Sexual Reproduction in Flowering Plants

Class 12 Biology · 24 NEET MCQs with answers & explanations

Sexual Reproduction in Flowering Plants is one of NEET Biology's highest-yield chapters. From microsporogenesis to double fertilisation, every diagram in NCERT is fair game. Questions test your understanding of the flower structure, pollination mechanisms, embryo development and seed formation — master these and you secure easy marks.

Key Structures & Processes

Structure / Process	Key Fact
Microsporangium	4 wall layers — epidermis, endothecium, middle layers, tapetum; tapetum nourishes developing pollen
Megasporangium (ovule)	Contains nucellus, embryo sac; 7-celled, 8-nucleate at maturity
Double fertilisation	One sperm + egg → zygote (2n); one sperm + 2 polar nuclei → PEN (3n) → endosperm
Pollination types	Autogamy (same flower), geitonogamy (same plant), xenogamy (different plant)
Embryo sac	Monosporic (Polygonum type); egg apparatus (2 synergids + 1 egg) + 3 antipodals + 2 polar nuclei
Post-fertilisation	Ovule → seed; ovary → fruit; integuments → seed coat

Questions

Q1. Which pair of developmental fates after fertilisation in angiosperms is correctly matched?

(A) Ovule → fruit; ovary → seed
(B) Zygote → embryo; ovule → seed
(C) Primary endosperm nucleus → pollen grain; integuments → embryo
(D) Integuments → embryo; synergids → seed coat

Q2. A typical angiosperm embryo sac contains three antipodals, two synergids, one egg cell and one central cell with two polar nuclei. What are the total number of cells and nuclei respectively?

(A) 8 cells and 8 nuclei
(B) 8 cells and 7 nuclei
(C) 7 cells and 8 nuclei
(D) 7 cells and 7 nuclei

Q3. In a typical angiosperm, the four microspores produced immediately after meiosis of a microspore mother cell are:

(A) Four diploid microspores
(B) Four haploid microspores
(C) Two diploid and two haploid microspores
(D) One haploid and three diploid microspores

Q4. Which structure in a typical angiosperm embryo sac contains the egg cell and two synergids?

(A) Egg apparatus
(B) Central cell
(C) Three antipodal cells
(D) Filiform apparatus

Q5. In more than half of angiosperm species, pollen grains are most commonly shed from the anther at which developmental stage?

(A) One-celled stage consisting of only the vegetative cell
(B) Two-celled stage consisting of a vegetative cell and a generative cell
(C) Four-celled stage in which the generative cell has divided twice
(D) Three-celled stage containing a vegetative cell and two male gametes

Q6. A pollen grain has a vegetative cell and a generative cell when shed from the anther. Which single event converts this two-celled condition into the three-celled male gametophytic stage?

(A) Mitotic division of the generative cell to produce two male gametes
(B) Meiotic division of the vegetative cell inside the pollen tube
(C) Fusion of the generative cell with the receptive stigma surface
(D) Meiotic division of the entire pollen grain after germination

Q7. A typical angiosperm anther is described as dithecous because it possesses

(A) Two theca, each with two microsporangia
(B) Four lobes, each with one theca
(C) Single theca with four pollen sacs
(D) Two microsporangia only

Q8. Fibrous thickenings that aid anther dehiscence develop in which wall layer?

(A) Epidermis
(B) Endothecium
(C) Middle layers
(D) Tapetum

Q9. Transfer of pollen from anther to stigma of the same flower is termed

(A) Autogamy
(B) Geitonogamy
(C) Xenogamy
(D) Cleistogamy

Q10. Geitonogamy differs from xenogamy in that geitonogamy involves

(A) Transfer between genetically different plants
(B) Pollen transfer between flowers of same plant
(C) Only wind as pollinating agent
(D) Obligatory cross pollination

Q11. The triploid primary endosperm nucleus undergoes repeated divisions to form

(A) Endosperm
(B) Embryo
(C) Seed coat
(D) Perisperm

Q12. In nuclear type of endosperm development, the primary endosperm nucleus undergoes

(A) Cell wall formation after each division
(B) Free nuclear divisions without wall formation
(C) Meiosis followed by mitosis
(D) Degeneration before division

Q13. Double fertilisation in angiosperms involves which two fusion events?

(A) Syngamy and triple fusion
(B) Syngamy and pollination
(C) Triple fusion and germination
(D) Meiosis and mitosis

Q14. Syngamy in angiosperms results in the formation of

(A) Primary endosperm nucleus
(B) Zygote
(C) Secondary nucleus
(D) Polar fusion product

Q15. Apomixis is defined as

(A) Seed formation without fertilisation
(B) Fruit development without fertilisation
(C) Embryo development after syngamy
(D) Fusion of more than one egg

Q16. In diplospory, the embryo develops from

(A) Haploid egg after meiosis
(B) Diploid egg cell without fertilisation
(C) Nucellus cells after syngamy
(D) Synergid after meiosis

Q17. Which layer of the microsporangium nourishes developing pollen grains and secretes enzymes for pollen wall formation?

(A) Tapetum
(B) Endothecium
(C) Epidermis
(D) Middle layers

Q18. In the Polygonum type of embryo sac development, which megaspore of the linear tetrad remains functional?

(A) Micropylar end megaspore
(B) Chalazal end megaspore
(C) Middle position megaspore
(D) Random — varies by species

Q19. The megaspore mother cell undergoes which type of division to form megaspores?

(A) Meiosis
(B) Mitosis
(C) Amitosis
(D) Free nuclear division

Q20. Microsporogenesis refers to which of the following events?

(A) Mitosis of vegetative cell in pollen
(B) Formation of pollen tube
(C) Development of embryo sac
(D) Meiosis in microspore mother cells

Q21. The highly resistant nature of pollen exine is attributed to the presence of

(A) Sporopollenin
(B) Cellulose
(C) Callose
(D) Pectin

Q22. The central cell of the embryo sac, prior to fertilisation, contains

(A) One diploid secondary nucleus
(B) Two polar nuclei
(C) One haploid egg nucleus
(D) Three antipodal nuclei

Q23. The generative cell of a pollen grain divides mitotically to produce

(A) Two vegetative nuclei
(B) One tube nucleus and one gamete
(C) Two male gametes
(D) One synergid and one gamete

Q24. In an anatropous ovule, the micropyle lies close to the

(A) Chalaza
(B) Nucellus
(C) Antipodal cells
(D) Hilum

Answer key

1-B	**2-C**	**3-B**	**4-A**	**5-B**	**6-A**	**7-A**	**8-B**
9-A	**10-B**	**11-A**	**12-B**	**13-A**	**14-B**	**15-A**	**16-B**
17-A	**18-B**	**19-A**	**20-D**	**21-A**	**22-B**	**23-C**	**24-D**

Answers with explanations

Q1 — Answer: (B) Zygote → embryo; ovule → seed
The zygote formed by syngamy develops into the embryo. The ovule as a whole develops into the seed. The ovary wall (pericarp) develops into the fruit wall, not the ovule. Integuments develop into the seed coat, not the embryo. Primary endosperm nucleus develops into the endosperm.

Q2 — Answer: (C) 7 cells and 8 nuclei
The embryo sac contains seven cells: three antipodals, two synergids, one egg cell and one central cell. Although the central cell contains two polar nuclei, it is counted as a single cell. The total nucleus count is eight: one in each antipodal (3), one in each synergid (2), one in the egg cell (1) and two polar nuclei in the central cell (2), giving 3+2+1+2 = 8 nuclei. Therefore the correct combination is 7 cells and 8 nuclei.

Q3 — Answer: (B) Four haploid microspores
Meiosis reduces the chromosome number to half; therefore one diploid microspore mother cell produces four haploid microspores. These subsequently develop into pollen grains. Option A incorrectly states diploid microspores, reversing the ploidy change of meiosis. Options C and D propose mixed ploidy outcomes that do not occur.

Q4 — Answer: (A) Egg apparatus
The egg apparatus is located at the micropylar end of the embryo sac and consists of one egg cell flanked by two synergids. The central cell contains two polar nuclei. The three antipodal cells occur at the chalazal end. The filiform apparatus is a wall ingrowth within synergids and is not a separate structure housing the egg.

Q5 — Answer: (B) Two-celled stage consisting of a vegetative cell and a generative cell
NCERT states that in more than 60 percent of angiosperms, pollen is shed at the two-celled stage, which contains one vegetative cell and one generative cell that has not yet divided. In the remaining species the generative cell divides before shedding, giving the three-celled stage with two male gametes present inside the pollen grain. A one-celled or four-celled stage is not described in NCERT for normal angiosperm pollen.

Q6 — Answer: (A) Mitotic division of the generative cell to produce two male gametes
The generative cell undergoes a single mitotic division to produce two male gametes, converting the two-celled pollen grain into the three-celled stage. The vegetative cell does not divide; it elongates to form the pollen tube. No meiosis occurs at any point during pollen germination or male gamete formation. Fusion with the stigma is not an event that transforms the pollen grain structure.

Q7 — Answer: (A) Two theca, each with two microsporangia
A dithecous anther has two theca, and each theca contains two microsporangia, making a total of four microsporangia per anther. Option B is wrong because each lobe belongs to one theca, not the reverse. Option D incorrectly omits the theca organization entirely.

Q8 — Answer: (B) Endothecium
Endothecium develops fibrous bands (thickenings) that help rupture the anther wall for pollen release. Epidermis is the outermost protective layer with no thickening role. Tapetum is the innermost nutritive layer — its function is nourishment, not mechanical dehiscence.

Q9 — Answer: (A) Autogamy
Autogamy is self-pollination within the same flower — pollen from the anther lands on the stigma of the same flower. Geitonogamy also involves the same plant but occurs between different flowers. Cleistogamy is a condition (closed flowers), not a pollination type per se.

Q10 — Answer: (B) Pollen transfer between flowers of same plant
Geitonogamy occurs between different flowers on the same plant — it requires a pollinating agent but is genetically equivalent to autogamy. Xenogamy involves pollen transfer between genetically different plants, generating true genetic variation. Option C is wrong because geitonogamy can use any agent — wind, insect, or water.

Q11 — Answer: (A) Endosperm
Primary endosperm nucleus (3n) divides mitotically to form the nutritive endosperm tissue. Embryo arises from the zygote, not the endosperm nucleus. Seed coat and perisperm have entirely different origins.

Q12 — Answer: (B) Free nuclear divisions without wall formation
Nuclear endosperm is characterised by repeated free nuclear divisions where cytokinesis is delayed; cell walls form only later. Option A describes cellular endosperm. Meiosis never occurs during endosperm formation.

Q13 — Answer: (A) Syngamy and triple fusion
Double fertilisation consists of two distinct fusion events: syngamy (fusion of one male gamete with the egg cell) and triple fusion (fusion of the second male gamete with the two polar nuclei). Pollination is a pre-fertilisation event, not a fusion. Meiosis and mitosis are cell division types — not fertilisation events.

Q14 — Answer: (B) Zygote
Syngamy is the fusion of one male gamete (n) with the egg cell (n) to produce the diploid zygote (2n) — the precursor of the embryo. Primary endosperm nucleus results from triple fusion, not syngamy. Secondary nucleus is formed by fusion of the two polar nuclei before fertilisation — a separate, pre-fertilisation event.

Q15 — Answer: (A) Seed formation without fertilisation
Apomixis is the production of seeds without fertilisation, bypassing normal sexual reproduction entirely. Option B describes parthenocarpy; Options C and D describe events of normal sexual reproduction.

Q16 — Answer: (B) Diploid egg cell without fertilisation
In diplospory, meiosis is suppressed and the diploid egg (unreduced) develops into embryo without fertilisation, preserving parental genotype. This contrasts with normal fertilisation where the haploid egg requires a sperm.

Q17 — Answer: (A) Tapetum
Tapetum is the innermost nutritive layer of the microsporangium wall, supplying nutrients and enzymes to developing microspores. Endothecium is involved in anther dehiscence, not pollen nourishment.

Q18 — Answer: (B) Chalazal end megaspore
In the most common (Polygonum type) monosporic development, the chalazal megaspore is functional while the other three degenerate. This chalazal position is a direct NEET fact from NCERT.

Q19 — Answer: (A) Meiosis
The diploid megaspore mother cell (MMC) undergoes meiosis to produce four haploid megaspores. Mitosis would maintain ploidy and cannot produce haploid megaspores. Free nuclear division occurs later during embryo sac development, not megasporogenesis.

Q20 — Answer: (D) Meiosis in microspore mother cells
Microsporogenesis is the process by which diploid microspore mother cells (MMC) undergo meiosis to form haploid microspores. Option C describes megasporogenesis, a common distractor. Option A describes a later event within male gametophyte maturation.

Q21 — Answer: (A) Sporopollenin
Sporopollenin is one of the most resistant biological polymers known, forming the exine of pollen grains and protecting them from extreme conditions. Callose is a temporary wall around microspore tetrads and is dissolved before maturation. Cellulose forms the intine, not the exine.

Q22 — Answer: (B) Two polar nuclei
The central cell contains two polar nuclei (each haploid) which may fuse to form a secondary nucleus before fertilisation in some species. Option A is a trap — secondary nucleus is diploid and forms by fusion of two polar nuclei, but it is not always present before fertilisation. Option C describes the egg cell, not central cell.

Q23 — Answer: (C) Two male gametes
The generative cell undergoes mitosis to form two male gametes, which participate in double fertilisation. Vegetative nuclei are not products of generative cell division. Options B and D are fabricated combinations with no NCERT basis.

Q24 — Answer: (D) Hilum
In an anatropous ovule the body of the ovule is inverted (turned through 180°), so the micropyle comes to lie close to the hilum — the point where the funicle attaches. The chalaza and the antipodal end of the embryo sac lie at the opposite end, and the nucellus is the central tissue enclosed by the integuments.

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