Globular type
    c) A-Two celled stage, B-Globular type, C-Heart-shaped, D-Mature embryo
    d) A-Mature embryo, B-Heart-shaped, C-Globular type, D-Two celled stage
13. Tapetum is
    a) Protective b) Reproductive c) Nutritive d) Respiratory
14. Formation of diploid embryo sac from diploid vegetative structure, eg, nucellus or integument, etc, without meiosis is called
    a) Apospory b) Apomixis
    c) Diplospory d) Adventive polyembryony
15. The terminal structure of stamen is called
    a) Pollen b) Filament c) Anther d) All of these
16. Generally pollen tube enters through
    a) Micropylar region b) Antipodal region c) Chalazal end d) Nuclear region
17. Identify the type of flower *A* and *B*

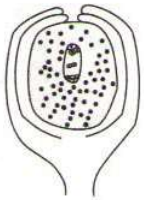


    a) A-Cleistogamous; B-Chasmogamous b) A-Homogamous; B-Heterogamous
    c) A-Chasmogamous; B-Cleistogamous d) A-Heterogamous; B-Homogamous
18. Water pollinated plant is
    a) *Vallisneria* b) *Hydrilla* c) *Zostera* d) All of these
19. Endospermic seeds are seen in
    a) Castor b) Coconut c) Both (a) and (b) d) None of these
20. Diagram showing discharge of gametes in the egg apparatus. Identify *A*, *B* and *C*



a) A-Polar nuclei, B-Female gametes, C-Synergid cell
b) A- Male gametes, B- Synergid cell, C- Polar nuclei
c) A- Synergid cell, B- Male gametes, C- Polar nuclei
d) A- Polar nuclei, B- Male gametes, C- Synergid cell

21. Parthenogenesis is a type of
    a) Sexual reproduction b) Asexual reproduction
    c) Budding d) Regeneration
22. The diagram given below represents the sectional view of



    a) Amphitropous ovule b) Campylotropous ovule
    c) Anatropous ovule d) Orthotropous ovule
23. Banana fruits are seedless, because
    a) Auxins are sprayed for rapid development of fruits
    b) Of vegetative propagation of plants
    c) Of triploid plants
    d) Fruits are artificially ripened
24. Which of the following is not true for double fertilization?
    a) Discovered by Nawaschin
    b) Male gamete and secondary nucleus fused to form endosperm nucleus
    c) endosperm nucleus is diploid
    d) endosperm nucleus nutrition to embryo
25. Mature male gametophyte is derived from a 'pollen mother cell' by
    a) Three meiotic divisions
    b) One meiotic, one mitotic division
    c) Single mitotic division
    d) Two mitotic divisions
26. Embryo sac is also known as
    a) Micro-gametophyte b) Mega-gametophyte c) Micro-sporangium d) Mega - sporangium
27. Albuminous seed
    a) Has no endosperm b) Has thick cotyledons
    c) Have food storage in cotyledons d) Both (b) and (c)
28. How many nuclei take part in double fertilization of flowering plants?
    a) 3 b) 2 c) 4 d) 8
29. A typical dicotyledonous embryo consist of an …A… axis and …B… cotyledons.
    The portion of embryonal axis above the level of cotyledons is …C… which terminates with the

…D… or stem tip

A,B,C,D in the above statement are

a) A-Plumule, B-epicotyle, C-cotyledons, D-embryonal axis

b) A- embryonal axis, B- cotyledons, C- epicotyle, D- Plumule

c) A- embryonal axis, B- epicotyle, C- cotyledons, D- Plumule

d) A- embryonal axis, B- Plumule, C- cotyledons, D- epicotyle

30. Transfer of pollen grains from one flower to another flower of same plant is

a) Geitonogamy b) Autogamy c) Allogamy d) Cleistogamy

31. Which one of the following statements is not true?

a) Pollen grains are released from anthers at 2-celled state

b) Sporogenous cell directly behaves as the megaspore mother cell

c) Megaspore divides twice to form an eight nucleate embryo sac

d) Egg and synergids always lie near the micropylar end of ovule

32. In embryo sac the number of → synergid → egg cell → central cell → antipodal cell follows the order

a) 1-1-2-3 b) 2-1-3-2 c) 2-1-2-3 d) 3-2-1-2

33. Choose the mis –matched option.

a) Wind – *Cannabis* – Anemophily b) Water – *Zoostera* – Hydrophily

c) Insect – *Salvia* – Entomophily d) Birds – *Adansonia* – Ornithophily

34. Which one of the following would not lead to formation of clones?

a) Double fertilization b) Apomixis

c) Vegetative reproduction d) Tissue culture

35. Apomixis is seen in

a) Asteracea b) Grasses c) Both (a) and (b) d) None of these

36. Ovary develops into

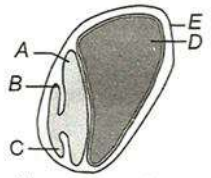
a) Fruit b) Seed c) Fruit wall d) Embryo

37. Pollination is

a) Shedding of pollens b) Maturing of anther

c) Transfer of pollen to stigma d) Formation of pollen

38. Find out the type of seed and identify cotyledons epicotyle and endosperm



Monocot seed structure

a) Monocots- *A*, *B* and *C* b) Dicots-*B*, *A* and *C* c) Monocots-*A*, *B* and *D* d) Dicots-*D*, *E* and *A*

39. Approximate diameter of pollen grain is

a) 25-50 micrometer b) 50-75 micrometer c) 75-100 micrometer d) 25-35 micrometer

40. In porogamy, pollen tube enters the ovule through the

a) Chalazal end b) Integument c) micropyle d) Ovary wall

41. A seed matures if water content is reduced to …'A' ….. . If the general metabolism …B…. . The embryo enter a state called … C … .

Choose correct option for A,B and C

a) A-50-60%, B-fast, C-infertile b) A-10-15%, B-slow down, C-dormancy

c) A-35-50%, B-slow down, C-development d) A-35-60%, B-fast, C-Embryogenesis

42. What will be the gametic chromosome number of a cell, if somatic cell have 40 chromosomes?

a) 10 b) 20 c) 30 d) 40

43. Stem cutting are commonly used for the propagation of

a) Banana b) Rose c) Mango d) Cotton

44. The fertilization in which male gametes are carried through pollen tube, is known as
a) Syngamy b) Porogamy c) Siphonogamy d) Chalazogamy

45. If endosperm has 36 number of chromosomes then find out the chromosome number of male and female gamete
a) 18, 18 b) 17, 18 c) 20, 20 d) 12, 12

46. For the formation of tetrasporic embryo sac, how many megaspore mother cells are required?
a) 1 b) 2 c) 3 d) 4

47. The phenomenon in which, anther and stigma grow and mature at same time is called
a) Homogamy b) Syngamy c) Allogamy d) Fusion

48. Emasculation is not required in
a) Unisexual flower b) Bisexual flower c) Dioecious flower d) Both (a) and (c)

49. Testa of a seed is produced from
a) Ovary wall b) Hilum
c) Outer integument of ovule d) Funicle

50. Thalamus contributes in the fruit formation in
a) Apple b) Strawberry c) Cashewnut d) All of these

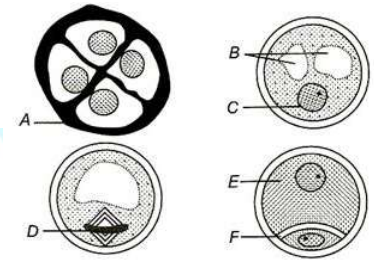
51. Most oldest viable seed is of
a) Lupine b) *Ficus* c) Date palm d) Phoenix

52. Which one of the following was observed for the first time by Trenb?
a) Entry of the pollen tube into the ovule through the micropyle in *ottetia*
b) Entry of the pollen tube into the ovule through the chalaza in *casuarina*
c) Entry of the pollen tube into the ovule through the integuments
d) Formation of many pollen tube into the ovule through the grain in *hibiscus*

53. If male plant have genotypes $= S_A S_B$ and female plant have genotypes $= S_C S_B$. Then the result would be
a) All of the pollen will germinate
b) All pollen will die
c) Fertilization doesn't occur
d) Half pollen die and half will germinates on stigma

54. Self incompatibility is
a) For incouraging self-fertilisation pollination
b) Genetic method for preventniig self-pollination
c) Both (a) and (d)
d) Found in unisexual flower

55. 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

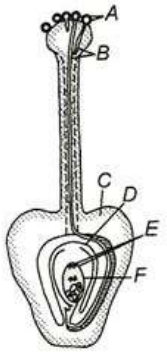
56. In embryo sac, n, $2n$, $3n$, conditions are found respectively in

a) Egg, antipodal, endosperm
b) Nucleus, endosperm, egg
c) Antipodal, zygote, endosperm
d) Endosperm, nucleus, egg

57. Which one of the following is resistant to enzyme action?
a) Cork
b) Wood fibre
c) Pollen exine
d) Leaf cuticle

58. Pollens are considered as well preserved fossils due to the presence of
a) Exine
b) Intine
c) Mexine
d) Protein

59. Identify *A* to *F* in the following diagram



a) A-Pollen tube, B-Ovary, C-Ovule, D-Antipodal cell, E-Pollen grain, F-Secondary nucleus,(polar nuclei)
b) A-Polar nuclei (secondary nucleus), B-Antipodal cell, C-Ovule, D-Ovary, E-Pollen tube, F-Pollen grain
c) A-Pollen grain, B-Pollen tube, C-Ovary, D-Ovule, E-Antipodal cell, F-Secondary Nucleus (polar nuclei)
d) A-Antipodal cell, B-Ovule, C-Ovary, D-Secondary nucleus, E-Pollen grain, F-Pollen tube

60. Double fertilization involves
a) Syngamy and triple fusion
b) Double fertilization
c) Development of antipodal cell
d) None of the above

61. Seed germination requires
I. Light II. Temp (suitable
III. Moisture IV. Oxygen
Select correct option
a) I,II and III
b) II,III and IV
c) I,III and IV
d) II,IV and I

62. In which one pair, both the plants can be vegetatively propagated by leaf pieces?
a) *Bryophyllum* and *kalanchoe*
b) *Chrysanthemum* and *Agave*
c) *Agave* and *kalanchoe*
d) *Asparagus* and *Bryophyllum*

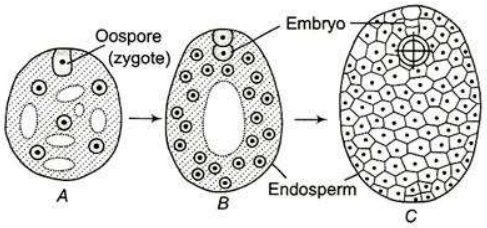
63. Larger nucleus in a pollen grain is
a) Tube nucleus
b) Sperm nucleus
c) Generative nucleus
d) None of these

64. Tallest flower is *Amorphophallus*. It is
a) True
b) False
c) Sometimes (A) and sometimes (b)
d) Neither (a) nor (b)

65. Anthesis is
a) Development of pollen
b) Development of anther
c) Opening of flower
d) Reception of pollen by stigma

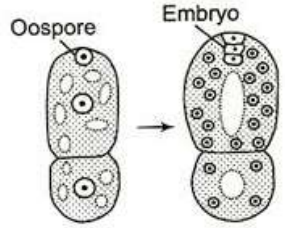
66. Single megasporic development is called
a) Single sporic
b) Unisporic
c) Monosporic
d) Nulleiporic

67. Identify the type of endosperm to given diagram

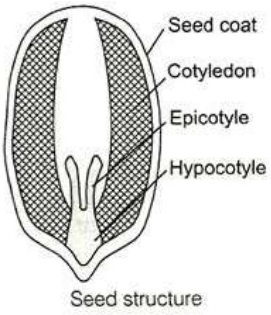


a) Cellular b) Helobial c) Nuclear d) None of these

68. Consider the following statements and choose the correct option.
I. The genetic constitution of a plant is unaffected in vegetative propagation.
II. Rhizome in ginger serves as an organ of vegetative reproduction.
III. Totipotency of cells enables us to micropropagate plants.
a) Statements I and II alone are true
b) Statements II and III alone are true
c) Statements II alone is true
d) All the three Statements I, II and II are true
69. Micropyle exists in
a) Seed b) Ovule c) Both (a) and (b) d) Fruit only
70. Which one of the following is surrounded by a callose wall?
a) Microspore mother cell b) Male gamete
c) Egg d) Pollen grain
71. In *Amorphophallus* and *Yucca*, the moth lay egg into the
a) Locule of ovary b) On stigma c) Into the fruit wall d) On style
72. Which of the following is incorrect in angiosperm?
a) Pollen grain - Haploid
b) Megaspore - Diploid
c) Synergid - Haploid
d) Endosperm - Triploid
73. Aleurone layer is found in
a) Dicotyledons b) Monocotyledons c) Both (a) and (b) d) None of these
74. Advantage of seed is/are
a) Given variation to upcoming new plants b) Better dispersal
c) Protect embryo d) All of the above
75. Identify the type of endosperm in given diagram



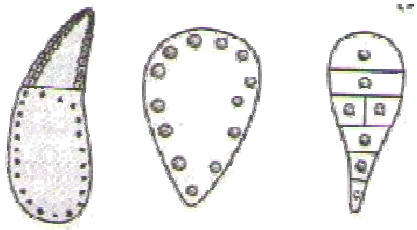
a) Cellular b) Nucleus c) Helobial d) Persist
76. Epicotyle is the upper part of embryonal axis in
a) Monocots b) Dicots c) All plants d) All of these
77. Ruminate endosperm is found in the seeds of family
a) Compositae b) Cruciferae c) Euphorbiaceae d) Annonaceae
78. Find out the type of seed and three embryonal parts out of the four labellings given below



Seed structure

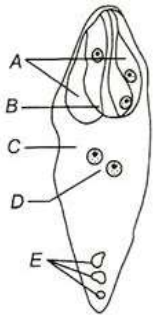
a) Monocot (seed coat, cotyledon, epicotyle) b) Dicot (seed coat, epicotyle, hypocotyle)
c) Monocot (seed coat, hypocotyle, cotylodon) d) Dicot (cotyledon, epicotyle, hypocotyle)

79. The process of embryo formation without fertilization, is known as
a) Apospory b) Apogamy c) Parthenocarpy d) Polyembryony
80. In previous figure find out *F* and *G*
a) F-Radicle; G-Root cap b) F-Root cap; G-Coleorhiza
c) F-Epiblema; G-Radicle d) F-Root cap; G-Epiblema
81. Micropyle is useful for the entry of
a) Pollen grain b) Pollen tube c) Water d) Male gamete
82. Cleistogamous flower is found in
a) Tobacco b) Viola c) Mirabilis d) None of these
83. Select the correct order of endosperm types.



a) Cellular, Helobial, Free nuclear b) Cellular, Free nuclear, Helobial
c) Helobial, Free nuclear, Cellular d) Free nuclear, Cellular, Helobial
84. Find out the odd one.
a) Micropyle b) Embryo sac c) Nucellus d) Pollen grain
85. The outermost and inner most wall layers of microporangium in anther are (respectively)
a) Endothecium and tapetum b) Epidermis to endodermis
c) Epidermis to middle layer d) Epidermis and tapetum
86. Microsporogenesis is
a) Formation of microspores b) Formation of female gametes
c) Formation of tapetum d) All of the above
87. Function of micropyle is
a) Helps in germination b) Helps in surviving
c) Both (a) and (b) d) Helps in endosperm formation
88. Bright colouration of flowers is an adaptation for
a) Anemophily b) Hydrophily c) Malacophily d) Entomophily

89. Identify *A* and *E* in the diagram given below



a) A-Antipodal, B-2 Polar nuclei, C-Center cell, D-Egg, E-Synergids
b) A- Antipodal, B-Central cell, C-2 Polar nuclei, D-Egg, E-Synergids
c) A-2 Polar nuclei, B-Central cell, C-Antipodal cell, D-Egg, E-Synergids
d) A-Synergids, B-Egg, C-Central cell, D-2 Polar nuclei, E- Antipodal cell

90. If root of flowering plant has 24 chromosomes then its gamete has how many chromosomes?
a) 24 b) 12 c) 4 d) 8

91. If stock contains 58 chromosomes and scion contains 30 chromosomes,
Then how many chromosomes are present in root and egg cell of resultant plant respectively?
a) 30 and 29 b) 15 and 58 c) 58 and 15 d) 29 and 30

92. In previous figure find out scutellum, radicle
a) A and E b) E and F c) F and G d) G and B

93. In some organisms, karyokinesis is not followed by cytokinesis as a result of which, multinucleate condition arises leading to the formation of syncytium. The perfect example for this is
a) Appearance of a furrow in cell membrane b) Liquid endosperm in coconut
c) Sexual reproduction d) Fertilization

94. The process of formation of microspore from the microspore mother cell is called megasporogenesis. The above statement is
a) True b) False
c) Sometimes (a) and sometimes (b) d) Neither (a) nor (b)

95. From which cells of embryo, plumule is produced?
a) Proembryo b) Hypophysis c) Apical octant d) Micropylar octant

96. Triploid tissue in angiosperms, is
a) Nucellus b) Endosperm c) endothelium d) Tapetum

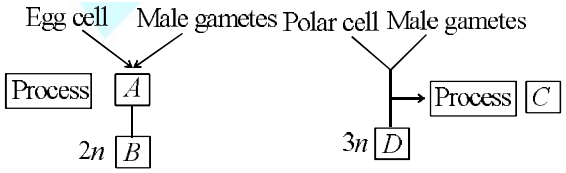
97. …A… egg cell, …B… zygote, …C… endosperm. Find out the correct ploidy nature of A, B and C
a) A $-$ $2n$, B $-$ $3n$, C $-$ $4n$ b) A $-$ $1n$, B $-$ $1n$, C $-$ $3n$
c) A $-$ $1n$, B $-$ $2n$, C $-$ $3n$ d) A $-$ $1n$, B $-$ $2n$, C $-$ $4n$

98. The ovule attached to the placenta of ovary wall by
a) Raphae b) Micropyle c) Funicle d) Hilum

99. Apomixis is the development of
a) Seeds with fertilization b) Seeds without fertilization
c) Seed from vegetative cells d) Seeds from reproductive cells

100. The plant part which consists of two generations one within the other, is
a) Germinated pollen grain b) Embryo
c) Unfertilized ovule d) Seed

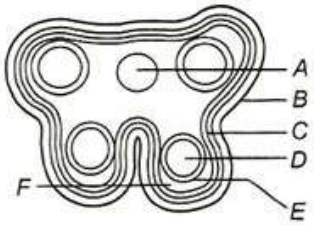
1. Find out right statement (s)
   I. Endosperm formation is the prior event than zyote formation
   II. Angiospermic endosperm is $3n$
   III. Gymnospermic endosperm is n
   a) Only I b) II and III c) I and III d) I,II and III
2. Transfer of pollen grains from the anther to the stigma of another flower of the same plants is called
   a) Xenogamy b) Geitonogamy c) Karyogamy d) Autogamy
3. After fertilization, the outer integument forms
   a) Testa b) Tegmen c) Perisperm d) Pericarp
4. Water pollination
   a) Is rare in flowering plant
   b) Is limited to 30 genera
   c) Takes place mostly in monocotyledons
   d) All of the above
5. Plants of which one of the following groups of genera are pollinated by the same agency?
   a) *Triticum, mussanda, zea mays* b) Kadam, *cannabis*
   c) *Salvia, calotropis* d) *Salvia, pinus, ophrys*
6. Pollens are be stored at which temperature
   a) $-196°C$ b) $196°C$ c) $10°C$ d) $0°C$
7. The total number of nuclei involved in double fertilization in angiosperms are
   a) Two b) Three c) Four d) Five
8. In a flowering plant, the pollen tube first arrives in
   a) Egg b) An antipodal cell c) A synergid d) Central cell
9. Filiform apparatus are
   a) Special cellular thickning at antipodal cell
   b) Special cellular thickning at micropylar end
   c) Special cellular thickning at synergid cells
   d) Special cellular thickning at nuclear end
10. What would be the number of chromosomes of the aleurone cell of a plant with 42 chromosomes in its root tip cells?
    a) 63 b) 84 c) 21 d) 42
11. Filiform apparatus is a characteristic feature of
    a) Egg b) Synergid c) Zygote d) Suspensor
12. An angiospermic leaf carries 16 chromosomes. The number of chromosomes in its endosperm will be
    a) 16 b) 24 c) 12 d) 8
13. Embryo developed from the somatic cells are called
    a) Cybrids b) Embryoid c) Callus d) Hybrids
14. Wind pollinated and water pollinated plants
    a) Are colourful b) Are non-colourful c) Are small in size d) Produce nector
15. Identify A, B, C and D



    a) A-Syngamy, B-Embryo, C-Triple fusion, D-Endosperm
    b) A- Endosperm, B- Syngamy, C- Embryo, D- Triple fusion
    c) A- Endosperm, B- Triple fusion, C- Syngamy, D-Embryo

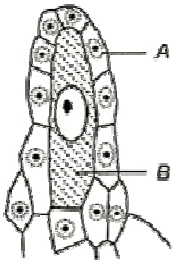
d) A- Endosperm, B- Triple fusion, C- Embryo, D-Syngamy

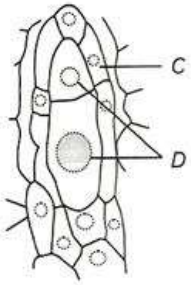
16. Identify *A* and *E* in the following diagram



a) A-Epidermis, B-Endodermis, C-Connective tissues, D-Sporogenous tissue, E-Middle layer, F-Tapetum
b) A- Endodermis, B- Connective tissues, C- Epidermis, D- Tapetum, E- Sporogenous tissue, F-Middle layer
c) A- Tapetum, B- Middle layer, C- Sporogenous tissue, D- Connective tissues, E- Endodermis, F-Epidermis
d) A- Connective tissues, B- Epidermis, C-Endothecium, D-Sporogenous tissue, E- Tapetum, F-Middle layer

17. Identify the labelling of given diagrams





a) A-MMC, B-Megaspore dyad, C-Nucellus, D-Nucleus
b) A- Nucellus, B- Megaspore dyad, C- Nucellus, D-MMC
c) A- Nucellus, B-MMC, C- Nucellus, D- Megaspore dyad
d) A-MMC, B- Nucellus, C- Megaspore dyad, D- Nucleus

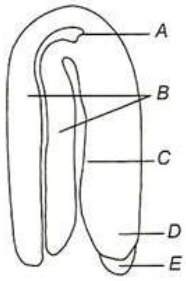
18. The endosperm in angiosperms develops from
a) Zygote
b) Secondary nucleus
c) Chalazal polar nucleus
d) Micropylar polar nucleus

19. 'Cells in the micropylar region are called antipodal cell'
a) True
b) False
c) Sometimes (a) and sometimes (b)
d) Neither (a) nor (b)

20. 'Sporopollenin is made up of organic material'. The above statement is
a) True
b) False
c) Sometimes (a) and sometimes (b)
d) Neither (a) nor (b)

21. Viability of date palm seed is
a) 2000 yr
b) 1000 yr
c) 500 yr
d) 100 yr

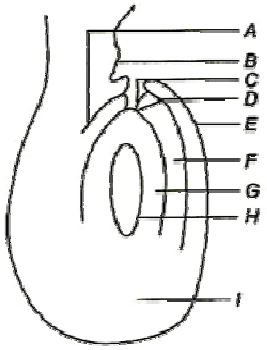
22. Identify the *A* to *E* in following diagram



a) A-Cotyledons, B-Hypocotyle, C-Plumule, D-Root cap, E-Radicle
b) A- Radicle, B- Root cap, C- Plumule, D- Hypocotyle, E- Cotyledons
c) A- Hypocotyle, B- Cotyledons, C- Plumule, D- Radicle, E- Root cap
d) A- Plumule, B- Cotyledons, C- Hypocotyle, D- Radicle, E- Root cap

23. Coleorhiza is
a) Lower end of embryonal axis in monocot
b) Lower end of embryonal axis in dicots
c) Lower end of embryonal axis in potato family
d) Lower end of embryonal axis in monocot

24. Identify *A* to *H* in the given diagram



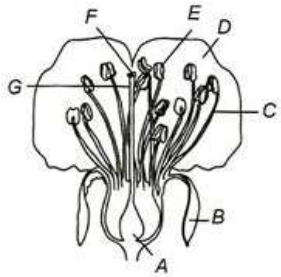
a) A-Chalazal end, B-Embryo sac, C-Nucellus, D-Inner integuments, E-Outer integuments, F-Micropylar pole, G-Micropyle, H-Funicle, I-Hilum
b) A- Inner integuments, B- Nucellus, C-Embryo sac, D- Chalazal end,E- Hilum, F- Funicle, G-Micropyle, H- Micropylor end, I- Outer integuments
c) A- Hilum, B- Funicle,C- Micropyle,D-Micropylar pole, E- Outer integuments,F-Inner integuments, G- Nucellus, H- Embryo sac, I- Chalazal pole
d) A- Micropylar end, B- Micropyle,C- Funicle, D-Hilum, E- Outer integuments, F- Inner integuments, G- Nucellus, H- Embryo sac, I-Chalazal end

25. Sugarcane is cultivated through
a) Stem cutting b) Root cutting c) True seed d) Adventitious roots

26. 'Sporopollenin is absent at the germpore'. The above statement is
a) True
b) False
c) Sometimes (a) and sometimes (b)
d) Neither (a) nor (b)

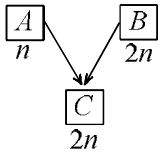
27. Why seed dormancy takes place?
a) Due to favourable conditions
b) Due to unfavourable conditions
c) Due to embryonic conditions
d) Due to specific endosperm conditions

28. Identify *A* to *G* in following figure and answer accordingly



a) A-Ovary, B-Filament, C-Sepal, D-Petal, E-Style, F-Stigma, G-Anther
b) A-Petal, B-Ovary, C-Petal, D-Filament, E-Anther, F-Stigma, G-Style
c) A-Ovary, B- Sepal, C- Filament, D- Petal, E-Anther, F-Stigma, G-Style
d) A- Petal, B- Anther, C- Stigma, D- Style, E- Filament, F- Sepal, G- Ovary

29. Find out *A*, *B* and *C* in the flow chart given below



a) A-Female gamete, B-Male gamete, C-Embryo
b) A- Male gamete, B- Female gamete, C-Embryo
c) A- Female gamete, B- Male gamete, C-Embryo
d) A- Male gamete, B- Embryo, C-Female gamete

30. One of the most resistant known biological material is
a) Lignin b) Hemicellulose c) sporopollenin d) Lignocellulose
31. It is process of embryo sac formation from cell of nucellus, without undergoing meiosis.
a) Polyembryony b) incompatibility c) Parthenocarpy d) Parthenogenesis
32. 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 tripoid.
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
33. Mass of cells enclosed by integuments is called
a) Nucellus b) Embryo c) Ova d) Pollen
34. Which of the following statements about sporopollenin is false?
a) Exine is made up of sporopollenin
b) Sporopollenin is one of the resistant organic materials
c) Exine has apertures called germ pores where sporopollenin is present
d) Sporopollenin can withstand high temperatures and strong acids
35. Genotype of endosperm is ZZA, find out the genotype of male and female plant respectively
a) ZZ, AA b) ZA, ZA c) AA, ZZ d) ZAA, ZZA
36. An ovule which becomes curved so that the nucellus and embryo sac lie at right angles to the funicle is
a) Hemitropous b) Campylotropous c) Anatropous d) Orthotropous
37. Polar nuclei are located in
a) Embryo sac b) Thalamus c) Pollen tube d) Ovule
38. A typical angiosperm anther is
a) Bilobed b) Dithecous c) Both (a) and (b) d) Monothecous
39. Study the following pairs.

I. Modified aerial stem	- Unisexual flowers Develop Acropetally	- Chalazal entry of pollen tube
II. Flowers achlamydeous	- Pedicels of all the flowers are of same Length	- Presence of false whorl
III. Cohesion of Bracts forming a cup	- Centrifugal opening of flowers	- Male flowers many
IV. flower Formation on One side in a Spiral manner	- Presence of rachilla	- terminal part of the peduncle is flowerless

Select the correct pair of answers in which the former represents the set of characters present in *poinsettia* and the latter in the pair represents the set of characters present in *casuarina.*

a) II and III b) I and II c) IV and III d) III and I

40. Identify the type of ovary in diagram

a) Monocarpellary syncarpous b) Monocarpellary apocarpous
c) Multicarpellary syncarpous d) Multicarpellary apocarpous

41. Wind pollination is common in grassess. This statement is
a) True b) False
c) Sometimes (a) and sometimes (b) d) Neither (a) nor (b)

42. Study the following and find correct option
I. Tapetum nurishes the developing pollen grain
II. Hilum represents the junction between ovule and funicle
III. In aquatic plants such as water hyacinth and lilly pollination is by water
IV. The primary endosperm nucleus is triploid
a) I and II b) I, II and IV c) II, III and IV d) II and IV

43. Apogamy is
a) Reproduction of virus b) Failure of fusion of gametes
c) Development of bacteria d) Loss of function of reproduction

44. Number of microsporangia in an angiospermic anther is
a) 1 b) 2 c) 3 d) 4

45. Which of the following statement is/are true
I. Endothecium lies behind epidermis
II. Fusion of egg with male gamete is called apogamy.
III. Synergids are haploid

IV. The point at which funicle touches the ovule is raphe.

a) II and IV only b) I and II only c) I and IV only d) I and III only

46. Egg apparatus of angiosperms consist of
    a) One synergid and two egg cells
    b) Two synergids and one egg cell
    c) One central cell, two synergids and three antipodal cells
    d) One egg cell, two polar nuclei and three antipodal cells
47. Pollen tube enters through
    a) Filiform apparatus b) Synergid cells c) Antipodal cells d) Chalazal cells
48. Aquatic plant like water-hyacinth and water lily are pollinated by
    a) Water b) Air c) Insect d) Both (b) and (c)
49. In the given diagram of pistil in which part fertilization takes place

    a) D b) C c) B d) A
50. Function of tapetum is to provide
    a) Protection b) Nutrition c) Respiration d) All of these

IMPORTANT PRACTICE QUESTION SERIES FOR NEET EXAM – 1 (ANSWERS)

1)	**a**	**2)**	**a**	**3)**	**d**	**4)**	**a**
5)	**a**	**6)**	**a**	**7)**	**a**	**8)**	**d**
9)	**a**	**10)**	**b**	**11)**	**a**	**12)**	**c**

13)	**c**	**14)**	**a**	**15)**	**c**	**16)**	**a**
17)	**c**	**18)**	**d**	**19)**	**c**	**20)**	**d**
21)	**b**	**22)**	**d**	**23)**	**c**	**24)**	**c**
25)	**b**	**26)**	**b**	**27)**	**d**	**28)**	**c**
29)	**b**	**30)**	**a**	**31)**	**c**	**32)**	**c**
33)	**d**	**34)**	**a**	**35)**	**c**	**36)**	**a**
37)	**c**	**38)**	**c**	**39)**	**a**	**40)**	**c**
41)	**b**	**42)**	**b**	**43)**	**b**	**44)**	**c**
45)	**d**	**46)**	**d**	**47)**	**a**	**48)**	**d**
49)	**c**	**50)**	**d**	**51)**	**a**	**52)**	**b**
53)	**d**	**54)**	**b**	**55)**	**c**	**56)**	**c**
57)	**c**	**58)**	**a**	**59)**	**c**	**60)**	**a**
61)	**b**	**62)**	**a**	**63)**	**a**	**64)**	**a**
65)	**c**	**66)**	**c**	**67)**	**c**	**68)**	**d**
69)	**c**	**70)**	**a**	**71)**	**a**	**72)**	**b**
73)	**b**	**74)**	**d**	**75)**	**c**	**76)**	**b**
77)	**d**	**78)**	**d**	**79)**	**b**	**80)**	**b**
81)	**b**	**82)**	**b**	**83)**	**c**	**84)**	**d**
85)	**d**	**86)**	**a**	**87)**	**c**	**88)**	**d**
89)	**d**	**90)**	**b**	**91)**	**c**	**92)**	**a**
93)	**b**	**94)**	**b**	**95)**	**c**	**96)**	**b**
97)	**c**	**98)**	**c**	**99)**	**b**	**100)**	**d**

1 **(a)**

Microsporangia is like a sac in which pollen develops. Also called pollen sac at the time of maturity

2 **(a)**

Sporopollenin.

Pollen grainsare generally 25-50 μm in diameter.

Pollen grains have two main layers

(i) **Outer Layer** It is also called **exine**. It is made up of **sporopollenin.** It is hard and protective in nature. Due to sporopollenin pollen can with stand extreme temperatures

(ii) **Inner layer** It is also called **intine.** It is made up of cellulose and pectin. It is very thin as compared to the outer layer

3 **(d)**

Pseudocopulation describes behaviours similar to copulation that serves a reproductive function for one or more or both the participants but not involve actual sexual union between the individuals. It is most generally applied to a pollinant attempting to copulate with a flower. Orchids commonly achieve reproduction in this manner.

4 **(a)**

CorollaThe leaf lifer covering of flower is called **corolla**. The individual segment of corolla is called **petals**

Petals are variously coloured.

Function To attract the pollinators and protection of male and female reproductive part

5 **(a)**

Never open.

Chasmogamy is the type of autofertilisation (self-fertilisation) in which both male and female gametes present on same flower but pistil and stamen have special adaptation like bending length, etc., so that fertilization takes place. They are open flower not closed like cleistogamous flowers

6 **(a)**

Presence of feathery and exposed stigma are the characters of wind-pollinated plant

7 **(a)**

Self-pollination When the process of pollination occurs in the same plant,it is called self-pollination. *It is of two types*

(i) **Autogamy**When pollination takes of place in the same flower of a plant. Here, no pollinating agent is required

(ii) **Geitonogamy** Transfer of pollen grains from anther to stigma of another flower of same plant. Although the geitonogamy is functionally cross-pollination involving a pollinating agent, genetically it is similar to autogamy since the pollen grains come from the same plant

9 **(a)**

Pollen grains which contribute the male gametes are formed within an anther. A typical anther is tetrasporangiate. It has a column of sterile tissues called connective. Mature anther wall comprises an epidermis followed by endothecium, 2 or 3 middle layer and single layered tapetum.

10 **(b)**

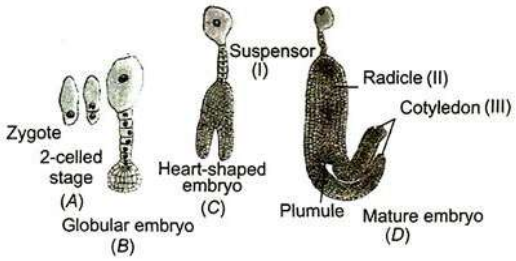
A-Exine, B-Sporopollenin, C-Germ pore

11 **(a)**

Pollen, syrup increase/improve performance because pollen contain highly nutritive material in the form of vegetative cell

12 **(c)**

Embryo develops at the micropylar end of the ovule or embryo sac, where the zygote is situated. Most zygote divide only after certain amount of endosperm is formed. The early stages of embryonic development is same in both monocotyledons and dicotylendons. The zygote give rise to the proembryo and subsequently into globular, heart-shaped and mature embryo



13 **(c)**

Tapetum is the innermost layer of the wall of pollen sac. The tapetum is **nutritive** in function. The tapetal cells are multinucleate and contain Ubish bodies.

14 **(a)**

Formation of diploid embryo sac from diploid vegetative structure (nucellus or integument) without meiosis is called **apospory**.

15 **(c)**

Terminal structure of stamen is called anther, which contain pollen grain (male gametophyte). Pollen grains are haploid in nature

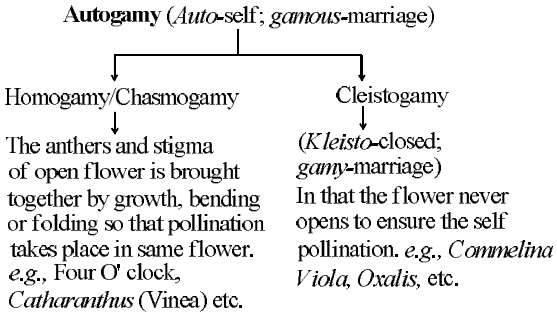
16 **(a)**

Micropylar region the most common way for entry of pollen tube (porogamy)

17 **(c)**

A-Chasmogamous-male and female part remain on the same flower but there are modification for ensuring self-fertilisation

B-Cleistogamous (closed flower)



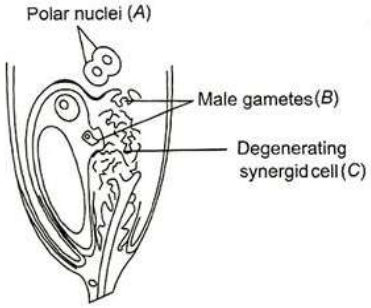
18 **(d)**

Some examples of water pollinated plants are *Vallisneria* and *Hydrilla,* which grow in fresh water and several marine sea-grasses such as *Zostera*. Not all aquatic plants use water for pollination. In a majority of aquatic plants such as water hyacinth and water lily the flower emerge above the level of water and are pollinated by insects of wind as in most of the land plants

19 **(c)**

Endosperm may either be completely consumed by the developing embryo (*e. g*., pea, ground nut, beans) before seed maturation or it may persist in mature seed (*e. g*., castor and coconut) and may be used up during seed germination. The first condition is called endospermic, while second condition is called non-endospermic

20 **(d)**



Discharge of male gametes into a synergid and the movements of the sperms, one into the egg the other into the central cell

21 **(b)**

Parthenogenesis is a type of **asexual reproduction** because it involves an unfertilized egg cell only.

22 **(d)**

When the micropyle, body of the ovule and funicle lie in one vertical plane, the ovule is called orthotropous, *e.g., Polygonum*.

23 **(c)**

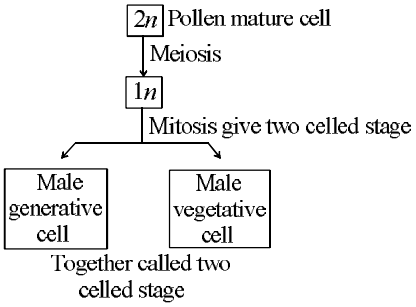
Genetic parthenocarpy is produced by mutation or hybridization. Most of banana varieties are **triploid** and triploidy is associated with seedlessness.

24 **(c)**

Double fertilization is characteristic feature of angiosperms. It was discovered by **S GNawaschin**in 1898. In double fertilization, one male gamete fused with ovum to form diploid zygote and the second male gamete fused with diploid secondary nucleus to form the triploid primary endosperm nucleus, which develops into endosperm. The endosperm provides nutrition to the developing embryo.

25 **(b)**

Mature male gametophyte is derived by one meiosis and one mitotic division. Two celled stage of male gametophyte is called mature male gametophyte



26 **(b)**

The **mega-gametophyte** or female gametophyte also called embryo sac, is mostly a 7-celled structure.

27 **(d)**

Albuminous seed retain a part of endosperm as it is not completely used up during embryonic development, *e. g*., Wheat, maize, barley, castor, sunflower. Their cotyledons are fleshy and thick as compared to the non-albuminous seed

28 **(c)**

Double fertilization is characteristic feature of angiosperms. It is a fusion of two male gamates brought by a pollen tube to two different cells of the same female gametophyte to produce zygote and endosperm. A total of five nuclei takes part in double fertilization (sometimes called four as the two polar nuclei fuses to form one).

29 **(b)**

A- Embryonal axis, B- cotyledons, C- Epicotyle, D- Plumule

30 **(a)**

Geitonogamy involves the transfer of pollen grains from a male flower to the stigma of an other female flower growing on the same plant. Thus, geitonogamy operates only in monoecious plant, *i.e*, plants having male and female flowers on different places, e.g., *Zeamays*.

31 **(c)**

Megaspore mother cell is developed inside the nucellus and by a meiotic division, it forms four megaspores. Out of these, generally three degenerate and remaining one is called functional megaspore. It undergoes mitosis three times without cytoplasmic division to form an eight nucleate embryo sac.

32 **(c)**

2-1-2-3

Development of Female Gametophyte

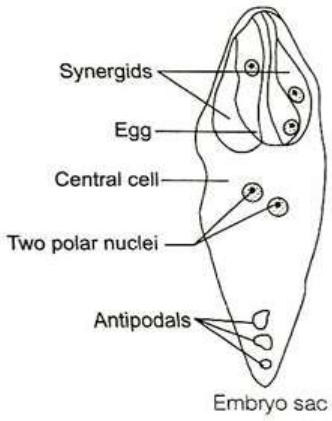
(i) Megaspore mother cell undergoes the reductional/meiotic division that give rise to four megaspores

(ii) Three of them die (in majority of plants) only one remains viable. This method of embryo sac formation is called monosporic development

(iii) The nucleus of the functional megaspore divides mitotically to form two nuclei, which move to the opposite poles forming two nucleate embryo sac

(iv) Two more sequential mitotic nuclear divisions results in the formation of four nucleate and later 8 nucleate stages of embryo sac

(v) After the 8 nucleate stage cell walls are laid down leading to the organization of typical female gametophyte



33 **(d)**

Pollination of flowers by birds is called **ornithophily**. Ornithophilous flowers are large sized, brightly coloured, odourless and produce a large amount of mucilagenous nectar as drinking material of birds, *e.g.*, *Strelitzia reginae, Bigonia, Aloe vera, Salmelia.*

Pollination of flowers by means of bats is called cheiropterophily. *Eidoling helvum,*a large and strictly vegetarian bat visit the flowers of *Adansonia digitata* to extract nectar.

34 **(a)**

Clone is an individual obtaining from single parent through apomixis, vegetative reproduction and tissue culture. The process of fusion of two male gametes in a single embryo sac is called **double fertilization.** It is found in sexual reproduction of angiosperms only and discovered by **Nawaschin** (1898).

35 **(c)**

Although seeds. In general are the product of fertilization, a few flower plants such as some species of Asteraceae and grasses, have evolved special mechanism to produced seed without fertilization called **apomixis**

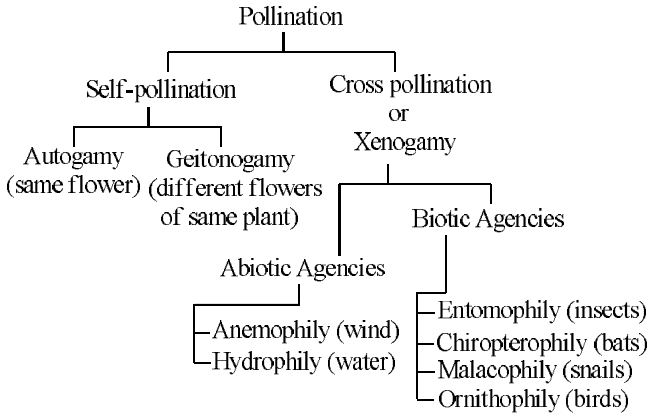
36 **(a)**

The transformation of part of flower

Before Fertilisation		**After Fertilisation**
Calyx, corolla	-	Wither
Androecium, style and stigma	-	Fruit
Ovary		
Ovary wall	-	Pericarp
Ovule	-	Seed
Integuments	-	Seed coat
Outer integuments	-	Testa
Inner integuments	-	Tegaman
Micropyle	-	Micropyle
Funicle	-	Stalk of seed
Nucellus (if persistant)	-	Perisperm
Egg cell	-	Zygote (oospore)
Synergid	-	Disintegrate

37 **(c)**

Pollination Transfer of pollen grains to the stigma is called pollination



38 **(c)**

Monocot A-Cotyledon, B-Epicotyle, C-Radicle, D-Endosperm, E-Seed coat

39 **(a)**

Pollen grain are generally 25-50 μm in diameter.

Pollen grains have two main layers

(i) **Outer Layer** It is also called **exine**. It is made up of **sporopollenin.** It is hard and protective in nature. Due to sporopollenin pollen can with stand extreme temperatures.

(ii) **Inner layer** It is also called **intine.** It is made up of cellulose and pectin. It is very thin as compared to the outer layer

40 **(c)**

In porogamy, pollen tube enters the ovule through the **micropyle**. It is the most common way of the entry of pollen tube inside ovule.

41 **(b)**

A-10-15%, B-Slowdown, C-Dormancy

42 **(b)**

Gametes are haploid structures, containing chromosome number half of somatic cells. When somatic cell has 40 chromosomes, the gametes will have 20 chromosomes.

43 **(b)**

Rose, sugarcane, cocoa and *Baugainvillea* are propagated by stem cutting.

44 **(c)**

Fusion of male and female gametes (i.e, syngamy) in seed plants, occurs through **siphonogamy** as the gametes are carried through the pollen tube.

Pollen tube can enter the ovule by three methods:

1.Porogamy- through micropyle

2.Chalazogamy- through chalaza

3.Mesogamy –pollen tube penetrates laterally through integuments or funiculus.

45 **(d)**

Endosperm $-3n$

Chromosome given $= 36$

Haploid number $\frac{36}{3} = 12$ chromosome male and female gametes are haploid, so answer is 12 and 13

46 **(d)**

When all the fourmegaspore nuclei take part in the formation of the female gametophyte (embryo sac), this type of development is called as **tetrasporic**. In tetrasporic emryo sacs, meiosis is not accompanied by wall formation.

47 **(a)**

Homogamy is condition, in which male and female parts of a flower mature simultaneously.

48 **(d)**

Emasculations is the removal of anther. It is done only in bisexual of mionoecious plants

49 **(c)**

The outer seed coat (testa) of a seed is produced from outer integument of ovule. The inner integument forms tegmen (inner seed coat). Ovary wall forms pericarp (fruit wall).

50 **(d)**

In most of the plants the fruit develops from the ovary (true fruits) and other floral part degenerate and fall off. However in a few species such as apple, strawberry, cashew, etc., the thalamus also contributes to fruit formation such fruits are called false fruit

51 **(a)**

Viability means ability to grow. This is a certain time period in which plant seed have ability to germinate. Lupine have the viability period about 10,000 years

52 **(b)**

Trenb observed entry of pollen tube into the ovule through chalazal end in *Casuarina.* This is known as chalazogamy.

54 **(b)**

Genetic method for preventing self-fertilisation

Flowering plants have developed many devices to discourage self-pollination. In some species, pollen, releases and stigma receptibility is non-syncronised, *i.e.,* either the pollen is released before the stigma becomes receptive or stigma becomes receptive much before the release of pollen.

In some other species the anther and stigma are placed at the different positions so that the pollen can not come in contact with the stigma of same flower. Both these devices prevent autogamy.

The third device to prevent inbreeding is self-incompatibility. This is genetic a mechanism and prevents self pollination (from same flower or other flower of same plant) from fertilizing the ovules by inhibiting pollen germination or pollen tube growth in pistil

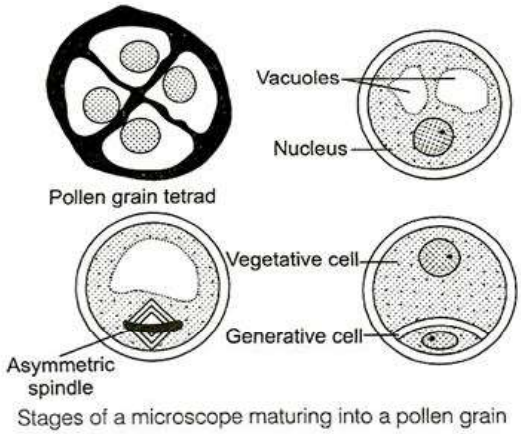
55 **(c)**

Stage of microsporogenesis forming pollens.

Pollen Grain When pollen grain matures *it contains two cells*

(i) **Vegetative cell** Vegetative cell is bigger and has abundant food reserve and a large irregular shaped nucleus

(ii) **Generative cell** The generative cell is small and floats in the cytoplasm of vegetative cell. It is spindle-shaped with dense cytoplasm and a nucleus



Stages of a microscope maturing into a pollen grain

56 **(c)**

In angiosperms, the functional megaspore is haploid, which undergoes mitotic division and form 7-celled, 8-nucleate embryo sac. Therefore, each nucleus of embryo sac is haploid. At the time of fertilization, one male gamete fused with egg nucleus to form zygote ($2n$),

whereas the second male gamete fuses with two polar nucleus(central cell) to form endosperm ($3n$). This type of fertilization is called double fertilization. Double fertilization is unique in angiosperms and discovered by **Nawaschin** (1898).

57 **(c)**

The pollen wall consists of two layers, the outer exine and inner intine. The exine is chiefly made up of sporopolenin, which is derived by the oxidative polymerization of carotenoids. Sporopollenin is one of the most resistant biological materials known. Exine is thin in beginning but become very thick with maturity.

58 **(a)**

Pollens are well preserved because the sporopollenin. It is hard and resistable to many organic and inorganic compounds

60 **(a)**

In angiosperms, one male gamete fuses with the egg to form the diploid zygote. The process is called **syngamy**. The other male gamete fuses with the two polar nuclei to form triploid primary endosperm nucleus. The process is called **triple fusion**. These two acts of fertilization constitute the process of **double fertilizaiton**.

61 **(b)**

During the germination the light is not needed. But later stage of development light plays a greater role in making food

62 **(a)**

Both *Bryophyllum* and *kalanchoe are* propagated by leaf pieces.

63 **(a)**

Pollen grain is the mother cell of male gametophyte. Development of male gametophyte begins inside the micro sporangium. The microspore nucleus divide mitotically to form a smaller generative cell and a much large, vegetative cell (tube cell) the generative cell produces two male gametes, whereas, the vegetative cell form pollen tube after pollination. Pollen grain contains two cells, *i*. *e*, tube cell and generative cell at the time of pollination.

64 **(a)**

Amorphophallus (6 feet height)

In some species floral rewards are seen in providing safe places to lay eggs: an example is that of the tallest flower*Amorphophallus.* A similar relationship exist between a species of moth and the plant *Yucca* where both the species moth and plant cannot complete their life cycles without each other.

The moth deposits its eggs in the locule of the ovary and flower in turn gets pollinated by moth. The larvae of moth come out of the eggs as the seed starts developing

65 **(c)**

Opening of flower is called anthesis

66 **(c)**

Although the meaning of unisporic monosporic, single sporic cell is same but only monosporic term is used for single megaspore

67 **(c)**

There are three types of endosperm development

(i) **Nuclear Type** The primary endosperm nucleus divides repeatedly without wall formation to produce a large number of free nuclei. *e*. *g*., Maize, coconut and wheat

(ii) **Cellular Type Endosperm** Every division of the primary endosperm nucleus is followed by cytokinesis *e*. *g*., *Balsam, Datura, Petunia*

(iii) **Helobial Endosperm** The first division of primary endosperm nucleus is followed by transverse cytokinesis to form two cells. Further development in both the cells occurs like that of nuclear endosperm

68 **(d)**

In vegetative propagation, there is no genetic recombination, so the genetic constitution of a plant is unaffected in vegetative propagation. In ginger (*Zingiber officinale*), the means of vegetative propagation is fleshy, dorsiventral, horizontal, branched, underground, perennial, straggling rhizome (modified stem).

Totipotency is the capability of any plant cell to develop into entirely new plant when provided with the suitable growing medium. it enables us to micropropagate plants.

69 **(c)**

Micropyle is found is both seed and ovule. In seed it is the pore through which water goes inside during germination. In ovule the absense of integuments form micropyle

70 **(a)**

The wall of the pollen mother cell (microspore mother cell) is deposited by calloseβ-1, 3-glucan).

71 **(a)**

In some species floral rewards are seen in providing safe places to lay eggs: an example is that of the tallest flower *Amorphophallus.* A similar relationship exist between a species of moth and the plant *Yucca* where both the species moth and plant cannot complete their life cycles without each other.

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72 **(b)**

In angiosperm, a single diploid Megaspore Mother Cell (MMC) matures within an ovule. Through first meiosis, it gives rise to a dyad cell and then second meiosis takes place which forms four megaspores (haploid). In most plants, only one of these megaspore, survives, the rest are absorbed by the ovule.

73 **(b)**

Aleurone layer is the layer surrounds the endosperm. It is made up of protein. It is found only in mococotyledons

74 **(d)**

Seeds offer several advantages to angiosperms. Seeds have better adaptive strategies for dispersal to new habitats. Testa (outer covering) of seed protect embryo from injuries. Being products of sexual reproduction, they generate new genetic recombination leading to variation to upcoming new plants

75 **(c)**

Helobial.

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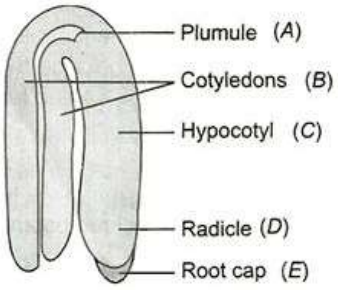
76 **(b)**

Dicot.

The diagram showing typical dicot embryo having various important parts. A typical dicotyledonous embryo, consist of an **embryonal** axis and two **cotylendons.** The portion of embryonal **axis** above the level of cotyledons is **epicotyle,** which terminates with **plumule** or **stem tip**. The cylindrical portion below the level of cotyledons is **hypocotyl** that terminates

at its lower end in the **radicle** or **root tip** Root tip is covered with **root cap**



A typical dicot embryo

77 **(d)**

Mature endosperm with any degree of irregularity and unevenness in its surface contour is called ruminate endosperm. It is known to occur In about 32 families of angiosperms. In family-Annonaceae, the ruminate endosperm is found.

78 **(d)**

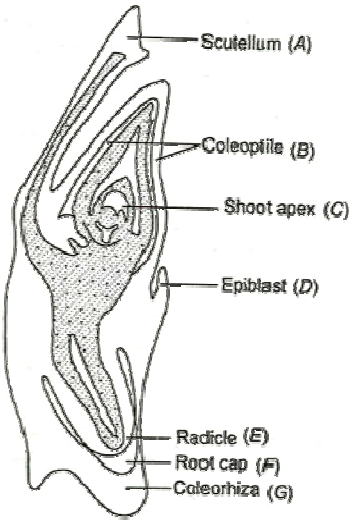
Dicot, cotyledon, epicotyle and hypocotyle are the three main parts of embryo

79 **(b)**

The embryo formation without fertilization is known as **apogamy**. Apogamy is the development of a sporophyte directly from the gametophyte without the intervention of sex organs and gametes.

80 **(b)**

Root cap coleorhiza.



LS of an embryo of grass

Embryos of monocotyledons possess only one cotyledon. In the grass family the cotyledon is called scutellum that is situated toward the one side (lateral) of the embryonal axis. At its lower end, the embryonal axis has the radical and root cap enclosed in an undifferentiated sheath called coleorhiza.

The portion of the embryonal axis above the level of attachment of scutellum is epicotyl. Epicotyl has a shoot apex and few leaf primordial enclosed in hallow structure the coleoptile

81 **(b)**

Micropyle is a minute opening present at one end of the seed coat. It is very helpful in seed germination as sufficient water enters the seed through micropyle.

During fertilization, micropyle of the ovule provides a passage for the entry of pollen tube, but the pollen tube may enter the ovule by passing through chalaza or integuments.

82 **(b)**

Bisexual flowers which do not open at all are called **cleistogamous**. In such flowers, anthers and stigma lie close to each other. *Viola* (common pansy) has both cleitstogamous and chasmogamous flowers. Chamogamous flowers remain open with exposed anthers and stigma.

83 **(c)**

The order of endosperm types in the diagram is **helobial**, **free nuclear** and **cellular**. Helobial endosperm is formed due to formation of a large micropylar and a small chalazal chamber by mitotic division in primary endosperm mother cell.

84 **(d)**

Pollengrain is male reproductive part of angiospermic plant while embryo sac, micropyle and nucellus are female reproductive parts.

85 **(d)**

Epidermis is the outermost layer of the microsporangium, which is protective in nature. Tapetum is the innermost layer, which provide nourishment to the developing pollen grain in mirosporangium

86 **(a)**

Microsporogenesis During developmental phase of anther the cells of sporogenous tissue undergoes meiotic division to form microspore tetrad. The process of formation of microspore from pollen mother cell is called microsporogenesis. The microspores are formed and arranged in a group of four cells called microspore tetrad. Microspore develops into the pollen grain and represents the male gametophyte

87 **(c)**

Micropyle is the small aperture through, which the water goes inside at the time of germination. It also helps in the gaseous exchange

88 **(d)**

Bright coloured flowers attract the insects. These insects takes part in the pollination of these flowers, therefore, bright colouration of flowers is an adaptation for entomophily, *i.e,* pollination by insects.

89 **(d)**

Development of Female Gametophyte

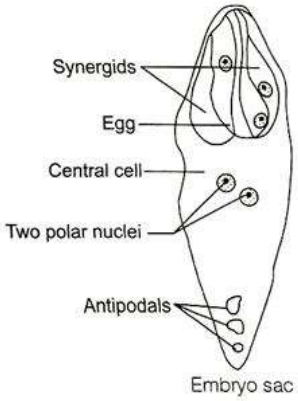
(i) Megaspore mother cell undergoes the reductional/meiotic division that give rise to four megaspores

(ii) Three of them die (in majority of plants) only one remains viable. This method of embryo sac formation is called monosporic development

(iii) The nucleus of the functional megaspore divides mitotically to form two nuclei, which move to the opposite poles forming two nucleate embryo sac

(iv) Two more sequential mitotic nuclear divisions results in the formation of four nucleate and later 8 nucleate stages of embryo sac

(v) After the 8 nucleate stage cell walls are laid down leading to the organization of typical female gametophyte



Embryo sac

90 **(b)**

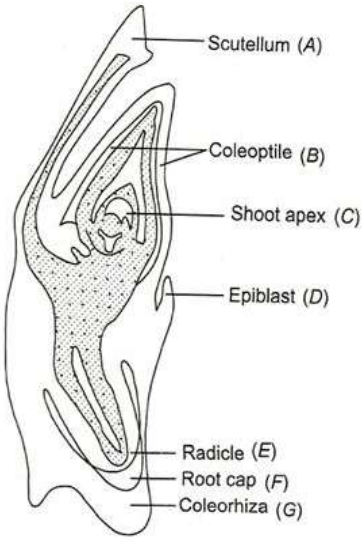
The root cell of flowering plant is diploid $(2n=24)$, while the gamete is haploid, therefore, the number of chromosomes will be **12** in the gamete.

91 **(c)**

The plant part containing strong root system is called stock while the plant part containing better flower, fruit yield is called scion. The chromosome number remains same in root cells but reduced to half in egg cell.

92 **(a)**

A, E.



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93 **(b)**

Coconut endosperm is unique because of its early liquid syncytial stages, which forms a hard matured kernel at later stages of fruit development.

94 **(b)**

Microsporogenesis

Microspore mother cell and pollen mother cell are the same term and form male gametes (pollens) by the process called microsporogenesis

95 **(c)**

During development zygote, divides into large basal cell, called the suspensor cell and the other termed as 'terminal cell' or 'pro-embryo'. The pro-embryo cell after division develops into 'epibasal' at terminal and 'hypobasal' near suspensor. The 'epibasal cells' or apical octant develops into cotyledons and 'embryo plumule' the 'hypobasal cell' produce the 'hypocotyl'.

96 **(b)**

In angiosperms, endosperm is the triploid $(3n)$.

97 **(c)**

Egg cell – haploid, formed by meiosis.

Zygote – Diploid formed by union of male female gametes. Endosperm – triploid, it is a union of male gamete (vegetative), which is haploid and central cell, which is diploid together make triploid structure

98 **(c)**

Ovule is the integumented indehiscent megasporangium, which develops as a small outgrowth from the tissue of placenta. It attached to placenta by a stalk called **funiculus**.

99 **(b)**

Seeds without fertilisation

Although seeds. In general are the product of fertilization, a few flower plants such as some species of Asteraceae and grasses, have evolved special mechanism to produced seed without fertilization called **apomixes**

100 **(d)**

Seed represent the present generation and have the plant of next generation within.

1)	**a**	**2)**	**b**	**3)**	**a**	**4)**	**d**
5)	**c**	**6)**	**a**	**7)**	**d**	**8)**	**c**
9)	**c**	**10)**	**a**	**11)**	**b**	**12)**	**b**
13)	**b**	**14)**	**b**	**15)**	**a**	**16)**	**d**
17)	**a**	**18)**	**b**	**19)**	**b**	**20)**	**a**
21)	**a**	**22)**	**d**	**23)**	**a**	**24)**	**a**
25)	**a**	**26)**	**a**	**27)**	**c**	**28)**	**c**
29)	**b**	**30)**	**c**	**31)**	**d**	**32)**	**b**
33)	**a**	**34)**	**c**	**35)**	**c**	**36)**	**a**
37)	**a**	**38)**	**c**	**39)**	**d**	**40)**	**d**
41)	**a**	**42)**	**b**	**43)**	**b**	**44)**	**d**
45)	**d**	**46)**	**b**	**47)**	**b**	**48)**	**c**
49)	**b**	**50)**	**b**				

1 **(a)**
All statement are correct. In gymnosperm the triple fusion is rare so their endosperm is haploid and in angiosperm endosperm is formed prior to zygote and triploid

2 **(b)**
Geitonogamy (Gk : $geiton$ = neighbour; $gamein$ = to marry) involves the transfer of pollen grains from a male flower to the stigma of another female flower originating on the same plant.

3 **(a)**
After fertilization, the outer integument forms tests.

4 **(d)**
Water pollinated plants are very less and limited to 30 genera and mostly are cotyledons. It is rare in flowering plants

5 **(c)**
Salvia, $Calotropis$and $Rafflesia$all are insect pollinating flowers.

6 **(a)**
Pollen grain stored at $-196°C$ which is the temperature of liquid nitrogen. In that temperature the sperm can also be stored. Such stored pollen can be used as pollen banks, similar to seed bank in crop breeding experiment

7 **(d)**
The total number of nuclei involved in double fertilization in angiosperms are **five.**

8 **(c)**
The typical embryo sac (*polygonum* type) is 7-celled, 8-nucleate (two synergids, one egg, three antipodal and one central cell). The synergids are also known as helpers. They help in distribution of nutrients in embryo sac with the help of filiform apparatus and also help in attracting pollen tube towards egg.

9 **(c)**
Filiform apparatus are the special thickening of synergid cells for guiding the pollen tube and male gametes, so that the fusion takes place property

10 **(a)**
The outermost cell later of the endosperm $(3n)$ of seed is called aleurone layer. Since, the cells of aleurone layer are triploid, the number of chromosomes would be $= 63$, as root tip cells $(2n)$ has 42 chromosomes.

11 **(b)**
Filiform apparatus is finger-like projection of the cell membrane of synergids or helper cells at the micropylar end of the ovule. Filiform apparatus is rich in polysaccharides and chemottracts pollen tube towards egg.

12 **(b)**

A somatic cell (*e*. *g*.,cell of leaf) contains diploid number of chromosomes. In angiosperms, the endosperm is formed by triple fusion, *i*. *e*.,fusion of two polar nuclei and second male gamete. Therefore, it is triploid ($3n$). Hence, the chromosome number in endosperm will be $=24$.

13 **(b)**

When the somatic cells are cultured and the culture is made stationary, each cell starts differentiating into an independent embryo showing all the stages of embryo development. These embryos are called **embryoids**, which can give rise to a complete plant.

14 **(b)**

Because wind pollinated and water pollinated plants do not need any biotic agency for pollination so no need for fragrance. Nector and colourfulness. Generally, wind-pollinated plant are big in size due to producing more pollen and have exposed stigma for easily capturing pollens

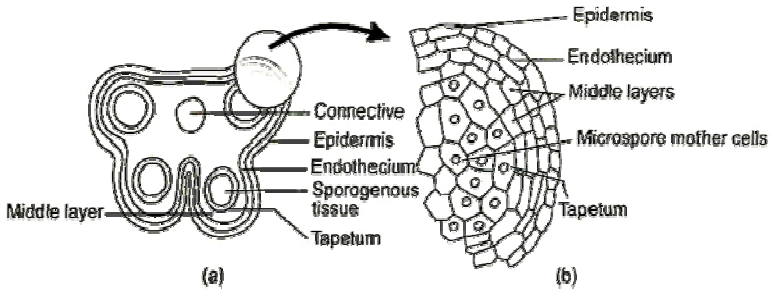
16 **(d)**

A- Connective tissues, B- Epidermis, C-Endothecium, D-Sporogenous tissue, E- Tapetum, F-Middle layer

Microsporangium is mainly surrounded by four layers/wall, *i*. *e*., Epidermis, endothecium, middle layer and tapetuem

(i) Epidermis endothecium and middle layer help in protection and dehiscence of anther from pollen

(ii) Tapetum nourishes the developing pollen grains



(a) Transverse section of a young other
(b) Enlarged view one micro sporangium showing wall layers

17 **(a)**

A- Nucellus, B-MMC, C-Nucellus, D-Megaspore diad

Development of Female Gametophyte

1. Megaspore mother cell undergoes the reductional/meiotic division that give rise to four megaspores
2. Three of them die (in majority of plants) only one remains viable. This method of embryo sac formation is called monosporic development
3. The nucleus of the functional megaspore divides mitotically to form two nuclei, which move to the opposite poles forming two nucleate embryo sac
4. Two more sequential mitotic nuclear divisions results in the formation of four nucleate and later 8 nucleate stages of embryo sac
5. After the 8 nucleate stage cell walls are laid down leading to the organization of typical female gametophyte.

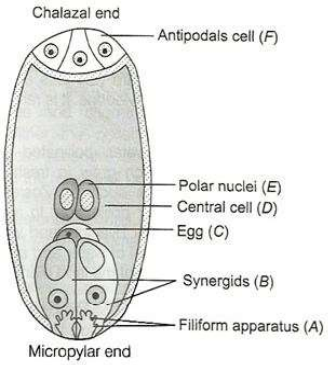
18 **(b)**

Endosperm in angiosperms develops as a fusion product of secondary nucleus with male gamete. Secondary nucleus is diploid structure formed by fusion of haploid chalazal polar nucleus and haploid micropylar polar nucleus. Zygote is formed by fusion of male gamete with egg.

19 **(b)**

False.

Mature embryo sac



A diagrammatic representation of the mature embryo sac

False In the embryo sac the cells, which are present at the chalazal end are called antipodal cells. At the micropylar end the synergid and egg cells are present.

20 **(a)**

True.

Pollen grain are generally 25-50 μm in diameter.

Pollen grains have two main layers

(i) **Outer Layer** It is also called **exine**. It is made up of **sporopollenin.** It is hard and protective in nature. Due to sporopollenin pollen can with stand extreme temperatures.

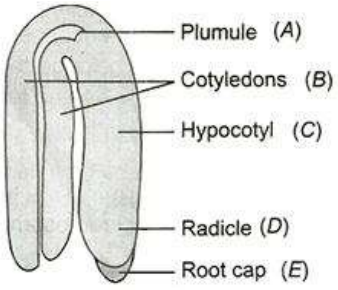
(ii) **Inner layer** It is also called **intine.** It is made up of cellulose and pectin. It is very thin as compared to the outer layer

21 **(a)**

Viability of datepalm is 2000 yr

22 **(d)**

The diagram showing typical dicot embryo having various important parts. A typical dicotyledonous embryo, consist of an **embryonal** axis and two **cotylendons.** The portion of embryonal **axis** above the level of cotyledons is **epicotyle,** which terminates with **plumule** or **stem tip**. The cylindrical portion below the level of cotyledons is **hypocotyl** that terminates at its lower end in the **radicle** or **root tip** Root tip is covered with **root cap**



A typical dicot embryo

23 **(a)**

Lower end of embryonal axis in monocot.

Embryos of monocotyledons possess only one cotyledon. In the grass family the cotyledon is called scutellum that is situated toward the one side (lateral) of the embryonal axis. At its lower end, the embryonal axis has the radical and root cap enclosed in an undifferentiated sheath called coleorhiza.

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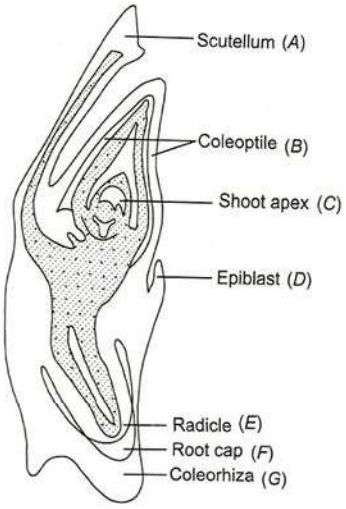
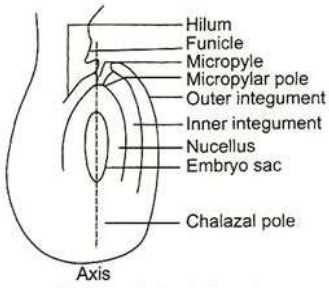


LS of an embryo of grass

24 **(a)**

Megasporangium The ovule is a small structure attached to the placenta by means of stalk called funicle. The body of the ovule fuses with **funicle** in the region called **hilum**.
Thus, hilum represents the junction between ovule and funicle. Each ovule has one or two protective envelope called integuments. These integuments encircle the ovule except the tip, where a small opening called micropyle is organised. Opposed to the micropylar end is the chalaza representing basal part of the ovule



Diagrammatic view of a typical anatropous ovule

25 **(a)**

Sugarcane is cultivated through **stem cutting**.

26 **(a)**

True. So that at the time of germination the pollen tube can emerge out from germ pore

27 **(c)**

As the seed matures, its water content is reduced and seed becomes relatively dry (10-15% moisture by mass). The general metabolic activity of the embryo slows down. The embryo may enter a state of inactivity called dormancy. When favourable condition are available (adequate moisture, oxygen, suitable temperature) seeds germinate

30 **(c)**

Sporopollenin is the most resistant known biological material, found in the exine of pollen grains. It is resistant to chemical and microbial decomposition. Due to it, the pollen grains are well preserved during fossilization.

31 **(d)**

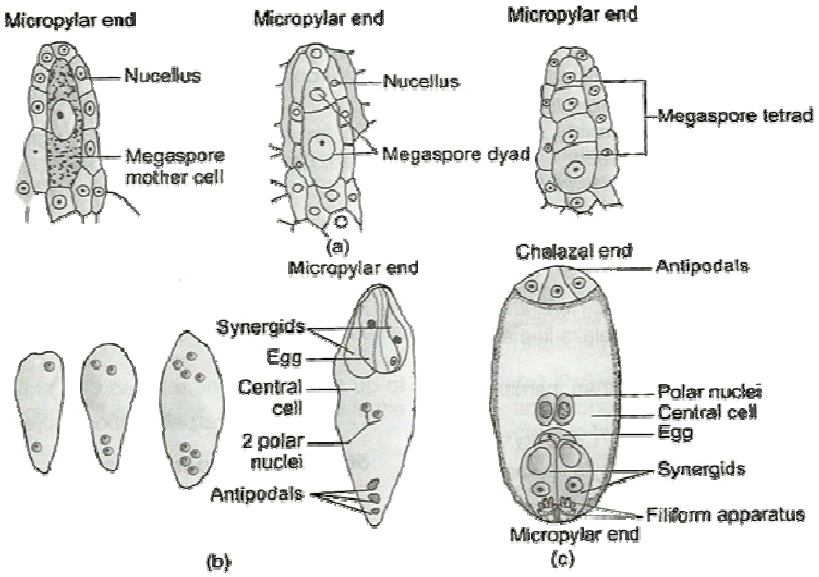
In gametophytic apomixis, embryo sac develops form the microspore mother cell by cirumvention of meiosis or directly from a cell in the nucellus. Embryo is formed By the unfertilised egg, *i*. *e*., called **parthenogenesis**.

32 **(b)**

The innermost wall layer of microporangium is the**tapetum.** Cells of tapetum possess dense cytoplasm and generally have more than one nucleus. Tapetum nourishes the developing pollen grains.
The body of the ovule fuses with funicle (stalk of ovule) in the region called **hilum.** Thus, hilum represents the junction between ovule and funicle.
The primary endosperm nucleus is triploid $(3n)$ as it is the product of triple fusion
In majority of aquatic plants such as water hyacinth and water lily, the flower emerge above the level of water and are pollinated by insects or wind as in most of the land plants.

33 **(a)**

Nucellus Integuments encloses a mass of cells called nucellus. Cells of the nucellus have abundant reserve food materials. Located in the nucellus is the embryo sac or female gametophyte. An ovule generally has single embryo sac formed from a megaspore through reductional (meiotic) division



(a) Parts of the ovule showing a large megaspore mother cell, a dyad and a tetrad of megaspore (b) 2, 4 and 8-nucleate stages of embryo sac and a nature embryo sac (c) A diagrammatic representation of the mature embryo sac

34 **(c)**

Exine is chiefly made up of sporopollenin. Exine is discontinous or ruptured only by nexine at some places (where sporopollenin absent), these are called pores, through which pollen tubes come out during germination on stigma.

35 **(c)**

Endosperm union of male gametes and female polar nuclei, which is diploid in nature.
In question the genotype of endosperm in ZZA means ZZ belongs to female and A belongs to male gametes, so genotype of male plant is = AA and female plant is = ZZ

36 **(a)**

In hemianatropous type, the ovule becomes curved and nucellus and embryo sac lies at right angles to the funicle, *e.g.,* Ranunculaceae, while in campylotropous, the micropyle is directed forwards chalaza. Chalaza lies at right angle to funicle, *e.g.,* Leguminosae.

37 **(a)**

Two polar nuclei are located in **embryo sac**, which participate in triple fusion.

38 **(c)**

Bilobed or dithecous are the same terms used in angiospermic anther lobes

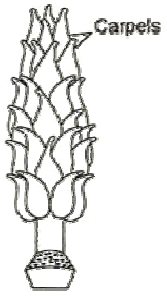
39 **(d)**

In $PoinsettiaandEuphorbia$, inflorescence is cyathium, in which involucre fuse to form a cup surrounding a large achlamydous, pedicellate, tricarpellary, syncarpous female flower.

Numerous centrifugally arranged male flowers surround the female flower.numerous centrifugally arranged male flowers surround the female flower.
In *Casuarina*,cylindrical phylloclades are found which are modified aerial stems. Flowers are unisexual which develop acropetally and pollen tube enters the ovule through chalazal tissues, *i.e.*, chalazogamy.

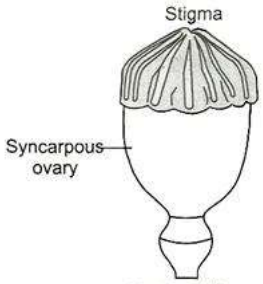
40 **(d)**

Diagram showing multicarpellary apocarpous condition



Multicarpellary apocarpous pistil in *Michelia*

The gynoecium represents the female reproductive part of the flower. The gynoecium may consist of single pistil (monocarpelllary) or may have more than one pistil (multicarpellary) When there are more than one pistil fused together than the pistil is called multicarpellary syncarpous pistil when the pistils are not in fused condition than this type of ovary is called multicarpellary apocarpous pistil



Multicarpellary syncarpous ovary in *Papaver*

41 **(a)**

True. Because huge pollen mass and feathery structure is the mark of wind pollinated pollen. These features are found in grass pollens

42 **(b)**

In water hyacinth and lily the pollination agency is not water rather it is insect. Although, they are aquatic plants. It is not necessary that all aquatic plants are pollinated by water

43 **(b)**

Apogamy was first reported by **Farlow** (1874). It can be defined as the development of a sporophyte directly from the gametophyte without the intervention of sex organs and gametes.

44 **(d)**

Each theca contains two microsporangia so total four microsporangia present in angiospermic anther

45 **(d)**

The fusion of male and female gametes is called **fertilization**, while the mode of formation of new individuals from specialized or non-specialized parts of the parent without meiosis or fusion of gametes is called the asexual reproduction.
Apogamy is a type of asexual reproduction, in which sporophyte is directly formed from a gametophyte without involving the formation and fusion of gmetes.
Funicle is the stalk of ovule. The point of attachment to the body of ovule with the funiculus is known as **hilum**.
A **raphe** or **longitudinal ridge** is formed by the fusion of funiculus with the body of ovule.

46 **(b)**

In embryo sac of angiosperm, egg apparatus occurs towards micropylar pole and generally

organises by two synergids and one egg cell. Egg cell has a large vacuole at its upper and a prominent nucleus near its lower end. Synergids show a filiform apparatus attached to their upper wall. It is known to attract and guide the pollen tube. Each of the synergids has a vacuole at its lower end and the nucleus at its upper end.

47 **(b)**

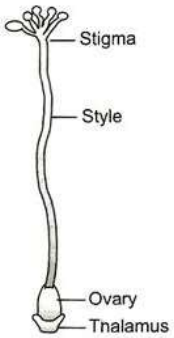
Pollen tube enters through the synergid cell, guiding by filiform apparatus present in synergid cell. Synergid cells are present at the micropylar end of the ovule

48 **(c)**

Water hyacinth is aquatic plant but it is not pollinated by water. It is pollinated by insect

49 **(b)**

Fertilization is the process in which the fusion of male and female gametes takes place. This process takes place in the ovary



Part of pistil

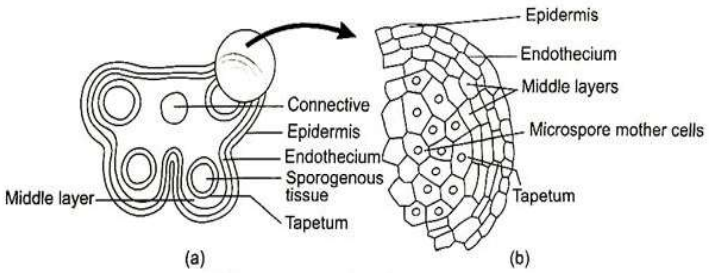
50 **(b)**

Nutrition.

Microsporangium is mainly surrounded by four layers/wall, *i*. *e*., Epidermis, endothecium, middle layer and tapetuem.

(i) Epidermis endothecium and middle layer help in protection and dehiscence of anther from pollen

(ii) Tapetum nourishes the developing pollen grain



(a) Transverse section of a young other
(b) Enlarged view one micro sporangium showing wall layers