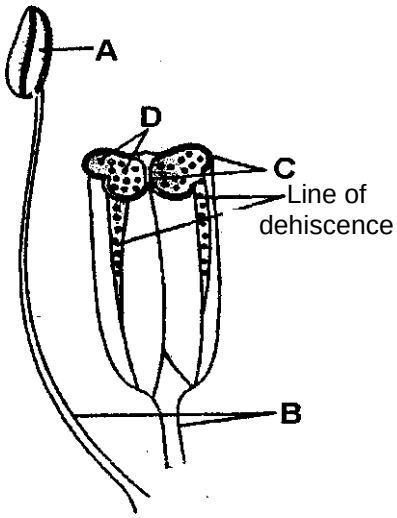
SEXUAL REPRODUCTION IN FLOWERING PLANTS

1. Double fertilisation was first discovered by nawaschin (1898) in-
(a) Lilium and Frittilaria (b) Mango and sugarcane (c) Papaya and Pea (d) brassica and Condtuft

2. If testa in removed from the water soaked gram seed, the remaining structure in-
(a) Full mature embryo (b) Cotyledom with endosperm
(c) Cotyledom filled with starch (d) None of the above

3. Which of the following is false false?
(a) Flowers do not exist only for us to be used for our own selfishness
(b) All flowering plants show sexual reproduction
(c) Gymnosperms, being nonflowering, do not show sexual reproduction
(d) Flowers are objects of aesthetic, ornamental, social, religious and cultural value

4.



Identify A to D-

	A	B	C	D
(a)	Anther	Petiole	Pollen sac	Megaspore
(b)	Anther	Petiole	Megasporangium	Pollen grains
(c)	Anther	Pedicel	Megasporangium	Pollen grains
(d)	Anther	Filament	Pollen sac	Pollen grains

5. Microsporangium is generally surrounded by 4 wall layers. Which of the following 3 wa!l layers perform the function of protection and help in the dehiscence of anther to release the pollen?
(a) Epidermis, tapetum, endothecium (b) Epidermis, aril, endothecium
(c) Epidermis, endodermis, mesocarp (d) Epidermis, middle layer and ndothecium

6. Each cell of sporbgenous tissue in anther is -
(a) Microspore (b) Pollen
(c) Potential pollen or microspore mother cell (d) Megaspore mother cell

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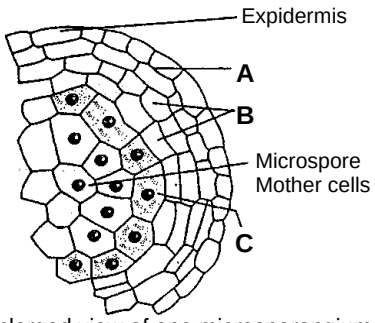
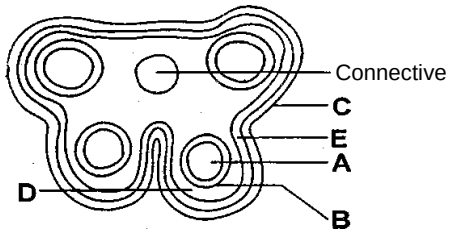


The above given diagram is an enlarged view of one microsporangium of a matured anther, identify A, B and C -
(a) A-Middle layer, B-Endothecium, C-Tapetum (b) A-Endothecium, B - Tapetum., C-Middle layer
(c) A-Endothecium, B - Middle layer, C-Tapetum (d) A-Tapetum, B - Middle layer, C – Endothecium

8.



The above diagram refers to a T. S. of anther. Identify A to E respectively -
(a) Sporogenous tissue, tapetum, epidermis, middle layer, endothecium
(b) Sporogenous tissue, epidermis, tapetum, middle layer, endothecium
(c) Sporogenous tissue, epidermis, middle layer, tapetum, endothecium
(d) Sporbgenbusiissue, tapetum, middle layer, epidermis, endothecium

9. Which of the following sequences of development of embryo sac / female gametophyte is correct?
(a) Nucellus —^ Megaspore —> Embryo sac
(b) Nucellus —*> Megaspore mother cell —> Megaspore —^ embryo sac
(c) Nucellus —^ Megasporangium —+> Megaspore —*> Embryo sac
(d) Nucellus —^ Megagametophyte —^ Megaspore —^ Embryo sac

10. Match the Column I with Column II

Column I	Column II
A. Funicle	I. Mass of cells within ovule with more food
B, Hilum	II. Basal part of ovule
C. Integument	III. One or 2 protective layers of ovule
D. Chalaza	IV Region where body of ovule fuses with funicle
E. Nucellus	V. Stalk of ovule

(a) A-i, B-II.C-III, D-IV, E-V (b) A-V, B-IV, C-lll, D-ll, E-l
(c)A-IV, B-II.C-I, D-lll, E-V (d)A-l, B-III.C-V, D-ll, E-'lV

11. Which of the following is correct about *Parthenium* (Carrot grass)?
(a) *Parthenium* came into India as a contaminant with imported wheat
(b) It has become ubiquitous in occurence
(c) It causes pollen allergy (d) All of the above

12. In angiosperms pollination occurs when pollen grains are in -
(a) 2-celled stage (b) 3-celled stage (c) 2 or 3 celled stage (d) Uninucleate stage

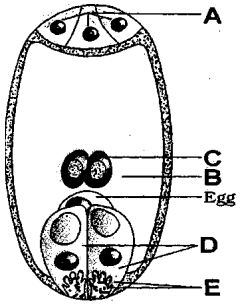
13. Which of the following statements is false?
I. Pollen grains represents immatured male gametophyte
II. In angiosperms partially developed male gametophytes are pollinated
III. Generative cell is siponogenous while vegetative cell is spermatogenous
IV. Formation and differentiation of pollen grains is called microsporogenesis
V. Hay fever is a pollen allergy
VI. Pollen grains of some plants produce severe allergy and respiratory or bronchial diseases
VII. Pollen grains are poor in nutrients.

(a) I and VII (b) III and VII (c) IV and V (d) VI and VII

14. Which of the following has the least pollen viability?
(a) Cereals like wheat and rice (b) Members of Rosaceae
(c) Members of Leguminoseae (d) Members of Solanaceae

15. In typical embryo sac, the nuclei are arranged as -
(a) 3 + 2+ 3 (b) 3 + 3 + 2 (c) 2 + 3 + 3 (d) 2 + 4 + 2

16.



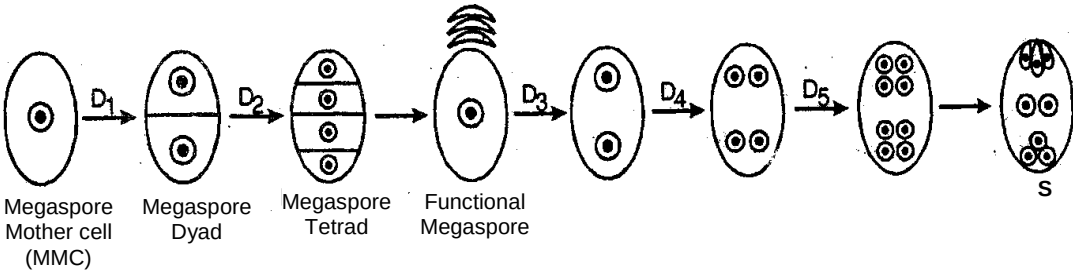
Identify A, B, C, D and E structures shown in figure of a female gametophyte-

	A	B	C	D	E
(a)	Antipodal cells	Central cell	Polar nuclei	Synergids	Acrosorhe
(b)	Antipodal cells	Central cell	Polar nuclei	Synergids	Filiform apparatus
(c)	Synergids	Central cell	Polar nuclei	Antipodal cells	Filiform apparatus
(d)	Synergids	Megaspore mother cell	Polar nuclei	Synergids	Filiform apparatus

17. Embryo sac is monosporic when it develops from –
(a) One of the four megaspores of a megaspore mother cell (MMC)
(b) 3 megaspores of a megaspore tetrad
(c) 2 megaspores
(d) The MMC where meiosis has occured but cytokinesis does not take place

18. For the formation of embryo sac, the megaspore mother cell undergoes –
(a) Two meiotic and two mitotic divisions (b) One meiotic and three mitotic divisions
(c) Two meiotic divisions (d) One meiotic and two mitotic divisions

19.



The diagram above shows megasporogenesis and development of typical female gametophyte in angiosperms. In which of the following options all divisions (D_1 to D_5) and structure (S) are correctly identified?

	D_1	D_2	D_3	D_4	D_5	S
(a)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Microgametophyte
(b)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Embryo
(c)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Embryo sac
(d)	Mitosis	Meiosis	Mitosis	Mitosis	Mitosis	Embryo sac

20. Match Column I with Column II-

Coiumn I	**Coiumn II**
A. Megasporogenesis	I. Monosporic development

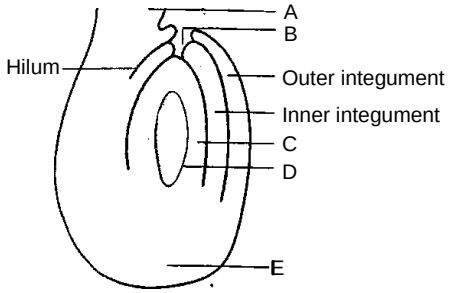
B. Megagametogenesis — II. Fatty substance
C. Sporopollenin — III. Embryo sac formation
D. Typical embryo sac — IV. Megaspore formation

	A	B	C	D
(a)	I	II	III	IV
(b)	IV	III	II	I
(c)	IV	I	II	III
(d)	III	II	I	IV

21. An interesting modification of flavor shape for insect pollination occurs in some orchids in which a male insect mistakes the pattern an the orchid flower for the female of lin species and tries to copulate with it, thereby pollinating the flower, thin phenomena is called-
(a) Pseudopartherocary (b) Mimicry (c) Pseudopollination (d) Pseudocopulation

22. Pollination by snail and slug in known as-
(a) Ornithophilous (b) Chiropterophilous (c) Entomophilous (d) Malacophilom

23.



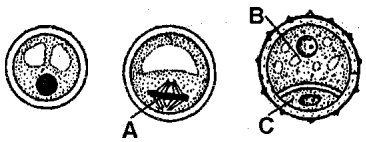
Adiagrammatic view of a typical anatropous ovule is given above. In which of the following all five parts labelled as A, B, C, D and E are corectly identified –

	A	B	C	D	E
(a)	Funicle	Micropyle	Femalegametophyte	Embryo sac	Chalaza
(b)	Raphe	Micropyle	Egg	Embryo sac	Chalaza
(c)	Placenta	Micropyle	Egg	Embryo sac	Chalaza
(d)	Funicle	Micropyle	Nucellus	Embryo sac	Chalaza

24. Pollen grains can be stored in liquid nitrogen at -
(a) 70°C (b)100``°C` (c) –196ºC (d) 0º C

25. The viability of pollen grains depends upon –
(a) Prevailing temperature (b) Prevailing humidity
(c) Genetic potenti ty of the concerned species (d) Members of Solanaceae

26.



The above diagram shows some stages in microgametogenesis. Identify A, B and C –

	A	B	C
(a)	Symmetric spindle	Generative cell	Vegetative cell
(b)	Symmetric spindle	Vegetative cell	Generative cell
(c)	Asymmetric spindle	Vegetative cell	Generative cell
(d)	Asymmetric spindle	Generative cell	Vegetative cell

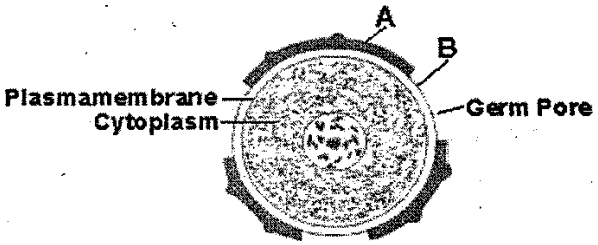
27. Which of the following points is incorrect about sporopollenin?
(a) It is one of the most resistant organic material known
(b) It can withstand high temperature and strong acids and alk
(c) 2 enzymes that degrade sporopollenin are known so far .
(d) Pollen grains are well preserved as fossils because of presence of sporopollenin

28. Which of the following sequences is correct for microsporogenesis?
(a).Micro S.M.C (2N) Mitosis> Microspore tetrad (2N) Meios'V Microspore (N)
(b) Micro S.M.C (2N) ————> Microspore tetrad (N) ———> Microspores (N)
(c) Microspore tetrad (2N)—' OSIS> Microspores
(d) Micro S.M.C (2N) MitOSIS> Microspore tetrad (2N) Mitosis» Microspores (2N)

29. The proximal part of filament of stamen is attached to -
(a)Thalamusorthepetal (b) Sepals or thalamus
(c) Pedicel or petiole (d) Ovary or ovule

30. Diversity of structures of the inflorescences, flower and floral parts -
(a) Are responsible for making our garden beautiful
(b) Ensure self pollination
(c) Are adaptations to ensure formation of end products of sexual reproduction
(d) Ensure anemophily

31.



A an B are respectively –
(a) Exine, intine (b) Intine, exine (c) Epidermis and endoderrnis (d) Epicarp apd end,ocarp

32. As the anthers mature and dehydrate, the …… separate dissociate from each other and develop into
(a) Megaspore, embryo sac (b) Microspores, pollen grains
(c) Pollen grains, megaspores (d) Megaspores, microspores

33.

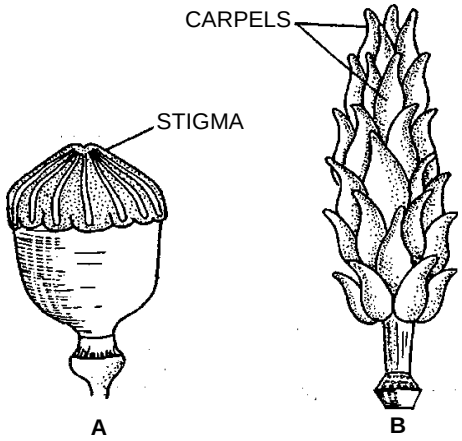


Figure A and B show female reproductive organs of Papaverand *Michelia* respectively-
(a) A- Multicarpellary syncarpous pistil and B - Multicarpellary apocarpous pistil
(b) A- Multicarpellary apocarpous pistil and B - Multicarpellary syncarpous pistil
(c) Both A and B are multicarpellary and syncarpous pistils
(d) Both A and B are multicarpellary apocarpous pistil

34. The female gametophyte /embryo sac of typical dicot *(Polygonum)* or monosporic embryo sac is –
(a) 7-celled and 7-nucleate (b) 8-celled and 8-nucleate (c) 7-celled and 8-nucleate (d) 8-celled and 7-nucleate

35. Geitonogamy is -
(a) Functionally cross pollination involving a pollinating agent
(b) genetically it is similar to autogamy since the pollen grains come from the same plant
(c) Functionally and genetically autogamy
(d) Both a and b are correct

36. Which of the following is false about xenogamy?
(a) It is the transfer of pollen grains from anther to stigma of another plant of the same species
(b) It produces genetic variation
(c) it is genetically and ecologically (= functionally) cross pollination
(d) It occurs in Cleistogamous flowers

37. Autogamy is -
(a) Transfer of pollen grains from anther to stigma of the same flower
(b) transfer of pollen grains from anther to stigma of another flower
(c) Pollination between two flower
(d) Maturation of anther and stigma at different times

38. A monocarpic plant in are which-
(a) Has only are carpel
(b) Flowers and gruits only once in life time and thereafter dies
(c) Produces only seed
(d) None of the above

39. Maturation of male and female sex organo at different times in known as-
(a) Herkogamy (b) Dichgamy (c) Polygamy (d) Apogamy

40. Embeyo sac in also know as-
(a) MIcrogametophyte (b) Megagametophyte (c) Microsporangium (d) Megasporagium

41. The term pollination signifies -
(a) Dehiscence of anther
(b) The transfer of pollen grains from anther to stigma
(c) The transfer of pollen grains from anther to the stigma of the same flower
(d) Formation of pollinia

42. During the formation of embryo sac from megaspore mitotic divisions occurs. These mitotic divisions are -
(a) Strictly free nuclear (b) Strictly cellular (c) Strictly reduction (d) Strictly cytoplasmic

43. Which of the following devices is not used by plants to prevent autogamy -
(a) Self-incompatibility (b) Production of unisexual flowers
(c) Heterostyly (d) Production of Cleistogamous flowers

44 Go through the following statements -
I. Flowers are bisexual and homogamous maturing anther and stigma of a flower at the same time.
II. Mechanical devices bringing anthers and stigma close together in a bisexual chasmogamous flower.
III. Cleistogamy (bisexual flowers remain closed)
IV. Anther and stigma of an intersexual flower mature, in bud condition. The above contrivances favour -
(a) allogamy (b) Autogamy (c)Xenogamy (d) Cross pollination

45. Pollination occuring in closed flowers is - . .
(a) Bud pollination (b) Cleistogamy (c) Chasmogamy (d) Allogamy

46. Cleistogamous flowers produces assured seed-set even in the absence of pollinator - why?
(a) Because they have fragrance (b) Because they remain open
(c) Because they are autogamous (d) Because they are colourful

47. Egg apparatus of an embryo sac consists of -
(a) Egg cell only . (b) Egg cell + 3 antipodal cells
(c) One oosphere (egg) + 2 synergids (d) One oosphere (egg) + 2 synergids + 2 antipodal cells

48. Go through the following points.
I. Dicliny(unisexu ty of flower)
II. Dichogamy (protoandry or protogyny)
III. Self sterility / self incompatibility
IV. Heterostyly
V. Herkogamy (Barrier between anther and stigma of a bisexual homogamous flower)
(a) Geitonogamy (b) Xenogamy (c) Allogamy (d) Autogamy

49. Subterranean Cleistogamous and geophilous flowers occur in-
(a) *Viola* (b) *Commelina* (c) *Ficus bengalensis* (d) *Anthocephalus*

50. The root cell of wheat plant has 42 chromosomes what would be the number of chromosomes in the synergid cell-
(a) 7 (b) 14 (c) 21 (d) 28

51. 8 nucleated embryo sacs are-
(a) monopolie only (b) Bispolic only (c) Teliasporic only (d) Any of these

52. Contrivance for self-pollination/autogamy is -
(a)Homogamy (b) bisexu ty (c) Cleistogamy (d)AII

53. The ploidy levels of the cells of the nucellus, MMC, the functional megaspore and female gametophyte -
(a) 2N, N, 2N, N (b) N, N, 2N, N (c) 2N, 2N, N, N (d) N, 2N, 2N, N

54. Chasmogamy is pollination in -
(a) Bud condition (b) Closed flowers (c) Unrelated flowers (d) Opened flowers

55. Which of the following plants produce(s) chasmogamous and Cleistogamous flowers?
(a) *Viola* (Common pansy) (b) Oxa//s (c) *Commelina* (d)AII

56. The largest cell in an embryo sac is -
(a) Egg (b) Central cell (c)Synergid (d) Antipodal cell

57. The process whereby a perfect flower is pollinated by its pollen is called -
(a) Allogamy (b) Autogamy (c) Xenogamy (d)Hydrogamy

58. Transfer of pollen grains from anther to the stigma of another flower of same plant is -
(a) Geitonogamy (b) Xenogamy (c) Autogamy (d) Cleistogamy

59. The development of fruit without fertilisation is-
(a) Parthenogenesis (b) Parthenocapy (c) Apomixis (d) Apogamy

60. Which type of association in found in between entomosphilous flower and pollinating apeat-
(a) Mutualism (b) Commercialism (c) Cooperation (d) None of these

61. In nature, allogamy is met within _____ surely-
(a) unisexual flowers (b) Neuter flowers (c) Underground flowers (d) Bisexual flower

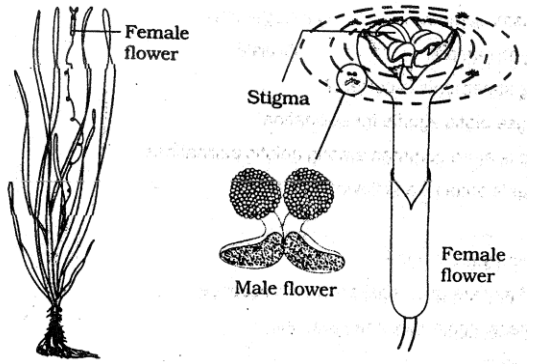
62. In Tapegrass (*Vallisneria)* -
(a) The female flower reach the surface of water by long stalk arid male flowers / pollen grains are released on to the surface
(b) Monoecism is found
(c) Pollen grains or flowers are actively carried by water current
(d) All the above are correct

63. I. Flowers are small. They are often packed in inflorescence
II. Flowers are colourless, nectarless and odourless
III. Well exposed stamens
IV. Pollen grains - produced in large number, light, non-sticky
V. Flowers often have a single ovule in each ovary
VI. Stigma - large, often feathery.
The above contrivances favour-
(a) Self pollination (b) Anemophily (pollination by wind)
(c) Ornithophily (pollination by birds) (d) Entemophily (pollination by insects)

64. Anthesis in a phenomena which refers to-
(a) Formation of pollen (b) Development of anther (c) Operning of flower bud (d) Reception of pollen

65. Plants of which of these groups are pollinated by the same agercy-
(a) Triticum, cocos, mangifera (b) Ficus, Kigelia, Casurina
(c) Salvia, Mocus, Euphorbia (d) Bombax, Butea, Bactiria.

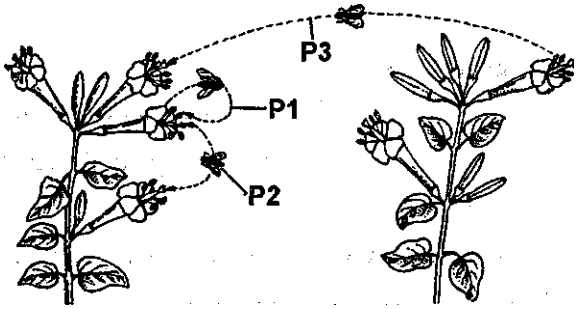
66.



The above figure showing hydrophily is of
(a) Zostera (b) Lotus (c) *Vallisneria* (d) *Hydrilla*

67. Which of the following statements is correct.
(a) Majority of plants use biotic agents for pollination
(b) Pollination by wind is more common among abiotic pollinations
(c) Pollination by water is quite rare in flowering plants
(d) AII

68.



The above diagram shows 2 plants of the same species. Identify the types of pollination indicated as PI, P2 and P3.

	P1	P2	P3
(a)	Allogamy	Chasmogamy	Cleistogamy
(b)	Autogamy	Xenogamy	Geitonogamy
(c)	Autogamy	Geitonogamy	Xenogamy
(d)	Geitonogamy	Allogamy	Autogamy

69. Which of the following statements is false?
I. *Vallisneria* and *Hydrilla* are fresh water plants while sea-grasses (e.g. *Zostera)* are marine plant.
II. *Vallisneria* is epihydrophilous while *Zostera* is hypohydrophilous
. 'III. Pollination in water lily / Lotus *(Nymphea)* and *Eichhornia* (water hyacinth) takes place by insects ~ v
IV. In majority of aquatic plants flowers emerg© above the level of water and are pollinated by insects or wind
V. In most of the water pollinated species, pollen grains are protected from wetting due to absence of mucilaginous covering
VI. In hydrophilous plants pollen grains are spherical
(a) All (b)None (c)VI (d)IV

70. Which of the following is false?
(a) Wind-pollination is quite common in grasses
(b) Hydrophily is limited to about 30 genera mostly monocots
(c) Both wind and water pollinated flowers are not very colourful and do not produce nectar .
(d) None of the above

71. Self-incompatibility -
(a) works the same-way in all plants
(b) Does not have potential agricultural applications
(c) Maintains variation

(d) On the same mechanism of transplant rejection seen in animal

72. All of the following include outbreeding devices except -
(a) Unisexu ty of flowers, self-incompatibility
(b) Pollen release and stigma receptivity are not synchronized
(c) Anthers and stigma are placed at different position
(d) Bisexu ty, homogamy, cleistogamy

73. I. Flowers are usually large, colourful, fragrant
II. Pollen grains are produced in large number
III. Pollen grains are light in weight and non-sticky
IV. Sticky pollen grains
V. Stigma rough and sticky
VI. Stigma is feathery
Which of the above characters favour entomophily?
(a) II, IV, V (b) I, II, III (c)lll, IV, V (d)l,IV, V

74. Which of the following would not have an effect on flowering of a particular plant species?
(a) Plant age (b) Nutritional status (c) Temperature (d) Prevailing wind

75. Choose the mismatched options-
(a) Wind-cannabin : Anemophily (b) Water-Zoostera : Hydrophily
(c) Insects-Salvia : Entomophily (d) Birds-Adonsoria : Ormithophily

76. Self-incompatibility -
I. Is a device to prevent inbreeding.
II. Provides a biochemical block to self-fertilization.
III. Ensures cross-fertilization.
IV. Is governed by pollen-pistil interaction
V. Is governed by series of multiple alleles.
VI. Prevents self pollen (from the same flower or other flowers of the same plant) from fertilizing the ovules by inhibiting pollen germination or pollen tube growth in the pistil.

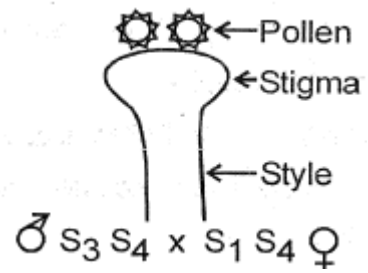
77. Majority of flowering plants- \
(a) Produce hermaphrodite flowers (b) Are dioecious
(c) Show self-pollination (d) Show autogamy

78. Which of the following is the tallest flower?
(a) Vallisneria (b) Lotus *(c) Amorphophallus* (d) *Zostera*

79. Which of the following Paris las Laploid number of chromosomes-
(a) Nuclellus and Antipodal cells (b) Egg nucleus an secondary nucleus
(c) Megaspore moker cell Egg nucleus (d) Egg cell and artipodal cells

80. A plant that is self-incompatible has a genotype of S_5Sq for S-locus. It recieves pollen from a plant that is S_3Sq.
Which of the following is most likely to occur?
(a) All of the pollen will germinate, forming pollen tubes (b) None of the pollen will germinate
(c) About half of the pollen will germinate (d) Fertilization will occur in about pollinated plant

81.



The above diagram refers the self-inompatibility. The genotypes of embryo and endosperms are –

	Embryo	Endosperm
(a)	S_1S_3,S_3S_4	$S_3S_4S_4$
(b)	S_4S_4	S_3,S_3S_4, S_1,S_1S_3
(C)	S_1S_3,S_3S_4	S_1,S_1S_3, S_4,S_4S_3
(d)	S_1,S_1	S_1,S_3S_4

82. Unisexu ty of flower prevents -
(a) Geitonogamy but not xenogamy
(b) Autogamy but not geitonogamy
(c) Autogamy and geitonogamy
(d) Both geitonogamy and xenogamy

83. Which of the following are usual floral rewards to pollinating animals?
(a) Shelter and pollen grains
(b) Shelter and fragrance
(c) nectar and pollen grains
(d) Ner*~ ^fragrance

84. Moth *(Pronuba / Tegaticula)* passes its larval stage in plant pollinated by it. The plant is
(a) *Ficus* (b) *Tagetes* (c) *Cosmos* (d) *Yucca*

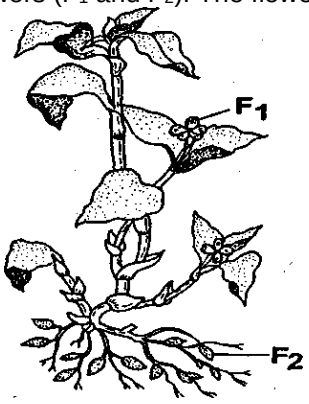
85. The most common type of pollination is -
(a) Entemophily (b) Ornithophily (c) Malacophily (by snails) (d) Chiropterophily (by bats)

86. Long silky hair coming out of the cob of maize are-
(a) Meant for fruit dispersal
(b) Meant for attracting insects
(c) Meant for protecting seeds
(d) Long styles and stigma

87. Find out the correct option -
(a) Among animals, insects, particularly bees are the dominant biotic pollinating agents
(b) Often flowers of animal - pollinated plants are specially adapted for particular species of animals
(c) In some species floral rewards like edible nectar, pollen grains, shelter for egg laying are given to pollinating animals
(d)AII

88. The given figure shows the plant of *Commelina* with two types of flowers (F_1 and F_2). The flowers are –

	F_1	F_2
(a)	Neutral	Staminate
(b)	Cleistogamous	Chasmogamous
(c)	Chasmogamous	Cleistogamous
(d)	Cryptogamous	Ovulate



89. In which part of a flower do both meiosis and fertilization occur?

(a) ovule (b) stigma (c) anther (d) petal

90. What is the genetic importance of outcrossing?
(a) Outcrossing is a characteristic of pollinators
(b) Outcrossing increases genetic diversity in a population
(c) Outcrossing increases the chances of sterility
(d) Outcrossing promotes inbreeding in a population

91. Repeated self pollination over the generation produces –

(a) New varieties (b) Better progenies (c) Inbreeding depression (d) Elimination of weak traits

92. Which of the following plants provide floral rewards to their pollinating agents -
(a) *Zostera and Vallisneria* (b) *Hydrilla and Commelina*
(c) *Amorphophallus and Yucca* (d)SugarcaneandP//?tys

93. An obligate association between flower and pollinating agent is found in -
(a) *Yucca* (b) Maize (c) *Cosmos* (d) *Arena*

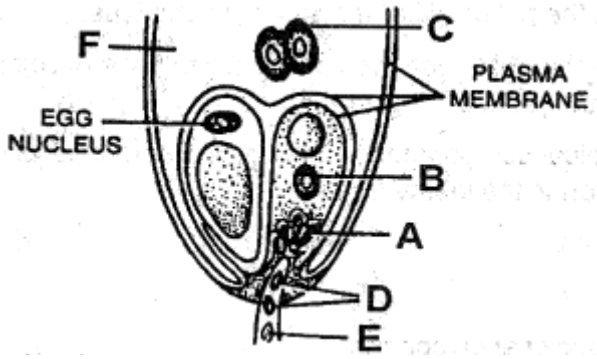
94. seedlers banana is-
(a) Parthenocarpic fruit (b) Multiple fruit (c) Seven called (d) Eight celled

95. Double fertilisatin involves,
(a) Fertilisation of the egg by two male gametes
(b) Fertilisation of two egg in the same embryo sac by two sperms brought by one pollen tube
(c) Fertilisation of the egg and the central cell by two sperms brought by different pollen tubes
(d) fertilisation of the egg and central cell by two sperms brought by the same pollen

96. Select the connect order of endosperm types.
(a) Cellular, helobial, free nuclear (b) Cellular, free nuclear Lelobial
(c) Helobial, free nuclear, cellular (d) Free nuclear, cellular, helobial

97. In castor and maize autogamy is prevented but geitonogamy occurs because -
(a) Plants are dioecious (b) Plants are unisexual (c) Flowers are bisexual (d) Flowers are unisexual

98.

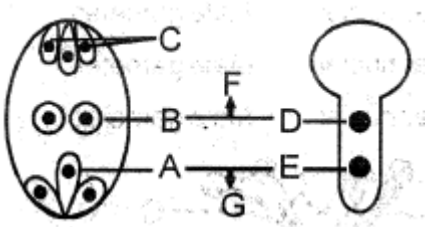


Study the diagram given above showing entry of pollen tube into embryo sac. Identify A to E –

	A	B	C	D	E	F
(a)	Filiform apparatus	Synergid	Polar nuclei	Vegetative Nucleus	Male gametes	Central cell
(b)	Filiform apparatus	Synergid	Polar nuclei	Male gametes	Vegetative Nucleus	Central cell
(c)	Obturator	Synergid	Polar nuclei	Male gametes	Vegetative Nucleus	Central cell
(d)	Egg apparatus	Synergid	Polar nuclei	Male gametes	Vegetative Nucleus	Central cell

99. Endosperm of the seed develops from-
(a) Haploid nucleus (b) Triploid nucleus (c) gymnosperms (d) Angiosperms

100.



The above diagram is related to double fertilization. A, B, D, E; F and G are identified as -
(a) Egg, Polar nuclei, Male gamete, Male gamete, Primary endosperm nucleus (PEN), and Zygote respectively
(b) Egg, Male gamete, Polar nuclei, Male gamete, Primary endosperm nucleus (PEN), and Zygote respectively
(c) Egg, Male gamete, Male gamete, Polar nuclei, Primary endosperm nucleus (PEN), and Zygote respectively
(d) Egg, Polar nuclei, Male gamete, Male gamete, Zygote, and Primary endosperm nucleus (PEN) respectively

101. Wiiich of the following options is correct?
(a) Pollination gives the guarantee of the promotion of post-pollination events that lead to fertilization
(b) The events— "from pollen deposition on stigma until pollen tubes enter the ovule" are together referred to as pollen-pistil interaction,
(c) Pollen-pistil interaction is a dynamic process involving pollen recognition followed by only promotion (not rejection) of the pollen.
(d) Pistil has no ability to recognise the pollen, whether right or wrong type.

102. Total number of nuclei involved in double fertilization is –
(a) 2 (b) 3 (c) 4 (d) 5

103. Double fertilization in unique be-
(a) Pteridophytes (b) Bryophytes (c) Symmnosperms (d) Angiosperm

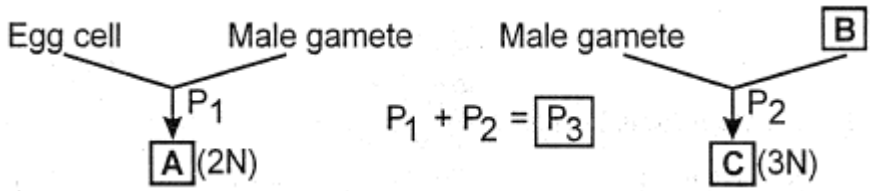
104. Entry of the pollen tube through the micropyle is-
(a) Anisogany (b) misogamy (c) porogamy (d) chalazogamy

105. Emasculation is not required when flowers are -
(a) Bisexual (b) Intersexual (c) Unisexual (d) Either a or b

106. A homogamous tall pistillate plant (TT) is crossed with homogamous dwarf staminate plant (tt). What is the genotype of endosperm?
(a)TTT (b)TTt (c)Ttt (d) ttt

107. Pollen tube enters the embryo sac usually –
(a) By penetrating egg cell (b) Through one degenerated synergid
(c) By destroying antipodal cells (d) Between persistent synergid and central cell

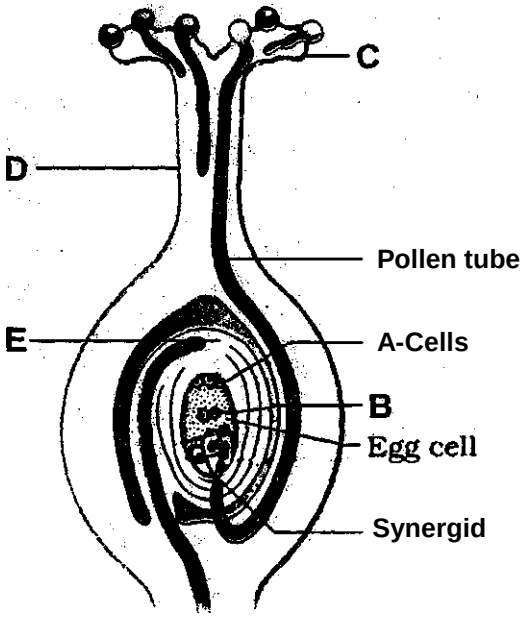
108.



Identify structures A, B, C and phenomena - P_v P_2, P_3.

	A	B	C	P_1	P_2	P_3
(a)	Zygote	Polar nuclei	PEN	Syngamy	Triple fusion	Double fertilization
(b)	Zygote	Polar nuclei	PEN	Triple fusion	Syngamy	Double fertilization
(c)	Zygote	Synergid	PEN	Syngamy	Triple fusion	Double fertilization
(d)	Zygote	Polar nuclei	PEN	Syngamy	Apogamy	Double fertilization

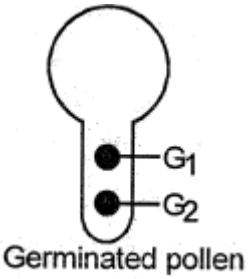
109.



Identify A, B, C, D and E

	A	B	C	D	E
(a)	Antipodal cells	Secondary nuclei	Stigma	Style	Chalaza
(b)	Antipodal cells	Secondary nuclei	Style	Stigma	Chalaza
(c)	Antipodal cells	Secondary nuclei	Stigma	Chalaza	Style
(d)	Antipodal cells	Secondary nuclei	Chalaza	Stigma	Style

110.



Why G_1 and G_2 are genetically identical?
(a) Because they are products of meiosis
(b) Because they are products of mitosis
(c) Because they are products of meiosis
(d) Because the/are products of amitosis

111. The ability of the pistil to recognise the pollen followed by its acceptance or rejection is the result of a continuous dialogue between pollen grain and the pistil,
This dialogue is mediated by chemical component^, of the pollen interacting with those of the pistil. Which of the

following chemicals mainly takes part in the interaction -
(a) Nucleotides (b) Proteins (c) Minerals (d) Lipidorinulin

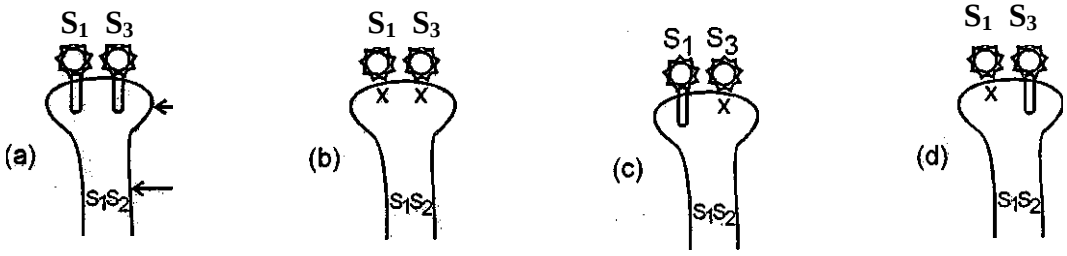
112. The role of double fertilization is angiosperms is to produce-
(a) Cotyledom (b) Endocarp (c) Endosperm (d) Hormones

113. Which of the following is correct?
(a) Double fertilization - characteristic of angiosperms
(b) Double fertilization or triple fusion was discovered by Nawaschin
(c) Pollen tube shows tip growth and chemotropic movement
(d) AII

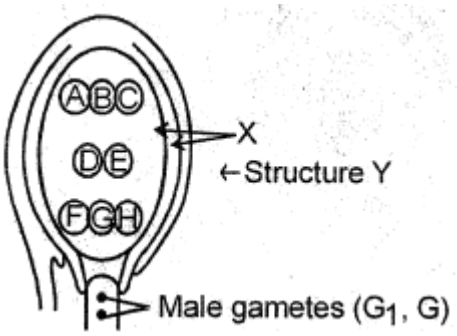
114. Coffee plant has chromosome no. of '2n' in its samatic cells, what in the chromosome number in the edible part of coffee seed.
(a) n (b) 2n (c) 3n (d) 4n

115. Thro ugh which cell of the embryo sac does the poller tube enter the embryo sac-
(a) Egg cell (b) Central cell (c) Persistant symerfid (d) Degenerated symergid

116. Considering the genetic basis of self-incompatibility which of the following options is correct. Male plant is 8,83 and female plant is S,S_2.



117.



The given diagram shows a section through the ovary and pollen tube of a flowering plant just before fertilization. After the fertilization the structures that convert into pericarp and seed coat are respectively –
(a) X,Y (b) Y, X (c) D, E (d) G, B

118. After triple fusion central cell changes into -
(a) Embryo (b) Embryo sac
(c) Primary endosperm cell (PEC) (d) Primary endosperm nucleus

119. Fertilization is depicted by the condition –
(a) N $\rightarrow$ 2N (b) 2N $\rightarrow$ N (c) 2N $\rightarrow$ 4N (d) 4N $\rightarrow$ 2N

120. In double fertilization total number of male nuclei and total number of female nuclei involved are-(a) 3, 2 respectively (b) 2, 3 respectively (c) 2, 2 respectively (d) 3, 3 respectively

121. The cells of endosperm have 24 chromosomes. What will be number of chromosomes in the gametes -
(a) 8 (b)16 (c)72 (d)24

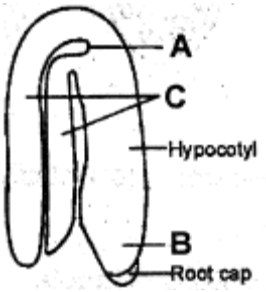
122. The number of chromosomes in radicle is 16. What will be the number of chromosomes in tube nucleus, antipodal

cells, definitive nucleus and endosperm respectively?
(a)8,8,16,24 (b)8, 8, 16, 16 (0)16,16,32,48 (d) 8, 8,16,48

123. Which one of the following produces both enzymes and Lemans-
(a) Topetum (b) Endothecium (c) Middle layers (d) Epidermis

124. Which of the following is false about emasculation?
(a) During emasculation process, stigma is removed.
(b) Emasculated flowers are bagged in order to prevent self-pollination
(c) Emasculation is the removal of stamens before maturation of selected bisexual flowers
(d) It is one of the steps for artificial hybridization

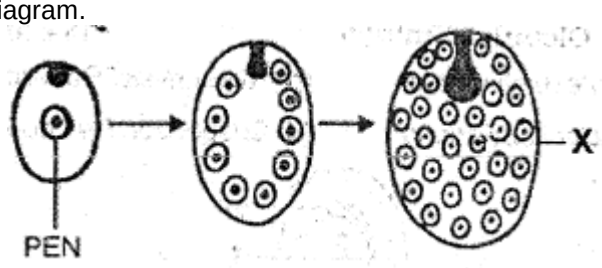
125.



Go through the given diagram of a typical dicot embryo. In which of the following all the 3 parts labelled as A, B, C with their respective functions are correctly identified?

	A	B	C
(a)	Plumule, shoot system formation	Radicle, root system formation	Hypophysis, formation of radicle
(b)	Plumule, shoot system formation	Radicle, root system formation	Cotyledon, food storage
(c)	Radicle, root system formation	Plumule, shoot system formation	Cotyledon, food storage
(d)	Radicle, root system formation	Plumule, shoot system formation	Endosperm, food storage

126. Go through the following diagram.



X is
(a) Cellular endosperm (b) Nuclear endosperm
(c) Helobial endosperm (d) Ruminate endosperm

127. Albuminous / endospermic seeds are –
(a) Coconut, castor, sunflower (b) Bean, pea
(c) Groundnut, pea (d) None

128. In coconut liquid nuclear endosperm is surrounded by white kernel which is -
(a) Integument/seed coat (b) Cellular endosperm (c) helobtel'endosperm (d) fibrous mesocarp

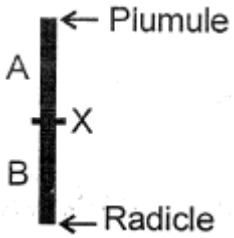
129. Which of the following is false?
I. Endosperm formation starts prior to first division of zygote
II. Angiospermic endosperm is mostly 3N while gymnc-spermic one is N.

III. The most common type of endosperm is nuclear.
IV Coconut has both liquid nuclear (multinucleate) and cellular endosperm.
V. Milky water of green tender coconut is liquid female gametophyte.
(a) I and II only (b) III only (c) Vonly (d) II only

130. The study of formation, growth and development of new individual from an egg is called -
(a) Embryology . (b) Embryogenesrs (c) Morphogenesis (d) Embryolysis

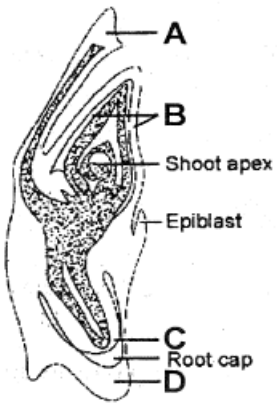
131. Endosperm is completely consumed by developing embryo before seed maturation or exalbuminous / non-endospermic seeds are found in –
(a) Pea, ground nut, beans (b) Coconut, castor (c) Maize, wheat (d) Coconut, Wheet

132.



Conder rod like structure as embryonal axis. X is the region at which cotyledon is attached, identify regions A and B respectively.
(a) Epicotyl, Hypocotyl (b) Hypocotyl, Epicotyl (c) Epicotyl, Mesocotyl (d) Mesocotyl, Hypocotyl

133.



In which one of the options all the four parts A, B, C and D are correct?

	A	B	C	D
(a)	Scutellum	Coleoptile	Radicle	Coleorhiza
(b)	Scutellum	Coleorhiza	Radicle	Coleoptile
(c)	Hypophysis	Coleorhiza	Radicle	Coleoptile
(d)	Hypophysis	Coleoptile	Radicle	Coleorhiza

134. During germination, micropyle of seed takes part in -
(a) Forming weak point for emergence of radicle (b) Entry of water and oxygen
(c) passage of gases (d) Leaching inhibitors

135. Which plant part has two generations, one within the other is -
(a) Embryo (b) Germinated pollen grain
(c) Unfertilized ovule (d) Seed

136. Aleurone layer takes part in -
(a) Protection of delicate embryo (b) Enzyme synthesis
(c) Transfer of food to cotyledons (d) Is also called scutellum

137. Which of the following statements is correct?
(a) parthenoearpie fruits (seedless fruits) develop without fertilization e.g, banana.
(b) Parthenocarpy can be induced by hormones
(c) Seed is the basis of our agriculture
(d)AII

138. Germination of pollen gairs on the stigma is-
(a) Autogamy (b) in siro germination (c) in nitro germination (d) in situ germination

139. Match the Column I with Column II -

Column I	**Column II**
A. Ovary	I. Groundnut, mustard
B, Ovule	II. Guava, orange, mango
C. Wall of ovary	III. Pericarp
D. Fleshy fruit	IV. Seed
E. Dry fruits	V. Fruit

	A	B	C	D	E
(a)	V	IV	III	II	I
(b)	I	II	III	IV	V
(c)	I	II!	II	IV	V
(d)	V	IV	I	II	III

140. In citrus, a seed has 10 embryos. Out of 10 embryos -
(a) One is normal and 9 are adventive, mostly nucellar embryos
(b) One is adventive, mostly nucellar and 9 are normal embryos
(c) 5 are nucellar and 5 are normal embryos
(d) One is normal and 9 are monozygotic embryosis

141. Perisperm differs from endosperm in-
(a) Having no reseve food
(b) Being a diploid tissue
(c) Its formation by fusion of secondary nucleus with several sperms
(d) Being a haploid tissue

142. Which one of the following statements is correct ?
(a) Hard outer layer of pollen is called intine (b) Sporoganeous tissue is haploid
(c) Endothecium produces the microspores (d) Tapetum nourishes the developing pollen

143. What would be number of chromosomes of aleurone cells of plant with 42 chromosome in its root tip cells?
(a) 42 (b)63 (c)84 (d)2T

144. What is common between vegetative reproduction and Apomixis?
(a) Both occur round the year (b) Both produces progeny identical to the parent
(c) Both are applicable to only dicot plants (d) Both bypass the flowering phase

145. Active research is going on in many laboratories around the world to understand the genetics of apomixis. What is the purpose of such active research?
(a) Hybrid plants are directly formed by apomixis
(b) Apomixis is the method to produce seed without fertilization
(c) To transfer apomictic genes into hybrid varieties which will prevent loss of hybrid vigour with successive years
(d) Apomixis produces genetically different individuals

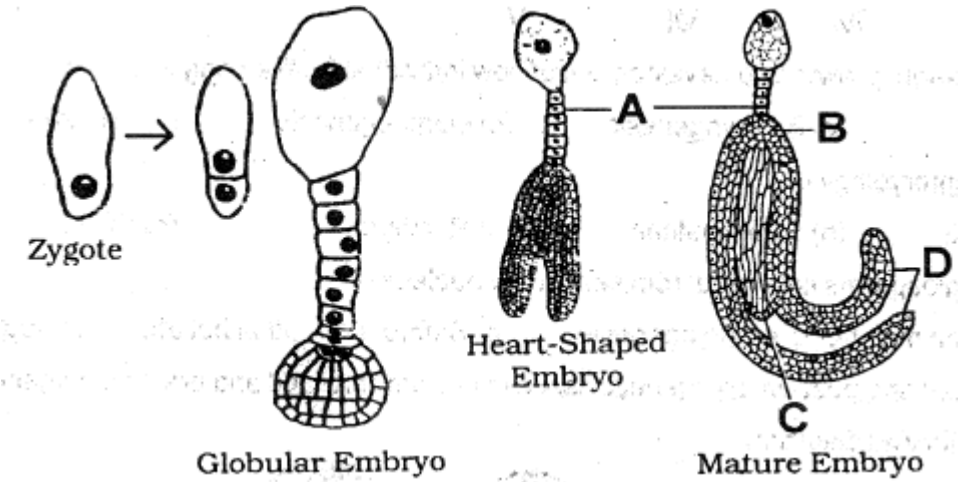
146. In most plants; the fruit develops from the ovary, other parts degenerate and fall off such fruits are called-
(a) False fruits (b) True fruits (c) parthenoearpie fruit (d) None of the above

147. An example of a seed with endosperm, perisperm and caruncle is -
(a) Castor (b) Coffee (c) Lily (d) Cotton

148. In some seeds like black pepper and beet, remnants of nucellus are present. This residual, persistent nucellus is called-
(a)Aleuronelayer (b) Endothelium (c)Perisperm (d) Obturator\

149. Embryos of monocotyledons possess only one ___A____. In the grass family the cotyledon is called ____B___ that is situated towards 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 ____C___.
The portion of the embryonal axis above the level of attachment of scutellum is the ____D___ which has a shoot apex enclosed in a foliar structure called ____E____.
(a) A - cotyledon, B - scutellum, C - coleorrhiza, D - epicotyl, E - coleoptile
(b) A- scutellum, B - cotyledon, C - coleorrhiza, D - epicotyl, E - coleoptile
(c) A - cotyledon, B - scutellum, C - coleorrhiza, D - Hypocotyl, E - coleoptile
(d) A- cotyledon, B - scutellum, C - coleoptile, D - epicotyl, E - coleorrhiza

150. Diagram given below shows stages in embryogenesis in a typical dicot *(Capsella).* Identify structures Ato D respectively-



(a) Suspensor, Radicle, Plumule, Cotyledons (b) Hypophysis, Radicle, Plumule, Cotyledons
(c) Suspensor, Plumule, Radicle, Cotyledons (d) Suspensor, Radicule, Plumule, Hypocotyls

151. Endoserpm in angiosperms is formed from secondary nucleus -
(a) After fertilization but prior to embryogenesis (b) Before fertilization but after embryogenesis
(c) As post-fertilized and post-embryogenetic tissue (d) As pre-fertHiz§d and pre-embryogenetic tissue

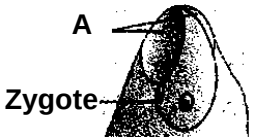
152. In a fertilized ovule, n, 2n and 3n conditions occur repsectively in -
(a) antipodals, egg, endosperm (b)megaspore mother cell, nucellus, endosperm
(c) egg, nucellus, microspore (d) endosperm, micropyle, egg

153. Fatherof Indian embryology is—
(a) P. Maheshwari (b) Swaminathan (c) R. Misra (d) Butler

154. For artificial hybridisation experiment in bisexual flower, which of the sequences it correct?
(a) Bagging ⟶ Emasculation ⟶ Cross pollination ⟶ Rebagging
(b) Emasculation ⟶ Bagging ⟶ Cross pollination ⟶ Rebagging
(c) Cross pollination ⟶ Baggging ⟶ Emasculation ⟶ Rebagging
(d) Self-pollination ⟶ Bagging ⟶ Emasculation ⟶ Rebagging

155. The purpose of bagging an emasculated flower in artificial hybridisation programme is
(a) To prevent intrafloral pollination
(b) To prevent self-pollination (from the pollen of the same flower)
(c) To prevent contamination of its stigma with unwanted pollen
(d) For rebagging

156. Identify the components labelled A, B, C and D in the diagram above from the list I to VIII given along with



components-
I. Micropyle
II. Chalaza
III. Central cell IV PEN
V. PEC
VI. Megaspore
VII. Degenerating synergid
VIII. Degenerating antipodal cell
I.. Polar nuclei
The correct components are-

	A	B	C	D
(a)	I	II	VIII	III
(b)	II	VIII	III	I
(c)	IV	IV	VII	III
(d)	VI	IV	VII	V

157. Maize grain in a-
(a) seed (b) Ovule (c) embryo (d) fruit

158. Which are the external conditions required for seed germination-
(a) Oxygen, carbon dioxide and suitable temperature
(b) Oxygen, light and suitable temperature
(c) Light, moisture and suitable temperature
(d) Oxygen, moisture and suitable temperature

159. Which of the following is false?
(a) The storage tissue of rice and other cereal grains, is endosperm
(b) Outermost layer of endosperm of maize grain is Aleurone layer
(c) Aleurone layer of maize grain is specially rich in proteins
(d) The transformation of ovules into seeds and ovary into fruit does not proceed simultaneously

160. The world's oldest viable seed, excavated from Arctic Tundra is of -
(a) *Pheonix dactylifera* (b) *Calotropis* (c) Lupine *(Lupinus)* (d) *Victoria*

161. Hybrid seeds have to be produced every year because -
(a) Hybrid plants become sterile in coming years
(b) They show more heterosis in coming years
(c) Hybrid vigour is not maintained beyond one generation as segregation of genes begins in the second generation
(d) Hybrid seed industry tends to increase cost of the seeds

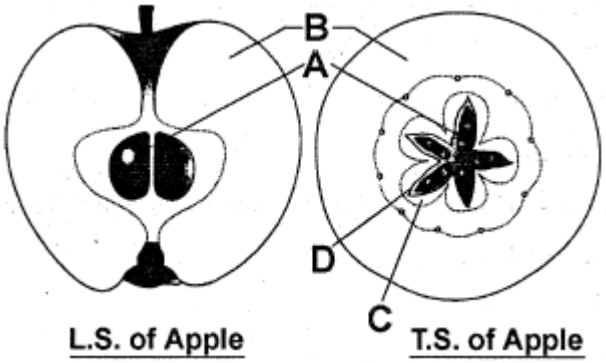
162. An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is:
(a) Cuticle (b) Sporopollenin (c)Lignin (d) Cellulose

163. Wind pollination is common in
(a) Orchids (b) Legumes (c) Lilies (d) Grasses

164. Even in absence of pollinating agents seed setting is assured in
(a) Commellina (b)Zostera (c)Salvia (d)Fig

165. Which of the following statements one true-
(a) Endothecium lies behind epidermis
(b) Fusion of egg with male gamete is called apogamy
(c) symergids are lipoid
(d) The point at which fumicle touches the ovule is called laplae
(a) (a) and (d) only (b) (a) and (b) only (c) (a) and (c) only (d) All are true

166.



Identify the edible part (A, B, C and D) shown in the diagram –
(a) A - seed (b) B - ttialamus (c) C = Epicarp + Mesocarp (d) D = Endocarp

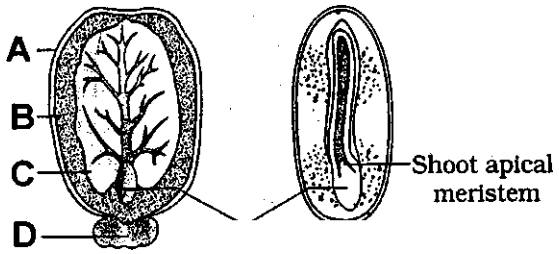
167. Collar like outgrowth that arises from the base of the ovule and focus a salt of thind integument is called-
(a) caruncle (b) aril (c) operculum (d) fericulus

168. False fruits (thalamus also contributes to fruit formation)»are found in -
(a) Apple and pear (b) Strawberry (c)Cashewnut (d)AII

169. Which of the following is not correct?
(a) As the seed matures, its water content is reduced and seeds become relatively dry(10-15% moisture by mass)
(b) The seed dormancy is the internal or innate inhibition of generation of normal or viable seeds
(c) Embryo in dormant seed shows higher rate of general metabolic rate
(d) Because of dormancy seeds remain viable for longer period and can be stored

170. Seed dormancy allows the <lantsto-
(a) Overcome unfavourable climatic conditions
(b) Develop healthy seeds
(c) Reduce viability
(d) Prevent deterioration of seeds

171.



The above diagrams are related to castor seeds. Identify A, B, C and D respectively -
(a) Endosperm, seed coat, cotyledon and caruncle (b) Seed coat, endosperm, caruncle and cotyledon
(c) Seed coat, cotyledon, endosperm and caruncle (d) Seed coat, endosperm, cotyledon and caruncle

172. What is the function of germ pore?
(a) Emergence of radicle (b) Absorption of water for seed germination
(c) Initiation of pollen tube (d) Release of male gametes

173. The gynoecium consists of many free pistils in flowers of
(a) Aloe (b) Tomato (c)Papaver (d) Michelia

174. Which of the sequences is correct for embryogenesis in dicots?
(a) Zygote —> Globular stage —> Proembryo —> Heart shaped stage —> Matured embryo
(b) Zygote —> Heart shaped stage —> Globular stage —> Matured embryo

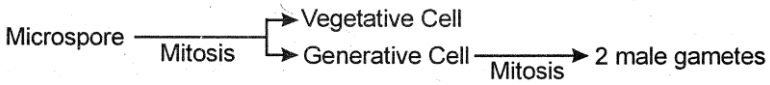
(c) Zygote —-> Proembryo —> Heart shaped stage —> Globular stage —> Matured embryo
(b) Zygote — Proembryo —> Globular stage —>Heart shaped stage —> Matured embryo

175. Nuclear or cellular nature of endosperm can be known at a -
(a) Matur^stage
(b) Cordate stage of embryo^
(c) First and subsequent divisions of PEN
(d) beginning of divisions in embryo

176. An ovule has generally how many embryo sac?
(a) 1 (b) 3 (c) 4 (d) 8

177. Go through the above figure showing a dissected flower of *Hibiscus* showing pistil. Identify A, B, C and D respectively-
(a) Hilum, Carpel, Ovary and thalamus
(b) Stigma, Style, Ovary and thalamus
(c) Stigma, style, ovary and placenta
(d) Stigma, style, Gynophore, anthopore

178. Micropyle is found in
(a) Seed (b) Ovule (c) Both ovule and seed (d) Fruit

179. 

Which of the following cells has more food and a large irregular shaped nucleus?
(a) Vegetative cell
(b) Generative cell
(c) Microspore
(d) Either Vegetative cell or Generative cell

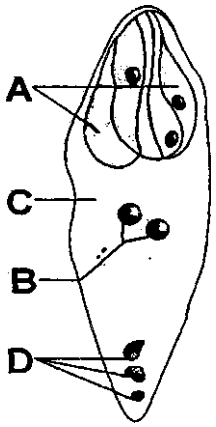
180. The inner wall of pollen grain -
(a) Is thin, continuous and pecto cellulosic and is called intine
(b) Comes out in the form of pollen tube through germpore
(c) Is thick and consists of sporopollenin
(d)aand b

181. The first division in a pollen grain results in formation of - ^ - '
(a) a larger vegetative cell and smaller generative cell
(b) a larger generative cell and smaller vegetative cell
(c) 2 equal cells
(d) 4 male gametes

182. Pollen grain …… has prominent apertures called ……. where sporopollenin is …….
(a) intine, germpore, absent
(b) exine, germpore, absent
(c) exine, germpore, present
(d) exine, foramen ovale, absent

183. Pollen grains of different species show characteristic difference in -
(a) Shapes, size and colours only
(b) Shapes, sizes, colours and ploidy only
(c) Shapes, sizes, colour and design only
(d) Ploidy only

184.



Identify A, B, C and D structures shown in above diagram of female gametophyte -

	A	B	C	D
(a)	Synergid	Polar nuclei	Central cell	Antipodal cells
(b)	Antipodal cells	Polar nuclei	Central cell	Synergids
(c)	Antipodal cells	Polar nuclei	Megaspore mother cell	Synergids
(d)	Filiform	Polar nuclei	Central cell	Arrtipodal cell

185. Which of the following statements is false about filiform apparatus?
(a) The synergids have special cellular thickenings at the micropylar tip called filiform apparatus
(b) It plays an important role in guiding the pollen tubes into the synergid
(c) Both
(d) Pollen tube stimulates the formation of filliform apparatus

186. In an angiosperm, male plant is diploid and the female plant in tetraploid, endosperm will be-
(a) Haploid (b) Triploid (c) Tetraploid (d) Pentaploid