

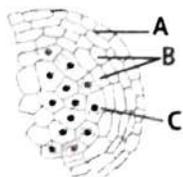
Sexual Reproduction in Flowering Plants

- A dithecous anther consists of (i) microsporangia, (ii) in each lobe.

(i)	(ii)
(a) four,	two
(b) two,	one
(c) two,	two
(d) four,	one.
- Study the following statements regarding the structure of microsporangium and select the correct answer.
 - Microsporangium is generally surrounded by four wall layers – epidermis, endothecium, middle layers and tapetum.
 - Outer three layers perform functions of protection and dehiscence of anthers.
 - Cells of tapetum undergo meiosis and produce microspore tetrads.
 - Only (i) and (ii) are true.
 - Only (ii) and (iii) are true.
 - Only (i) and (iii) are true.
 - All are true.
- Science of cultivation, breeding, marketing and arrangement of flowers is called

(a) arboriculture	(b) floriculture
(c) horticulture	(d) anthology.
- Select the mismatched pair.

(a) Microsporangium	– Pollen sac
(b) Megasporangium	– Ovule
(c) Pollen grain	– Male gamete
(d) Embryo sac	– Female gametophyte.
- The given diagram shows microsporangium of a mature anther. Identify A, B and C.



- A - Middle layer, B- Endothecium, C - Tapetum
 - A - Endothecium, B - Tapetum, C - Middle layer
 - A - Endothecium, B - Middle layer, C - Tapetum
 - A - Tapetum, B - Middle layer, C - Endothecium.
- Refer the given statements.
 - Outer exine is made up of sporopollenin.
 - Inner intine is pecto-cellulosic in nature.
 - Generative cell is bigger and contains abundant food reserve.
 - Vegetative cell is small and floats in the cytoplasm of the generative cell.

Which of the given statements are not true regarding structure of pollen grain?

(a) (i) and (ii)	(b) (ii) and (iii)
(c) (iii) and (iv)	(d) (i) and (iv).
 - Select the mismatched pair.

(a) Storage of pollen grains	– –196°C
(b) Pollen allergy	– Carrot grass
(c) Chasmogamous flowers	– Exposed anthers and stigmas
(d) Xenogamy	– Self pollination.
 - A typical angiospermous ovule is attached to the placenta by means of a stalk called X. Body of the ovule fuses with X in the region called Y. Thus Y represents the junction between ovule and funicle. Identify X and Y.

X	Y
(a) Funicle	Hilum
(b) Hilum	Funicle
(c) Funicle	Micropyle
(d) Hilum	Chalaza.
 - The true embryo develops as a result of fusion of
 - two polar nuclei of embryo sac
 - egg cell and male gamete
 - synergid and male gamete
 - male gamete and antipodals.

10. Select the correct option regarding the ploidy level of different structures of an angiospermous ovule.

Nucellus	MMC	Functional megaspore
(a) n	2n	2n
(b) 2n	n	n
(c) 2n	2n	n
(d) n	2n	n

11. Select the correct statement regarding the structure of a mature embryo sac.

- (i) Egg apparatus is situated towards chalazal end.
 (ii) Antipodal cells are situated towards micropylar end.
 (iii) A typical angiospermous embryo sac is 7-celled, 8-nucleate at maturity.

- (a) (i) only (b) (ii) only
 (c) (iii) only (d) All are correct.

12. Which of the following statements is correct?

- (a) Transfer of pollen grains from the anther to the stigma of the same flower – Autogamy
 (b) Transfer of pollen grains from the anther of one flower to the stigma of another flower of same plant – Geitonogamy
 (c) Transfer of pollen grains from the anther to the stigma of a genetically different plant – Xenogamy
 (d) All of these.

13. Refer the given characteristics of some flowers.

- (i) Light and non-sticky pollen grains.
 (ii) Exserted stigmas and anthers.
 (iii) Large, often feathery stigmas.
 (iv) Flowers colourless, odourless and nectarless.
 (v) Common in grasses.

Above features are the characteristics of

- (a) anemophily (b) hydrophily
 (c) entomophily (d) zoophily.

14. Which of the following is not a water pollinated plant?

- (a) *Zostera* (b) *Vallisneria*
 (c) *Hydrilla* (d) *Cannabis*.

15. This plant flowers once in 12 years. During September - October 2006, its mass flowering transformed large tracks of hilly areas in Kerala, Karnataka and Tamil Nadu into blue stretches and attracted a large number of tourists. This plant is

- (a) *Bambusa tulda* (b) *Strobilanthus kunthiana*
 (c) *Kigelia* (d) *Adansonia*.

16. These plants flower and fruit only once in their life time and die after fruiting.

- (a) Monocarpic plants (b) Polycarpic plants
 (c) Vegetative plants (d) Reproductive plants.

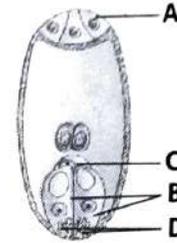
17. Spiny or sticky pollen grains and large attractively coloured flowers are associated with

- (a) hydrophily (b) entomophily
 (c) ornithophily (d) anemophily.

18. In (i) condition, both male and female flowers are borne on same plant; an example of such plants is (ii).

(i)	(ii)
(a) Monoecious	Cucurbit
(b) Monoecious	Papaya
(c) Dioecious	Cucurbit
(d) Dioecious	Papaya.

19. Refer the given figure and identify the parts labelled A, B, C and D.



	A	B	C	D
(a)	Synergids	Antipodals	Egg	Filiform apparatus
(b)	Antipodals	Synergids	Egg	Filiform apparatus
(c)	Antipodals	Synergids	Filiform apparatus	Egg
(d)	Polar nuclei	Antipodals	Filiform apparatus	Egg

20. Refer the given statements.

- (i) Both wind and water pollinated flowers are not very colourful and do not produce nectar.
 (ii) Entomophilous flowers are large, colourful, fragrant and rich in nectar.
 (iii) *Kigelia pinnata* is an insect pollinated flower.

Which of the above statements are incorrect?

- (a) (i) only (b) (ii) only
 (c) (iii) only (d) (i), (ii) and (iii).

21. Flowering plants have developed certain outbreeding devices to discourage self-pollination and to encourage cross-pollination. One of these is not an example of such outbreeding device.

- (a) Dicliny (b) Dichogamy
 (c) Herkogamy (d) Cleistogamy.

22. Male and female flowers are present on different plants (dioecious) to ensure xenogamy, in

- (a) papaya (b) bottle gourd
 (c) maize (d) all of these.

23. _____ cell of the pollen grain divides to form two male gametes.

- (a) Vegetative cell (b) Generative cell
 (c) Microspore mother cell
 (d) None of these.

24. Milk of tender coconut represents (i) and the surrounding white coconut meal represents (ii).

(i)

(ii)

- | | |
|----------------------------|------------------------|
| (a) Cellular endosperm | Free-nuclear endosperm |
| (b) Free-nuclear endosperm | Cellular endosperm |
| (c) Helobial endosperm | Cellular endosperm |
| (d) Free-nuclear endosperm | Helobial endosperm. |

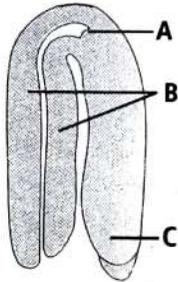
25. Fusion of one of the male gametes with egg nucleus, is referred to as

- (a) generative fertilization
 (b) syngamy
 (c) vegetative fertilization
 (d) both (a) and (b).

26. Double fertilization was first discovered in 1898 by _____ in *Fritillaria* and *Lilium*.

- (a) Nawaschin (b) Strasburger
 (c) Amici (d) Focke.

27. Identify the different parts of a typical dicot embryo labelled as A, B and C and select the correct option.



A

B

C

- | | | |
|----------------|------------|----------|
| (a) Plumule | Cotyledons | Radicle |
| (b) Radicle | Cotyledons | Plumule |
| (c) Cotyledons | Plumule | Radicle |
| (d) Cotyledons | Radicle | Plumule. |

28. Growth of pollen tube towards embryo sac is

- (a) chemotropic (b) thigmotaxis
 (c) geotropic (d) none of these.

29. Endospermic seeds are found in

- (a) castor (b) barley
 (c) coconut (d) all of these.

30. Coleoptile and coleorrhiza are the protective sheaths covering _____ and _____ respectively.

- (a) plumule, epicotyl
 (b) radicle, plumule
 (c) plumule, radicle
 (d) radicle, hypocotyl.

31. Which of the given statements are true?

- (i) During the development of a dicot embryo, heart-shaped embryo is followed by globular embryo.
 (ii) The part of embryonal axis above the level of cotyledons is epicotyl, while the part below the level of cotyledons is hypocotyl.

(iii) Monocot seeds possess a single cotyledon represented by scutellum.

- (a) (i) and (ii) (b) (ii) and (iii)
 (c) (i) and (iii) (d) (i), (ii) and (iii).

32. _____ is not an endospermic seed.

- (a) Pea (b) Castor
 (c) Maize (d) Wheat.

33. Refer the given diagram and identify the parts labelled A, B and C.



A

B

C

- | | | |
|-----------------|-------------|-------------|
| (a) Scutellum | Coleorrhiza | Coleoptile |
| (b) Scutellum | Coleoptile | Coleorrhiza |
| (c) Coleoptile | Scutellum | Coleorrhiza |
| (d) Coleorrhiza | Scutellum | Coleoptile. |

34. What is the function of filiform apparatus at the entrance into ovule?

- (a) Guides pollen tube from synergid to egg
 (b) Helps in the entry of pollen tube into a synergid
 (c) Prevents entry of more than one pollen tube into a synergid
 (d) Brings about opening of the pollen tube.

35. In a fertilized embryo sac, the haploid, diploid and triploid structures are

- (a) synergids, zygote and primary endosperm nucleus
 (b) synergids, antipodals and polar nuclei
 (c) antipodals, synergids and primary endosperm nucleus
 (d) synergids, polar nuclei and zygote.

36. In an embryo sac, the cells that degenerate after fertilization are

- (a) synergids and primary endosperm cell
 (b) synergids and antipodals
 (c) antipodals and primary endosperm cell
 (d) egg and antipodals.

37. While planning for an artificial hybridization programme involving dioecious plants, which of the following steps would not be relevant?

- (a) Bagging of female flower
 (b) Dusting of pollen on stigma
 (c) Emasculation
 (d) Collection of pollen.

38. In the embryos of a typical dicot and a monocot, true homologous structures are
 (a) coleorhiza and coleoptile
 (b) coleoptile and scutellum
 (c) cotyledons and scutellum
 (d) hypocotyl and radicle.

39. The part of gynoecium that determines the compatible nature of pollen is
 (a) stigma (b) style
 (c) ovary (d) synergids.

40. In a case of polyembryony, if an embryo develops from the synergid and another from the nucellus, then the synergid embryo is **(i)** and nucellar embryo is **(ii)**.

- | | |
|-------------|-------------|
| (i) | (ii) |
| (a) Haploid | haploid |
| (b) Diploid | diploid |
| (c) Haploid | diploid |
| (d) Diploid | haploid. |

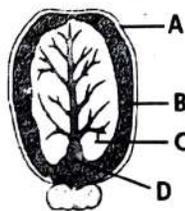
41. The three cells found in a pollen grain when it is shed at 3-celled stage are
 (a) 1 vegetative cell, 1 generative cell, 1 male gamete
 (b) 1 vegetative cell, 2 male gametes
 (c) 1 generative cell, 2 male gametes
 (d) either (a) or (b).

42. Given below are the events that are observed in an artificial hybridization programme. Arrange them in the correct sequential order.

(1) re-bagging; (2) selection of parents; (3) bagging;
 (4) dusting the pollen on stigma; (5) emasculation; (6)
 collection of pollen from male parent

- (a) 2 → 3 → 5 → 6 → 4 → 1
 (b) 2 → 5 → 3 → 6 → 4 → 1
 (c) 5 → 2 → 3 → 6 → 1 → 4
 (d) 2 → 3 → 6 → 4 → 5 → 1.

43. Refer the given figure and identify the parts labelled as A, B, C and D.



- | A | B | C | D |
|---------------|-----------|-----------|-----------|
| (a) Seed coat | Scutellum | Epicotyl | Hypocotyl |
| (b) Seed coat | Scutellum | Hypocotyl | Epicotyl |
| (c) Seed coat | Cotyledon | Endosperm | Hypocotyl |
| (d) Seed coat | Endosperm | Cotyledon | Hypocotyl |

44. Persistent nucellus is called as _____ and is found in _____.
 (a) perisperm, black pepper
 (b) perisperm, ground nut

- (c) endosperm, black pepper
 (d) endosperm, groundnut.

45. Select the correct statement regarding parthenocarpy.
 (a) Formation of fruits without fertilization.
 (b) Development of seedless fruits as in banana, grapes, navel orange, etc.
 (c) Auxins and gibberellins are used to induce parthenocarpy in different plants.
 (d) All of these.

46. In albuminous seeds, food is stored in _____ and in non-albuminous seeds, it is stored in _____.

- (a) endosperm, cotyledons
 (b) cotyledons, endosperm
 (c) nucellus, cotyledons
 (d) endosperm, radicle.

47. The anther wall consists of four wall layers where
 (a) tapetum lies just inner to endothecium
 (b) middle layers lie between endothecium and tapetum
 (c) endothecium lies inner to middle layers
 (d) tapetum lies next to epidermis.

48. How many pollen mother cells should undergo meiotic division to produce 64 pollen grains?
 (a) 64 (b) 32 (c) 16 (d) 8.

49. In a fully developed male gametophyte the number of nuclei is
 (a) one (b) two (c) three (d) four.

50. Endosperm is completely consumed by the developing embryo in
 (a) pea and groundnut
 (b) maize and castor
 (c) castor and groundnut
 (d) maize and pea.

51. The innermost layer of anther is tapetum whose function is
 (a) dehiscence (b) mechanical
 (c) nutrition (d) protection.

52. Read the given statements.

Assertion (A): Insects visit flowers to gather honey.

Reason (R): Attraction to flowers prevents the insects from damaging other parts of the plant.

- (a) Both **A** and **R** are true and **R** is the correct explanation of **A**
 (b) Both **A** and **R** are true and **R** is not the correct explanation of **A**
 (c) **A** is true but **R** is false
 (d) Both **A** and **R** are false.

53. Mature ovules are classified on the basis of funiculus. If micropyle comes to lie close to the funiculus the ovule is termed as
 (a) orthotropous (b) anatropous
 (c) hemitropous (d) campylotropous.

54. When micropyle, chalaza and hilum lie in a straight line, the ovule is said to be
 (a) anatropous (b) orthotropous
 (c) amphitropous (d) campylotropous.
55. If an endosperm cell of an angiosperm contains 24 chromosomes, the number of chromosomes in each cell of the root will be
 (a) 8 (b) 4
 (c) 16 (d) 24.
56. The female gametophyte of a typical dicot at the time of fertilization is
 (a) 8-celled (b) 7-celled
 (c) 6-celled (d) 5-celled.
57. Polyembryony commonly occurs in
 (a) banana (b) tomato
 (c) potato (d) citrus.
58. Match column-I with column-II and select the correct option from the codes given below.

Column-I

Column-II

- | | |
|-------------------------|----------------------------|
| (A) Tallest flower | (i) Maize |
| (B) <i>Pronuba</i> moth | (ii) <i>Amorphophallus</i> |
| (C) Anemophily | (iii) <i>Salvia</i> |
| (D) Entomophily | (iv) <i>Yucca</i> |
- (a) (A) - (ii), (B) - (iv), (C) - (i), D - (iii)
 (b) (A) - (ii), (B) - (iv), (C) - (iii), D - (i)
 (c) (A) - (iii), (B) - (ii), (C) - (i), D - (iv)
 (d) (A) - (iv), (B) - (iii), (C) - (ii), D - (i)

59. Polygonum type of embryo sac is
 (a) 8-nucleate, 7-celled
 (b) 8-nucleate, 8-celled
 (c) 7-nucleate, 7-celled
 (d) 4-nucleate, 3 celled.
60. Triple fusion in *Capsella bursa pastoris* is fusion of male gamete with
 (a) egg (b) synergid
 (c) secondary nucleus (d) antipodal.
61. An embryo may sometimes develop from any cell of embryo sac other than egg. It is termed as
 (a) apospory (b) apogamy
 (c) parthenogenesis (d) parthenocarpy.
62. In angiosperms, normally after fertilization
 (a) the zygote divides earlier than the primary endosperm nucleus
 (b) the primary endosperm nucleus divides earlier than the zygote
 (c) both the zygote and primary endosperm nuclei divide simultaneously
 (d) both the zygote and primary endosperm nuclei undergo a resting period.

63. Match the two columns and select the correct answer.

Column - I

Column - II

- | | |
|------------------|-----------------------|
| A. Monoecious | (i) <i>Primula</i> |
| B. Dioecious | (ii) Maize |
| C. Cleistogamous | (iii) Date palm |
| D. Heterostyly | (iv) <i>Commelina</i> |

A

B

C

D

- | | | | |
|-----------|-------|-------|------|
| (a) (iii) | (ii) | (iv) | (i) |
| (b) (ii) | (iii) | (iv) | (i) |
| (c) (ii) | (iii) | (i) | (iv) |
| (d) (i) | (ii) | (iii) | (iv) |

64. Select the incorrect pair of type of pollination and the corresponding pollinating agency.
 (a) Anemophily – Wind
 (b) Hydrophily – Water
 (c) Ornithophily – Birds
 (d) Chiropterophily – Insects.
65. One of the most resistant biological material present in the exine of pollen grain is
 (a) pectocellulose (b) sporopollenin
 (c) suberin (d) cellulose.
66. Match column-I with column-II and select the correct option from the codes given below.

Column-I

Column-II

- | | |
|-----------------|--|
| A. Anemophily | (i) Grasses, Date palm |
| B. Hydrophily | (ii) Rose, Jasmine |
| C. Entomophily | (iii) <i>Butea</i> , <i>Bignonia</i> |
| D. Ornithophily | (iv) <i>Vallisneria</i> , <i>Ceratophyllum</i> |
- (a) A - (i), B - (iv), C - (ii), D - (iii)
 (b) A - (i), B - (iv), C - (iii), D - (ii)
 (c) A - (ii), B - (iii), C - (i), D - (iv)
 (d) A - (ii), B - (i), C - (iii), D - (iv).

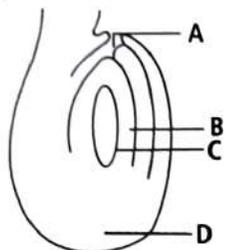
67. Feathery stigma occurs in
 (a) pea (b) wheat
 (c) *Datura* (d) *Caesalpinia*.
68. Match column - I with column - II and select the correct option from the codes given below.

Column - I

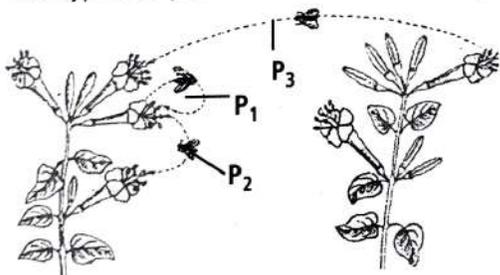
Column - II

- | | |
|---------------|--|
| A. Funicle | (i) Mass of parenchymatous cells |
| B. Hilum | (ii) Basal part of ovule |
| C. Integument | (iii) One or two 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 - (iii), D - (ii), E - (i)
 (c) A - (iv), B - (ii), C - (i), D - (iii), E - (v)
 (d) A - (i), B - (iii), C - (v), D - (ii), E - (iv).

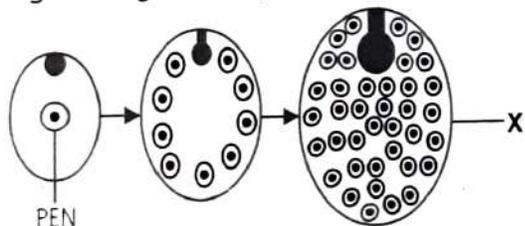
69. Fragrant flowers with well developed nectaries are an adaptation for
 (a) hydrophily (b) anemophily
 (c) entomophily (d) malacophily.
70. What is the function of germ pore?
 (a) Emergence of radicle
 (b) Absorption of water for seed germination
 (c) Initiation of pollen tube
 (d) Release of male gametes.
71. Refer the given figure and select the correct option.



- | A | B | C | D |
|---------------|--------------------|------------|-----------|
| (a) Chalaza | Female gametophyte | Embryo sac | Micropyle |
| (b) Chalaza | Nucellus | Embryo sac | Micropyle |
| (c) Micropyle | Egg | Embryo sac | Chalaza |
| (d) Micropyle | Nucellus | Embryo sac | Chalaza. |
72. The given diagram shows two plants of the same species. Identify the types of pollination indicated at P₁, P₂ and P₃.



- | P ₁ | P ₂ | P ₃ |
|-----------------|----------------|----------------|
| (a) Allogamy | Chasmogamy | Cleistogamy |
| (b) Autogamy | Xenogamy | Geitonogamy |
| (c) Autogamy | Geitonogamy | Xenogamy |
| (d) Geitonogamy | Allogamy | Autogamy. |
73. The cells of endosperm have 24 chromosomes. What will be the number of chromosomes in the gametes?
 (a) 8 (b) 16 (c) 23 (d) 32.
74. In the given diagram, X represents



- | | |
|------------------------|-------------------------|
| (a) cellular endosperm | (b) nuclear endosperm |
| (c) helobial endosperm | (d) ruminant endosperm. |

75. Father of Indian embryology is
 (a) P. Maheshwari (b) Swaminathan
 (c) R. Misra (d) Butler.
76. Match column - I with column - II and select the correct answer.

Column - I	Column - II
A. Ovary	(i) Groundnut, mustard
B. Ovule	(ii) Guava, orange, mango
C. Wall of ovary	(iii) Pericarp
D. Fleshy fruits	(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)	(iii)	(ii)	(iv)	(v)
(d)	(v)	(iv)	(i)	(ii)	(iii).

77. How many meiotic divisions are required for the formation of 100 pollen grains?
 (a) 100 (b) 50 (c) 25 (d) 26.
78. How many meiotic divisions are required for the formation of 100 functional megaspores?
 (a) 100 (b) 50 (c) 25 (d) 26.
79. Plant with ovaries having only one or a few ovules, are generally pollinated by
 (a) bees (b) butterflies
 (c) birds (d) wind.
80. This is an example of a very old viable seed excavated from Arctic Tundra. The seed germinated and flowered after an estimated record of 10,000 years of dormancy.
 (a) Victoria
 (b) *Lupinus arcticus*
 (c) *Phoenix dactylifera*
 (d) *Strobilanthes kunthiana*.
81. Even in absence of pollinating agents seed-setting is assured in
 (a) *Commelina* (b) *Zostera*
 (c) *Salvia* (d) fig
82. During the process of fertilization the pollen tube of the pollen grain usually enters the embryo sac through
 (a) integument (b) nucellus
 (c) chalaza (d) micropyle.
83. The filiform apparatus is present in
 (a) synergids (b) egg cell
 (c) antipodals (d) secondary nucleus.
84. Several pollen grains form a unit designated as pollinium in family
 (a) asteraceae (b) cucurbitaceae
 (c) asclepiadaceae (d) brassicaceae.

85. In angiosperms various stages of reductional division can best be studied in
 (a) young anthers (b) mature anthers
 (c) young ovules (d) endosperm cells.
86. All seed-bearing plants *i.e.*, gymnosperms and angiosperms exhibit a life cycle which is
 (a) haplontic (b) diplontic
 (c) haplodiplontic (d) diplohaplontic.
87. Modified shoot with highly condensed internodes is
 (a) leaf (b) flower
 (c) microsporophyll (d) megasporophyll.
88. Anther is generally
 (a) monosporangiate (b) bisporangiate
 (c) tetrasporangiate (d) trisporangiate.
89. Callase enzyme which dissolves callose of pollen tetrads to separate four pollens is provided by
 (a) pollens (b) tapetum
 (c) middle layers (d) endothecium.
90. Study of pollen grains is called
 (a) micrology (b) anthology
 (c) palynology (d) pomology.
91. Embryo sac is present embedded in nucellus at which end of ovule?
 (a) Micropylar end (b) Chalazal end
 (c) In the centre (d) None of these.
92. Pollen grain is a
 (a) megaspore (b) microspore
 (c) microsporophyll (d) microsporangium.
93. The stamens represent
 (a) microsporangia (b) male gametophyte
 (c) male gametes (d) microsporophylls.
94. Pollen kitt is generally found in
 (a) anemophilous flowers
 (b) entomophilous flowers
 (c) ornithophilous flowers
 (d) malacophilous flowers.
95. Which function of tapetum is correct?
 (a) Helps in pollen wall formation
 (b) Transportation of nutrients to inner side of anther
 (c) Synthesis of callase enzyme for separation microspore tetrads
 (d) All of the above.
96. Megasporangium along with its protective integuments is called
 (a) ovary (b) ovule
 (c) funicle (d) chalaza.
97. Both chasmogamous and cleistogamous flowers are present in
 (a) *Helianthus* (b) *Commelina*
 (c) *Rosa* (d) *Gossypium*.
98. Heterostyly as a contrivance for cross-pollination is found in
 (a) *Pennisetum* (b) *Impatiens*
 (c) *Primula vulgaris* (d) *Oenothera*.
99. The portion of embryonal axis between plumule (future shoot) and cotyledons is called
 (a) hypocotyl (b) epicotyl
 (c) coleorrhiza (d) coleoptile.
100. Part of the gynoecium which receives the pollen is called
 (a) style (b) stigma
 (c) ovule (d) ovary.