

Unit 1

SEED BIOLOGY

1.1. FLORAL BIOLOGY

1.1.1. Choose the correct answer

1. **Tassel is the staminate inflorescence of**
(a) Maize (b) Paddy
(c) Cotton (d) Sunflower
2. **The mode of pollination in maize is**
(a) Cross pollination (b) Self pollination
(c) Cleistogamy (d) Chasmogamy
3. **The male inflorescence of maize is**
(a) Tassel (b) Silk
(c) Cyme (d) Racemose
4. **Pollination of maize is by**
(a) Insect (b) Wind
(c) Water (d) Machine
5. **Cross pollination in radish is favoured by**
(a) Insects (b) Wind
(c) Water (d) Beetles
6. **Inflorescence in carrot flower is called as**
(a) Protectants (b) Compound umbel
(c) Protogynous (d) Raceme
7. **Pollination in cauliflower is done by**
(a) Wind (b) Honeybee
(c) Insect (d) Water
8. **Harvestable maturity stage for bhendi is**
(a) Yellow colour (b) Hair line crack formation
(c) Dried pod (d) Matured pod
9. **Example for dioecious fruit crop**
(a) Papaya (b) Jack
(c) Mango (d) Sapota
10. **Pollination in tea is effected by**
(a) Insects (b) Water
(c) Wind (d) Animals

11. The only cone bearing angiosperm is
 - (a) *Casuarina equisetifolia*
 - (b) *Pinus elliotii*
 - (c) *Pinus roxburghii*
 - (d) *Santalum album*
12. The monoecious plant normally having unisexual flowers
 - (a) Blackgram
 - (b) Groundnut
 - (c) Maize
 - (d) Paddy
13. Example for self pollination
 - (a) Tomato
 - (b) Brinjal
 - (c) Chilli
 - (d) Cucurbits
14. The crop with longest style is
 - (a) Sunflower
 - (b) Maize
 - (c) Cumbu
 - (d) Wheat
15. Self incompatible crop is
 - (a) Carrot
 - (b) Onion
 - (c) Cabbage
 - (d) Spinach
16. Heterostyly favours
 - (a) High seed yield
 - (b) Genetically pure seed
 - (c) Self pollination
 - (d) Cross pollination
17. Maturity of stamens and pistils at different time is called as
 - (a) Cleistogamy
 - (b) Dichogamy
 - (c) Dioecy
 - (d) Dicliny
18. Flower colour is a
 - (a) Truly qualitative characteristic
 - (b) Pseudo qualitative characteristic
 - (c) Standard characteristic
 - (d) Special characteristic
19. Hollow style is common in
 - (a) Maize
 - (b) Cotton
 - (c) Groundnut
 - (d) Blackgram
20. Flowering of inflorescence from bottom to top
 - (a) Acropetal
 - (b) Basipetal
 - (c) Centripetal
 - (d) Peripetal
21. King of coarse grain is
 - (a) Cumbu
 - (b) Jowar
 - (c) Ragi
 - (d) Maize
22. Prevention of self pollination by flower structure is
 - (a) Autogamy
 - (b) Allogamy
 - (c) Herkogamy
 - (d) Dichogamy
23. Rain favours pollination in
 - (a) Cardamom
 - (b) Cinnamum
 - (c) Pepper
 - (d) Nutmeg
24. If the flower is having all the floral parts, the flower is called as
 - (a) Incomplete flower
 - (b) Complete flower
 - (c) Imperfect flower
 - (d) Pistillate flower

25. If the flower is having only male and female organs, the flower is called as
(a) Incomplete flower (b) Imperfect flower
(c) Perfect flower (d) Pistillate flower
26. If the flower has gynoecium only that flower is named as
(a) Pistillate (b) Staminate
(c) Pistillode (d) Staminode
27. If the flower has androecium only that flower is named as
(a) Pistillate (b) Staminate
(c) Pistillode (d) Staminode
28. If the flower has rudimentary stamen that flower is named as
(a) Pistillate (b) Staminate
(c) Pistillode (d) Staminode
29. Self pollination is otherwise called as
(a) Allogamy (b) Homogamy
(c) Autogamy (d) Chasmogamy
30. The cross pollination is otherwise called as
(a) Allogamy (b) Homogamy
(c) Autogamy (d) Chasmogamy
31. The flowers do not open and self pollination is the rule
(a) Allogamy (b) Homogamy
(c) Autogamy (d) Cleistogamy
32. The insect pollination mechanism is called as
(a) Anemophily (b) Hydrophily
(c) Entomophily (d) Ornithophily
33. The water pollination mechanism is called as
(a) Anemophily (b) Hydrophily
(c) Entomophily (d) Ornithophily
34. The wind pollination mechanism is called as
(a) Anemophily (b) Hydrophily
(c) Entomophily (d) Ornithophily
35. The differential maturation of male and female flowers is known as
(a) Portandry (b) Protogyny
(c) Dichogamy (d) Dicliny
36. The pollination by birds is usually named as
(a) Chrotophily (b) Ornithophily
(c) Pscophily (d) Palenophily
37. The pollination by bats is usually known as
(a) Chrotophily (b) Ornithophily
(c) Pscophily (d) Palenophily

38. The pollination by beetle is called as
(a) Canthophily (b) Symphysophily
(c) Waspophily (d) Mycophily
39. The pollination by sawfly is called as
(a) Canthophily (b) Symphysophily
(c) Waspophily (d) Mycophily
40. Site of double fertilization is
(a) Embryo sac (b) Micropyle
(c) Ovary (d) Ovule
41. The pollination by flies is named as
(a) Myophily (b) Psycophily
(c) Palenophily (d) Ornithophily
42. The pollination by butterflies is called as
(a) Myophily (b) Psycophily
(c) Palenophily (d) Ornithophily
43. The pollination by moths is called as
(a) Myophily (b) Psycophily
(c) Palenophily (d) Ornithophily
44. Perisperm is
(a) Haploid (b) Diploid
(c) Tetraploid (d) Hexaploid
45. The transfer of pollen to stigma of different flowers of same plant is called as
(a) Chasmogamy (b) Cleistogamy
(c) Geitenogamy (d) Xenogamy
46. The transfer of pollen to stigma of flowers of two different plant is known as
(a) Chasmogamy (b) Cleistogamy
(c) Geitenogamy (d) Xenogamy
47. If the male and female organs present in the same flower, the flower is called as
(a) Hermaphrodite (b) Unisexual
(c) Andromonoecious (d) Gynomonoecious
48. If the male and female organ is present separately in two different flowers, the flower is named
(a) Hermaphrodite (b) Unisexual
(c) Andromonoecious (d) Gynomonoecious
49. The plant that possess any one of the following flower type is called as andromonoecious
(a) ♀ (b) ♂
(c) ♂ + ♂ (d) ♂ + ♀

50. The plant that possess any one of the following flower type is called as gynomonoecious
(a) ♂ + ♂ (b) ♂
(c) ♀ (d) ♀ + ♀
51. The period of dehiscence of anthers and pollen distribution is called as
(a) Flowering (b) Pollination
(c) Fertilization (d) Anthesis
52. Occurrence of pollination and fertilization in an unopened flower bud and 100% self fertilization will occur which is called as
(a) Chasmogamy (b) Cheiroptherophily
(c) Anemophily (d) Cleistogamy
53. Maturation of male and female reproductive organs of a hermaphrodite flower at different time is called as
(a) Dichogamy (b) Plasmogamy
(c) Cleistogamy (d) Herchogamy
54. The union of male and female gametes in sexual reproduction is known as
(a) Fertilization (b) Pollination
(c) Infertility (d) Incompatibility
55. The outer bract of the flowers of grasses sometimes referred to as flowering glume is called as
(a) Lemma (b) Glume
(c) Palea (d) Anther
56. The study of pollen is termed as
(a) Cartilnology (b) Palentology
(c) Ornithology (d) Palenology
57. The inflorescence of wheat is called as
(a) Racemose (b) Sporodix
(c) Spike (d) Cyme
58. The individual flower stalk in an inflorescence is known as
(a) Spikelet (b) Pedicel
(c) Auricle (d) Pellicle
59. The main axis of an inflorescence or, in the case of single flowers, the flower or fruit stalk is known as
(a) Peduncle (b) Spikelet
(c) Auricle (d) Pellicle
60. Collective term for the outer part of flower comprising calyx and corolla is known as
(a) Spike (b) Perianth
(c) Auricle (d) Spikelet

61. Study of the relations between seasonal climatic changes (e.g. temperature, day length and precipitation) and periodic biological phenomena such as flowering, fruiting, and dormancy is known as
(a) Chronology (b) Genology
(c) Physiology (d) Phenology
62. Region in the ovary where the ovules originate and are attached to the carpel is known as
(a) Placenta (b) Ligule
(c) Planta (d) Auricle
63. Many seeded fruit derived from a compound pistil embedded in a fleshy hypanthium or floral tube of epigynous flowers is known as
(a) Pod (b) Caryopsis
(c) Capsule (d) Pome
64. A spiral arrangement of modified leaves bearing the reproductive organs in conifers and certain other plants, functionally equivalent to angiosperm flowers is called as
(a) Achene (b) Strobilus
(c) Pome (d) Caryopsis
65. The stalk of the pistil between stigma and ovary is called as
(a) Style (b) Peduncle
(c) Ligule (d) Auricle
66. A centrifugal inflorescence on which the secondary or lateral branches continue to grow and extend beyond the main axis is called as
(a) Bolt (b) Curd
(c) Cyme (d) Caryopsis
67. The inflorescence of *Allium cepa* is
(a) Umbel (b) Corymb
(c) Spadix (d) Spike
68. Zygomorphic symmetry or bilateral symmetry is common in flowers of the family
(a) Solanaceae (b) Malvaceae
(c) Papilionaceae (d) Apocyanaceae
69. The components of perianth are called as
(a) Petals (b) Sepals
(c) Tepals (d) Stamens
70. Unbranched inflorescence with elongated axis with sessile florets is known as
(a) Raceme (b) Cyme
(c) Corymb (d) Spike
71. Characteristics of inflorescence in Asteraceae family is
(a) Capitulum (b) Catkin
(c) Spadix (d) Fascicle

- 72. Temperature plays a major role in sex expression in**
(a) Castor (b) Cotton
(c) Cabbage (d) Cauliflower
- 73. In bajra, heavy wind causes**
(a) Floral abortion (b) Tip sterility
(c) Abortive seeds (d) Under developed embryo
- 74. Anemophily indicates**
(a) Pollination of water (b) Pollination by wind
(c) Pollination by insects (d) Pollination by birds
- 75. Inability of flowering plant to produce functional pollen is**
(a) Male sterility (b) Self incompatibility
(c) Mutation (d) Inbreeding depression
- 76. Pin type flowers of Primula have**
(a) Long style and short stamen (b) Short style and long stamen
(c) Long style and long stamen (d) Short style and short stamen
- 77. Barnase Barstar model is in**
(a) Genetic male sterility (b) CGMS
(c) CMS (d) Transgenic male sterility
- 78. Self incompatibility is very much utilized for**
(a) Production of hybrids (b) Production of varieties
(c) Production of composites (d) Production of synthetics
- 79. The pollination behaviour of coconut is**
(a) Self pollination (b) Cross pollination
(c) Often cross pollination (d) Self and cross pollination
- 80. Vegetative apomixis can also be known as**
(a) Non recurrent apomixis (b) Agamospermy
(c) Agamogony (d) Pseudogamy
- 81. Epigynous flowers are more common in the members of**
(a) Leguminosae (b) Poaceae
(c) Asteraceae (d) Umbelliferae
- 82. Tapetum is present in**
(a) Placenta (b) Carpel
(c) Locule (d) Anther
- 83. The flowers are protandry in**
(a) Pearl millet (b) Sunflower
(c) Maize (d) Castor
- 84. Flowering behaviour of castor is**
(a) Monoecious (b) Dioecious
(c) Andromonoecious (d) Gynomonoecious

85. Pistil, stamen and petals are the common structural components of
(a) Flower (b) Inflorescence
(c) Apical bud (d) Vegetative bud
86. In which family, the flower is anomaly of very small fruits
(a) Compositae (b) Umbelliferae
(c) Graminae (d) Liliaceae
87. A single flower of gymnosperm is known as
(a) Strobilus (b) Strobili
(c) Microspore (d) Megaspore
88. Gymnosperms do not have botanical flower, but have the following for regeneration
(a) Male and female strobili (b) Cones
(c) Megaspore (d) Microspore
89. Angiosperm flowers containing both stamens and pistil are known as
(a) Perfect (b) Simple
(c) Solitary (d) Raceme
90. The flower with stamen, pistil, sepals and petals are known as
(a) Complete (b) Monoecious
(c) Hermaphrodite (d) Cyme
91. In angiosperm, flowers in which male sex organ mature first is known as
(a) Protandry (b) Protogynous
(c) Perfect (d) Monoclinous
92. In angiosperms, the functions which are to minimize the chances of self fertilization is known as
(a) Dichogamy (b) Monogamy
(c) Dioecious (d) Cross pollination
93. Both male and female reproductive organs occur on the same individual plant, but separate from each other, the plant is known as
(a) Monoecious (b) Imperfect
(c) Dioecious (d) Dicot
94. In gymnosperm, flowering denotes
(a) Period of pollen shedding and receptivity of the female organ
(b) Fusing of megaspore to microspore
(c) Opening of cones
(d) Formation of fruiting bodies
95. The largest species (30,00,000) and genera (1,21,000) of plant kingdom are grouped under
(a) Angiosperm (b) Gymnosperm
(c) Dicot (d) Monocot

96. Monocot and dicot are the sub divisions of
 (a) Angiosperm (b) Gymnosperm
 (c) Orthodox species (d) Recalcitrant species
97. Most of the woody plants are grouped as
 (a) Dicot (b) Monocot
 (c) Gymnosperm (d) Angiosperm
98. The pollen enclosed within the anther is released at maturity through pores in
 (a) Ericaceae (b) Lauraceae
 (c) Fagaceae (d) Fabaceae
99. In *Erythrina*, cross pollination occurs through
 (a) Birds/Honey eaters (b) Insects
 (c) Wind (d) Water
100. The transfer of pollen to stigma of different flowers of same plant is called as
 (a) Chasmogamy (b) Cleistogamy
 (c) Geitonogamy (d) Xenogamy
101. The transfer of pollen to stigma of different flowers of two different plant is known as
 (a) Chasmogamy (b) Cleistogamy
 (c) Geitonogamy (d) Xenogamy
102. The pollen is produced in
 (a) Ovule (b) Anther
 (c) Stigma (d) Style
103. Naked ovules are found in which one of the following group?
 (a) Angiosperm (b) Microsperm
 (c) Gymnosperm (d) Macrosperm
104. Which solution is used for testing the pollen viability?
 (a) 2% potassium permanganate (b) 2% acetic acid
 (c) 2% aceto-carmin (d) 2% naphthalene acetic acid

◆ Answer Keys ◆

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	a	2	a	3	a	4	b	5	a	6	b
7	b	8	b	9	a	10	a	11	a	12	c
13	a	14	b	15	c	16	d	17	b	18	a
19	a	20	a	21	b	22	c	23	c	24	b
25	c	26	a	27	b	28	d	29	c	30	a
31	d	32	c	33	b	34	a	35	c	36	b
37	a	38	a	39	b	40	a	41	a	42	b
43	c	44	b	45	c	46	d	47	a	48	b
49	d	50	d	51	d	52	d	53	a	54	a
55	a	56	d	57	c	58	b	59	a	60	b

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
61	d	62	a	63	d	64	b	65	a	66	c
67	a	68	c	69	c	70	d	71	a	72	a
73	b	74	b	75	a	76	a	77	d	78	a
79	b	80	b	81	c	82	d	83	c	84	a
85	a	86	a	87	a	88	a	89	a	90	a
91	a	92	a	93	a	94	a	95	a	96	a
97	a	98	a	99	a	100	c	101	d	102	b
103	c	104	c								

1.1.2. Fill in the blanks

- Flower pistil mature before stamen is called as
- is an example for protandry
- is an example for protogyny
- Naked ovules are found in
- Sexual reproduction involves fusion of gametes
- Pollination refers to the transfer of pollen grains from anthers to
- Inflorescence of carrot is
- High temperature at flowering affect the of pollen grains
- is a dioecious plant
- Dispersal of seeds by ant is known as
- Self incompatibility in crops can be broken by
- Triple waxy bloom is noticed in crop
- Heterostyly is common in
- Androecium in sunflower is
- Sorghum is an crop
- Mechanism that aid cross pollination in bajra is
- Mechanism that aid cross pollination in maize is
- Cowpea is pollinated crop
- Fruit of cruciferous family is called as
- Cross pollination is called as
- Self pollination is named as
- Style of the flower fertilized by the stamen of another flower of same plant is known as
- Complete self pollination is called as
- Presence of pistillate and staminate flowers in same flower is
- Pistil matures first is
- Anther matures first is
- Flowers with different styles are called as

28. Long style and short stamen flower is
29. Short style and long stamen flower is
30. Maize is a pollinated crop
31. reproductive part of a plant
32. Lack of any one of the reproductive parts is called as
33. In flowers, gynoecium is present
34. In flowers, androecium is present
35. Pistil rudimentary is called
36. Stamen rudimentary is called as
37. True to type will be maintained by pollinated crops
38. Synchronised maturation of ♂ & ♀ in the same flower is called as
39. Self pollination is a rule in
40. Cross pollination is effected by external agents like
41. Cross pollination is effected by biotic agents like
42. An example for anemophilous pollination is
43. An example for hydrophilous pollination is
44. Union of male and female gametes in sexual reproduction is called as
45. Site of double fertilization
46. An example for trimonoecious (♂, ♂, ♀) is
47. An example for gynomonoecious is
48. An example for andromonoecious is
49. Carrot is a pollinated crop
50. is known as angiosperms
51. Heterostyly is the common feature of crop
52. A special kind of spike covered by spathe is called
53. Pollen is produced in the
54. Stamens are the specialized
55. Pollen grain germination occurs in
56. Sperms made their way to ovule through
57. Pollination by wind is called
58. Pollination after flower opening is called
59. An example for often cross pollination is

◆ Answer Keys ◆

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	Protogyny	2	Maize	3	Bajra
4	Gymnosperm	5	Female and Male	6	Stigma
7	Umbel	8	Fertility	9	Papaya

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
10	Myrmecochory	11	Supplementary pollination	12	Castor
13	Brinjal	14	Syngeneic	15	Often Cross Pollinated
16	Protogyny	17	Protandry	18	Self
19	Siliqua	20	Allogamy	21	Autogamy
22	Geitonogamy	23	Cleistogamy	24	Monoecious
25	Protogyny	26	Protandry	27	Heterostyly
28	Pin flower	29	Thrum flower	30	Cross
31	Flower	32	Incomplete flower	33	Pistillate
34	Staminate	35	Pistillode	36	Staminode
37	Self	38	Homogamy	39	Bengalgram/Horsegram
40	Wind/Insect	41	Insect/Animal	42	Bajra
43	Water hyacinth	44	Fertilization	45	Embryo sac
46	Castor/banana	47	Ailanthus	48	Sorghum/Sunflower
49	Cross	50	Flowering plant	51	Brinjal
52	Spadix	53	Anther	54	Microsporophyte
55	Stigma	56	Pollen tube	57	Anemophily
58	Chasmogamy(or) Allogamy	59	Redgram/Cotton		

1.1.3. State True or False

- Flowers of bhendi varies based on style length
- When receptivity of stigma precedes the dehiscence of anther in a bisexual flower, the condition is termed protandry
- Genetic contamination is common in self-pollinated crops
- Bajra is a protogynous plant
- Bajra is typically a protandry
- Maize is a monoecious plant
- Chilli is an often cross pollinated crop
- Natural crossing is a serious problem in self pollinated crops when it is a male sterile line
- Heterostyly character is common in brinjal
- Heterostyly favours cross pollination in bhendi
- Pigeon pea is an often cross pollinated crop
- Heterostyly in brinjal aids cross pollination
- Sunflower is pollinated by insects
- The reproductive structure of angiosperms is flowers
- Gynoecium is the male reproductive part in the flowers
- The arrangement of floral parts like petals and sepals on the thalamus is called placentation

17. Maize is a typical example for monoecious type of plant
18. The cucurbits have hypogynous flowers with superior ovary
19. Dichogamy nature in flower favours the cross pollination
20. Effect of foreign pollen on seed coat of maize seed is called as meta xenia
21. Flowers with differential length of the style and stigma is called herkogamy
22. A special kind of spike covered by a spathe is called spadix
23. Heterostyly is more common in tomato crop
24. Peduncle is the main axis of flower
25. Radicle is a individual flower stalk in a inflorescence
26. Receptacle is found at the tip of floral structures
27. Sepals are the small outgrowth above the petal
28. Stamen is the male organ of a plant
29. Pistil is the male organ of a plant
30. Calyx is the union of petals
31. Corolla is otherwise called as calyx
32. Calyx and corolla together makes the perianth
33. Androecium is the female part of flower
34. Gynoecium is the female part of the flower
35. Autogamy is the fertilization of ovule by the pollen of the same flower
36. In cleistogamy, the flower do not open at all
37. Maize is an often cross pollinated crop
38. Sorghum is a self pollinated crop
39. Megaspore mother cell undergoes a meiotic division to form four megaspores
40. Three cells present at chalazal end are called as antipodal cells
41. Exine is thin and composed of pseudo cellulose
42. Fusion of one male gamete with egg cell is called as syngamy
43. Fusion of 2nd male gamete with two egg cells of central part of female gametophyte to form PEN (3N) (primary endosperm nucleus)
44. Nuclear divisions unaccompanied by cell wall formation is called as nuclear endosperm development
45. Pistil is otherwise called as androecium

◆ Answer Keys ◆

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	False	2	False	3	False	4	True	5	False	6	True
7	True	8	True	9	True	10	False	11	True	12	True
13	True	14	True	15	False	16	False	17	True	18	False
19	True	20	True	21	False	22	True	23	False	24	True

25	False	26	False	27	False	28	True	29	False	30	False
31	False	32	True	33	False	34	True	35	True	36	True
37	False	38	False	39	False	40	True	41	False	42	True
43	False	44	True	45	False						

1.2. SEED DEVELOPMENT AND MATURATION

1.2.1. Choose the correct answer

- Maturation of ovule leads to formation of
 - Fruit
 - Embryo
 - Endosperm
 - Seed
- Methods of endosperm development are
 - 2
 - 3
 - 4
 - 1
- The last phase of seed development is
 - Fertilization
 - Dehydration
 - Desiccation
 - Pollination
- Carbohydrates are transported from through the sieve tubes of the phloem
 - Source only
 - Sink only
 - Source to sink
 - Sink to source
- The fully developed leaf export percentage of its assimilate to sink is
 - 50-60
 - 40-50
 - 80-100
 - 60-80
- In leaf to root translocation, water recycles from sink to source through
 - Xylem
 - Phloem
 - Osmosis
 - Plasmolysis
- Reactions found during photosynthesis is
 - $6\text{CO}_2 + \text{H}_2\text{O} + \text{Sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
 - $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
 - $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
 - $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 8\text{O}_2$
- In photosynthesis, the energy released by the protein when they diffuse across the thylakoid membrane into the stroma is used to produce
 - NADH_2
 - ATP
 - Photolysis
 - CO_2 fixation
- How many turns of Calvin cycle are taken to produce one hexose molecule
 - 1
 - 3
 - 6
 - 12