DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB24

SYLLABUS : Sexual Reproduction in Flowering Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Entry of pollen tube through micropyle is
(a) Chalazogamy (b) Mesogamy
(c) Porogamy (d) Pseudogamy

2. Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is
(a) Caryopsis (b) Cypsela
(c) Berry (d) Cremocarp

3. One of the most resistant biological material is
(a) lignin (b) hemicellulose
(c) lignocellulose (d) sporopollenin

4. When funiculum, chalaza, and micropyle lie in one straight line, then ovule is called –
(a) Amphitropous (b) Orthotropous
(c) Campylotropous (d) Anatropous

5. Which one of the following is a fruit ?
(a) Ginger (b) Sweet potato
(c) Radish (d) Lady's finger

6. Female gametophyte of angiosperms is represented by
(a) Ovule
(b) Megaspore mother cell
(c) Embryo sac
(d) Nucellus

7. Which of the following pair has haploid structures?
(a) Nucellus and antipodal cells
(b) Antipodal cells and egg cell
(c) Antipodal cells and megaspore mother cell
(d) Nucellus and primary endosperm nucleus

8. Polyembryony commonly occurs in
(a) citrus (b) turmeric
(c) tomato (d) potato

RESPONSE GRID					
1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ		

Space for Rough Work

9. Chasmogamy refers to the condition where –
(a) Flowers remains closed
(b) Flowers are absent
(c) Flowers open
(d) Flowers gamopetalous

10. In oogamy, fertilization involves
(a) a small non-motile female gamete and a large motile male gamete
(b) a large non-motile female gamete and a small motile male gamete
(c) a large non-motile female gamete and a small nonmotile male gamete
(d) a large motile female gamete and a small non-motile male gamete

11. Cotyledons and testa respectively are edible parts in
(a) walnut and tamarind
(b) french bean and coconut
(c) cashew nut and litchi
(d) groundnut and pomegranate

12. A *Polygonum* type of embryo sac is
(a) 7-celled and 8-nucleate
(b) 8-celled and 7-nucleate
(c) 7-celled and 7-nucleate
(d) 8-celled and 8-nucleate

13. In dicot embryo the radicle is formed by
(a) epibasal tier of embryo
(b) hypobasal tier of embryo
(c) hypophysis of suspensor
(d) terminal cell of suspensor

14. A drupe develops in
(a) mango (b) wheat
(c) pea (d) tomato

15. When pollen grains are not transferred from anthers to stigma in a flower, due to the barrier, it is called
(a) herkogamy (b) heterogamy
(c) cleistogamy (d) dichogamy

16. The parenchyma tissue which forms the bulk of ovule where the sporogenous tissue is produced is –
(a) Megaspore mother cell
(b) Nucellus
(c) Ovule
(d) Embryo sac

17. Unisexuality of flowers prevents
(a) autogamy, but not geitonogamy
(b) both geitonogamy and xenogamy
(c) geitonogamy, but not xenogamy
(d) autogamy and geitonogamy

18. Which one of the following represents an ovule, where the embryo sac becomes horse-shoe shaped and the funiculus and micropyle are close to each other?
(a) Amphitropous (b) Circinotropous
(c) Atropous (d) Anotropous

19. If an angiospermic male plant is diploid and female plant tetraploid, the ploidy level of endosperm will be
(a) haploid (b) triploid
(c) tetraploid (d) pentaploid

20. These plants flower and fruit only once in their life time and die after fruiting. These are
(a) monocarpic plants
(b) polycarpic plants
(c) vegetative plants
(d) reproductive plants

21. Select the mismatched pair.
(a) Microsporangium — Pollen sac
(b) Megasporangium — Nucellus
(c) Pollen grain — Male gamete
(d) Embryo sac — Female gametophyte

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)		

Space for Rough Work

22. 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. Identify X and Y.

	X	Y
(a)	Funicle	Hilum
(b)	Hilum	Funicle
(c)	Funicle	Micropyle
(d)	Hilum	Chalaza

23. Which of the following options 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.

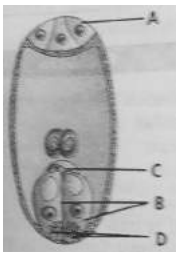
(c) Transfer of pollen grains from the anther to the stigma of a genetically different plant – Xenogamy.

(d) All of these

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

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

25. Identify the parts labelled A, B, C and D in the given figure and select the correct option.



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

26. Growth of pollen tube towards embryo sac is

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

27. The part of gynoecium that determines the complatible nature of pollen is

(a) stigma (b) style
(c) ovary (d) synergids

28. The innermost layer of anther is tapetum whose function is

(a) dehiscence (b) mechanical
(c) nutrition (d) protection

29. The female gametophyte of a typical dicot at the time of fertilization is

(a) 8-celled (b) 7-celled
(d) 6-celled (d) 5-celled

30. One of the most resistant biological material present in the exine of pollen grain is

(a) pectocellulose (b) sporopollenin
(c) suberin (d) cellulose

31. What is the function of germ pore?

(a) Emergence of radicle
(b) Absorption of water for seed germination
(c) Initiation of pollen tube
(d) All of these

32. How many meiotic divisions are required for the formation of 100 functional megaspores?

(a) 100 (b) 50
(c) 25 (d) 26

33. Study of pollen grains is called

(a) micrology (b) anthology
(c) palynology (d) pomology

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ			

Space for Rough Work

34. Which of these is a condition that makes flowers invariably autogamous?
(a) Dioecy
(b) Self incompatibilty
(c) Cleistogamy
(d) Xenogamy

35. 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

36. 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

37. The portion of embryonal axis between plumule (future shoot) and cotyledons is called
(a) hypocotyl (b) epicotyl
(c) coleohize (d) coleoptile

38. Stigma of a flower is removed before pollination. The flower will
(a) Form fruit normally
(b) Not form fruit
(c) Form deformed fruit
(d) Form fruit smaller than normal size

39. In a pea flower, all petals are removed before pollination. The flower will
(a) Form fruit normally
(b) Not form fruit
(c) Form smaller pod
(d) Form deformed pod

40. A drop of glue is placed on the stigma of a flower before pollination. The flower will
(a) Not form fruit
(b) Form normal fruit
(c) Form sticky fruit
(d) Form fruit filled with glue

41. An apomictic seed contains an embryo that is
(a) produced when two sperm fertilize one egg.
(b) developed from one egg alone.
(c) the result of parental self-fertilization
(d) genetically identical to its parent.

42. The embryo is carefully taken out of pea seed and sown in the soil and watered normally. New plant will
(a) Be healthier
(b) Be weaker
(c) Not be formed
(d) Be formed normally

43. Angiospermic plant has chromosome number of 24. The number of chromosomes in pollens will be
(a) 6 (b) 12
(c) 24 (d) 48

44. What is the fate of the seven cells of the embryo sac ?
(a) All but one disintegrate upon fertilization.
(b) Two become fertilized; the others disintegrate.
(c) Two become fertilized; the others fuse to form endosperm.
(d) All are involved in nuclear fusion events.

45. A close relation between flower and pollinating agent is best exhibited by :
(a) *Cocos* (b) *Salvia*
(c) *Yucca* (d) *Avena*

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 24 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB24

1. (c) In porogamy the tip of pollen tube enters the micropyle, pushes through the nucellar tissue & finally pierces the egg-apparatus end of the embryo sac. If pollen tube enters through the chalazal side it is called chalazogamy & if it enters laterally it is called mesogamy.

2. (b) Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is cypsela. Cypsela is also called inferior, false or pseudocarpic achene, the thin fruit wall (developed from pericarp and thalamus)is attached to the seed at one point but the fruits develops from an inferior, unilocular and uniovuled ovary, *e.g.*, sunflower, marigold. Some cypsela develop pappus for dispersal *e.g. Sonchus*, *Taraxacum.*

3. (d) Each pollen has two layered wall. The outer layer is thick, tough, cuticularised called exine which is composed of a material called "sporopollenin". It is highly resistant to biological and physical decomposition, due to which pollens are preserved for a long time in fossils.

4. (b) **5. (d)**

6. (c) Embryo sac is 7-celled structure. There is a large central cell with two polar nuclei, egg apparatus with egg cell and 2 synergids present at micropylar end and its chalazal end, 3 antipodal cells are present.

7. (b) Nucellus - 2n, antipodal cells - n
Antipodal cells - n, egg cell - n
Antipodal cells - n, megaspore mother cell - 2n
Nucellus - 2n primary endosperm nucleus - 3n
Antipodal and egg cell are the product of meiotic division and rest are not.

8. (a) Polyembryony refers to the formation of more than one embryo within a seed of a flowering plant. *e.g.* Citrus.

9. (c)

10. (b) In oogamy male and female gametes are morphologically as well as physiologically different. Female gametes are large and non-motile. Male gametes are small but motile.

11. (d) Cotyledons and testa respectively are edible parts in groundnut and pomegranate. A cotyledon is a significant part of the embryo within the seed of a plant. Upon germination, the cotyledon may become the embryonic first leaves of a seedling. Testa is often thick or hard outer coat of a seed.

12. (a) **13. (c)**

14. (a) Some fleshy fruits such as mango, plum etc. usually have a single hard stone that encloses a seed, called drupe.

15. (a) Herkogamy – when there is some physical barrier present between the stamens and carpels avoiding any chance of self pollination.
Cleistogamy – when the flowers remain closed, self-pollination is the rule.
Dichogamy – when the two sexes mature at different times.

16. (b)

17. (a) Unisexuality of flowers prevents autogamy, but not geitonogamy. In self fertilisation , the male and female gametes are derived from the same individual. Among plants, self fertilization also called autogamy is common in many cultivated species, *eg*., wheat and oats. However, self fertilization is a form of inbreeding and does not allow for the mixing of genetic material; if it occurs over a number of generations it will result in offspring being less vigorous and productive than those resulting from cross fertilization.

18. (a) Amphitropous : Both body of ovule and embryo sac are curved. The embryo sac assumes horse-shoe shape. *e.g. Papaveraceae.*

19. (d) The male gamete will be haploid (n). 2 polar nuclei will be diploid (2n). Endosperm formed by fusion of male gamete with two polar nuclei will be pentaploid.

$$\text{Male gamete} + 2 \text{ polar nuclei} \rightarrow \text{Endosperm}$$
$$(n) \qquad (2n) + (2n) \qquad (5n)$$

20. (a) Monocarpic plants are the plants in which flowers and fruits are formed only once after vegetative growth of several years e.g., some bamboos, *Agave*, etc.

21. (c) In angiosperms, microsporangium is equivalent to pollen sac, megasporangium is equivalent to nucellus and embryo sac is equivalent to female gametophyte. Pollen grain or microspore represents immature male gametophyte.

22. (a) Ovule is an integumented megasporagium found in spermatophytes which develops into seed after fertilization. An angiospermic ovule is typically an ovoid and whitish structure. It occurs inside ovary where it is attached to a parenchymatous cushion called placenta either singly or in a cluster. The ovule is stalked. The stalk is called funiculus or funicle. The point of attachment of the body of the ovule with the funiculus is known as hilum.

23. (d) Autogamy (Gk. autos-self, gamos-marriage) is a type of self pollination in which an intersexual or perfect flower is pollinated by its own pollen.
Geitonogamy (Gk. geiton-neighbour, gamos-marriage) is a type of pollination in which pollen grains of one flower are transferred to the stigma of another flower belonging to either the same plant or genetically similar plant. In geitonogamy, the flowers often show modifications similar to ones found in xenogamy or cross pollunation.
Xenogamy (Gk. xenos-strange, gamos-marriage) or cross pollination is the transfer of pollen grains from anther of one flower to the stigma of a genetically different flower.

24. (d) *Cannabis* is wind pollinated plant.

25. (b) The typical and the most common type of embryo sac, found in 80% flowering plants is called *Polygonum* type of embryosac. It contains 8 nuclei but 7 cells – 3 micropylar, 3 chalazal and one central. It is formed by one meiosis and three mitosis.

26. (a) The pollen tube eats its way through the solid part of the stigma and style by secreting pectinases and hydrolytic enzymes. Pollen tube travels intercellularly and chemotropically along the concentration gradient of calcium – boron -inositol sugar complex.

27. (a) Stigma is the terminal receptive part of the pistil which functions as landing platform for the pollen grains. It also determines the compatibility of the pollen grains.

28. (c) The tapetal layer is of great physiological significance as all the food material entering into the sporogenous tissue diffuses through this layer. Ultimately, the cells of tapetal layer disorganise. Thus, tapetum makes a nutritive layer for the developing microspores.

29. (b) The typical and the most common type of embryo sac, found in 80% flowering plants is called *Polygonum* type of embryosac. It contains 8 nuclei but 7 cells – 3 micropylar, 3 chalazal and one central. It is formed by one meiosis and three mitosis.

30. (b) Outer layer (exine) of pollen grain is made of a highly resistant substance called sporopollenin (Zelisch, 1932). Sporopollenin is not degraded by any enzyme. It is not affected by high temperature, strong acid or strong alkali. Because of sporopollenin, pollen grains are well preserved as fossils.

31. **(c)** One or more thin areas present in the exine of pollen grain are known as germ pores. The germ pores are apertures in the exine layer of the pollen grain where the sporopollenin is absent. The germ pore helps in the formation of the pollen tube and the release of the male gametes during fertilization. There are usually three germ pores in dicots (tricolpate) and one in monocots (monocolpate).

32. **(a)** Megaspore mother cell (MMC) is the sporogenous cell that divides to give 4 haploid megaspores. Out of these 4 megaspores, only one is functional and other three degenerate. Hence 100 meiotic divisions are required for the formation of 100 functional megaspores.

33. **(c)**

34. **(c)** Autogamy is possible only when anther and stigma are close together and there is synchrony in pollen release and stigma receptivity. As in case of cleistogamous flowers, the flowers remain closed so that anthers and stigmas are never exposed. The flowers undergo only self pollination. No external pollinating agency is required.

35. **(b)** Apogamy is the reproduction without the fusion of gametes, and usually without meiosis. The term may include any form of vegetative reproduction. The production of a diploid gametophyte from the sporophyte due to the absence of meiosis is known as apospory. Parthenogenesis is the development of an unfertilized egg into a complete individual without fertilization. Production and development of seedless fruits is called parthenocarpy.

36. **(a)** Endosperm represents the food storing tissue of a seed. It is produced as a result of double fertilization in angiosperms. In most monocots and some dicot seeds, the food reserve remains in the endosperm. They are called endospermic or albuminous seeds, e.g., cereals, castor, coconut, rubber. However, in the majority of dicot seeds (e.g., pea, gram, bean, mustard, groundnut) and some monocot seeds (e.g., orchids, *Sagittaria*), the endosperm is consumed during seed development and the food is stored in cotyledons and other regions. They are called nonendospermic or exalbuminous seeds.

37. **(b)** Part of embryo axis between the plumule and cotyledonary node is epicotyl (above the level of cotyledons) while the part between radicle and cotyledonary node is called hypocotyl (below the level of cotyledons).

38. **(b)** Pollination will not occur

39. **(b)** There will not be insect pollination

40. **(a)** Germination of pollens will not occur in ovule.

41. **(d)**

42. **(c)** Embryo can not grow without food stored in cotyledons.

43. **(b)** Pollens are formed by meiosis.

44. **(b)**

45. **(c)** Obligate symbiotic relationship is present between *Yucca* flowers and moth, *Tageticula*.