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Sexual Reproduction in Flowering Plants — CBSE Class 12 Biology Chapter Test

FREE CHAPTER TEST · CLASS XII · BIOLOGY (044) · PATTERN OF THE CBSE SAMPLE QUESTION PAPER 2026-27

TIME ALLOWED	MAXIMUM MARKS	QUESTIONS	NAME / ROLL NO.
1½ hours	37	17 (A 8 · B 3 · C 3 · D 1 · E 2)	

GENERAL INSTRUCTIONS

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 17 questions. All questions are compulsory.
2. This question paper is divided into five sections: A, B, C, D and E.
3. Section A (Q1–8) contains 6 multiple choice questions and 2 assertion-reason based questions of 1 mark each.
4. Section B (Q9–11) contains short answer questions of 2 marks each.
5. Section C (Q12–14) contains short answer questions of 3 marks each.
6. Section D (Q15) contains case-based questions of 4 marks each, with sub-parts of 1, 2 and 1 marks.
7. Section E (Q16–17) contains long answer questions of 5 marks each.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 1 question in Section D, 2 questions in Section E. Attempt only one of the alternatives in such questions.
9. Draw neat, labelled diagrams wherever necessary.
10. This chapter test follows the section structure, question types and marks per question of the CBSE Class XII Biology (044) Sample Question Paper 2026-27, at about half the length of the 70-mark board paper: 37 marks in 1½ hours.
11. The answer key and the marking scheme are at the end of this booklet. Attempt the paper in 1½ hours before you look at them.

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Chapter: Sexual Reproduction in Flowering Plants · **Topics:** Stamen, microsporangium and pollen · Pistil, megasporangium and embryo sac · Pollination and outbreeding devices · Double fertilisation · Endosperm, embryo, seed and fruit · Apomixis and polyembryony

SECTION A

This section comprises 8 questions of 1 mark each: 6 multiple choice questions (MCQs) and 2 assertion-reason based questions.

1. The number of meiotic divisions needed to produce 100 pollen grains is 1

(A) 100 (B) 25

(C) 50 (D) 400

2. In a flowering plant with 2n = 24, the number of chromosomes in a cell of the endosperm is 1

(A) 12 (B) 24

(C) 48 (D) 36

3. The function of the filiform apparatus of the synergids is to 1

(A) guide the pollen tube into the synergid (B) form the endosperm

(C) nourish the developing embryo (D) produce the male gametes

4. In the embryo of a grass (monocot), the scutellum is 1

(A) the sheath round the plumule (B) the sheath round the radicle

(C) the single cotyledon (D) the seed coat

5. Pollen grains of many species can be stored for years in pollen banks in liquid nitrogen at 1

(A) −4 °C (B) 0 °C

(C) −20 °C (D) −196 °C

6. Which of the following is a false fruit, in which the thalamus also forms part of the fruit? 1

(A) Mango (B) Apple

(C) Banana (D) Tomato

7. **Assertion (A):** In Vallisneria and Zostera, the pollen grains are protected from wetting by a mucilaginous covering. 1

Reason (R): These plants are pollinated by water.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

8. **Assertion (A):** Most flowering plants are pollinated by wind. 1

Reason (R): Wind pollination is quite common in grasses.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

SECTION B

This section comprises 3 short answer questions of 2 marks each.

9. (a) What is double fertilisation? Name the products formed and their ploidy. 2

OR

(b) Distinguish between perisperm and pericarp.

10. (a) Describe two devices that flowering plants have developed to discourage self-pollination and encourage cross-pollination. 2

OR

(b) In artificial hybridisation, what is emasculation, and why is bagging done?

11. Describe the structure of a mature pollen grain of a flowering plant. 2

SECTION C

This section comprises 3 short answer questions of 3 marks each.

12. Describe the development of the female gametophyte (embryo sac) from the megaspore mother cell in a typical flowering plant. 3

13. Give three differences between wind-pollinated and insect-pollinated flowers. 3

14. Describe the development of the endosperm. Distinguish between albuminous and non-albuminous seeds, with one example of each. 3

SECTION D

This section comprises 1 case-based question of 4 marks, with sub-parts of 1, 2 and 1 marks.

15. A farmer grows a high-yielding hybrid variety of maize. Each year he has to buy fresh hybrid seed, because seed saved from his own crop gives plants that vary and yield less. Scientists are trying to transfer the genes for apomixis into hybrid varieties so that farmers could keep using seed from their own crop.

(I) Why do plants grown from seed saved from a hybrid crop not keep the hybrid characters? [1]

(II) What is apomixis? Describe two ways in which apomictic seeds develop. [2]

(III) Name a family of flowering plants in which apomixis is found. [1]

OR

(III) What is polyembryony? Give one example. [1]

SECTION E

This section comprises 2 long answer questions of 5 marks each.

16. (a) (i) Describe the structure of a transverse section of a mature anther, and explain microsporogenesis. 5
(ii) How long do the pollen grains of rice and wheat remain viable?
(iii) Give one harmful and one useful effect of pollen grains on humans.

OR

(b) (i) Describe the structure of a typical anatropous ovule, naming its parts.
(ii) What is parthenocarpy? Give one example and state how it can be induced.

17. (a) (i) Describe the structure of a typical dicotyledonous embryo. 5

(ii) Describe how the ovule and the ovary change into the seed and the fruit after fertilisation.

(iii) Give two advantages of seeds to flowering plants.

OR

(b) (i) Distinguish between autogamy, geitonogamy and xenogamy. What are cleistogamous flowers? Give one advantage and one disadvantage of cleistogamy.

(ii) Explain pollen-pistil interaction and self-incompatibility.

END OF THE QUESTION PAPER

ANSWER KEY — SECTION A

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
(B)	(D)	(A)	(C)	(D)	(B)	(A)	(D)

MARKING SCHEME AND WORKED SOLUTIONS

Marks for each step are shown in brackets, as in the CBSE marking scheme. Any correct alternative method earns full marks.

Q1. Answer (B). Each pollen mother cell undergoes one meiosis and gives a tetrad of four pollen grains: 100/4 = 25.

Q2. Answer (D). The primary endosperm nucleus forms by triple fusion of two polar nuclei (n + n) and a male gamete (n): 3n = 36.

Q3. Answer (A). The filiform apparatus at the micropylar tip of the synergids guides the entry of the pollen tube.

Q4. Answer (C). The monocot embryo has one cotyledon, the scutellum, placed to one side of the embryonal axis; the plumule is covered by the coleoptile and the radicle by the coleorhiza.

Q5. Answer (D). Cryopreservation in liquid nitrogen (−196 °C).

Q6. Answer (B). In apple (as in strawberry and cashew) the thalamus contributes to the fruit; in true fruits only the ovary does.

Q7. Answer (A). Their pollen is carried in or on water, so it must not get wet; the mucilage protects it. R explains A. Answer A.

Q8. Answer (D). Most flowering plants use animals (mainly insects) as pollinating agents, so A is false; R is true. Answer D.

Q9. (2 marks) Answer: (a) syngamy + triple fusion; zygote 2n, PEN 3n; (b) residual nucellus vs fruit wall.
(a) In the embryo sac one male gamete fuses with the egg (syngamy) and the other with the two polar nuclei (triple fusion); two fusions take place, so it is called double fertilisation. [1] Products: the zygote (2n), which forms the embryo, and the primary endosperm nucleus (3n), which forms the endosperm. [1]
OR (b) Perisperm is the persistent, residual nucellus in some seeds (black pepper, beet). [1] Pericarp is the wall of the fruit, formed from the wall of the ovary. [1]

Q10. (2 marks) Answer: (a) any two outbreeding devices; (b) removing anthers; protecting the stigma.
(a) Any two [2]: pollen release and stigma receptivity are not synchronised; anther and stigma are placed at different positions; self-incompatibility (pollen of the same flower cannot fertilise its ovules); unisexual flowers (e.g. castor, maize); dioecy (male and female flowers on different plants, e.g. papaya).
OR (b) Emasculation: removing the anthers from the flower bud of a bisexual female parent before they dehisce. [1] Bagging: covering the emasculated flower with a bag of butter paper to prevent contamination of its stigma by unwanted pollen. [1]

Q11. (2 marks) Answer: exine (sporopollenin, germ pores), intine; vegetative and generative cells.
The wall has a hard outer exine made of sporopollenin (resistant to high temperature, acids and alkalis, and not degraded by enzymes), with germ pores where sporopollenin is absent, and a thin inner intine of cellulose and pectin. [1] At maturity the pollen contains two cells: a large vegetative cell with abundant food and an irregular nucleus, and a small spindle-shaped generative cell floating in it (in many species it divides into two male gametes before shedding: 3-celled pollen). [1]

Q12. (3 marks) Answer: meiosis → one functional megaspore → 3 mitoses → 8 nuclei, 7 cells.
The megaspore mother cell (2n) in the micropylar region of the nucellus divides by meiosis to give four megaspores (n). Three degenerate and one remains functional (monosporic development). [1]
The nucleus of the functional megaspore divides mitotically three times (free-nuclear divisions) to give 8 nuclei, four at each pole. [1]
Cell walls form: three cells at the micropylar end form the egg apparatus (egg and two synergids), three at the chalazal end the antipodals, and the two polar nuclei lie in the large central cell: 8 nuclei, 7 cells. [1]

Q13. (3 marks) Answer: any three differences.
Any three [3]: wind-pollinated flowers produce large amounts of light, non-sticky pollen, insect-pollinated flowers less pollen, usually sticky; wind-pollinated flowers are small, not colourful, without nectar or scent, insect-pollinated flowers are large, colourful, fragrant and rich in nectar; wind-pollinated flowers have well-exposed stamens and large, often feathery stigmas, insect-pollinated flowers do not need them; wind-pollinated flowers often have a single ovule in each ovary and are packed into inflorescences (e.g. the tassels of a corn cob).

Q14. (3 marks) Answer: free-nuclear then cellular; albuminous (wheat) and non-albuminous (pea).
The primary endosperm cell divides repeatedly to form the triploid endosperm, which stores food for the developing embryo; endosperm development precedes embryo development. [1]
Most commonly the PEN undergoes free-nuclear divisions first and walls form later (e.g. the tender coconut water is free-nuclear endosperm, the white kernel cellular endosperm). [1]
Albuminous seeds keep part of the endosperm (wheat, maize, castor); non-albuminous seeds have none left, it being used up by the developing embryo (pea, groundnut). [1]

Q15. (4 marks) Answer: (I) segregation; (II) seeds without fertilisation; (III) Asteraceae, or polyembryony in citrus.
(I) The characters segregate in the progeny of a hybrid, so the hybrid characters are not maintained. [1]
(II) Apomixis is the formation of seeds without fertilisation (asexual reproduction that mimics sexual reproduction). [1] The diploid egg is formed without reduction division and develops into an embryo without fertilisation; or cells of the nucellus surrounding the embryo sac start dividing, protrude into the embryo sac and develop into embryos. [1]
(III) Asteraceae (or grasses). [1]
OR (III) The occurrence of more than one embryo in a seed, e.g. citrus or mango. [1]

Q16. (5 marks) Answer: (a) four wall layers, tapetum, meiosis of PMCs; 30 minutes; allergy and supplements; (b) parts of the ovule; banana.
(a) (i) A typical anther is bilobed and dithecous; in transverse section it has four microsporangia. [½] Each microsporangium has four wall layers — epidermis, endothecium, middle layers (protective, help dehiscence) and the innermost tapetum (nourishes the pollen). [1] The centre has sporogenous tissue; its cells act as pollen (microspore) mother cells, each dividing by meiosis to form a microspore tetrad; as the anther matures and dehydrates, the microspores separate and develop into pollen grains. [1½]
(ii) About 30 minutes after release. [1]
(iii) Pollen of some plants (e.g. Parthenium, carrot grass) causes allergies and respiratory disorders such as asthma; pollen is rich in nutrients and is sold as tablets and syrups as a food supplement. [1]
OR (b) (i) The ovule is attached to the placenta by a stalk, the funicle; the junction of ovule and funicle is the hilum. [1] The ovule has one or two protective integuments, leaving an opening, the micropyle; opposite it is the chalaza. [1] Inside the integuments is the nucellus, which holds the embryo sac (female gametophyte); in the anatropous ovule the body is inverted so that the micropyle lies close to the funicle. [1]
(ii) Parthenocarpy is the formation of fruit without fertilisation (seedless fruit), e.g. banana. [1] It can be induced by applying growth hormones. [1]

Q17. (5 marks) Answer: (a) axis, cotyledons, plumule, radicle; integuments → seed coat, ovary → fruit; (b) autogamy, geitonogamy, xenogamy; pollen-pistil interaction.

(a) (i) An embryonal axis and two cotyledons; the part of the axis above the cotyledons is the epicotyl, ending in the plumule (stem tip); the part below is the hypocotyl, ending in the radicle (root tip), covered by the root cap. [2]

(ii) The integuments harden into the protective seed coats, the micropyle remains as a small pore; the seed becomes dry (10–15 % moisture) and the embryo may enter dormancy. [1] The ovary develops into the fruit, its wall forming the pericarp. [1]

(iii) Any two: seeds depend less on water for reproduction; they can be dispersed to new habitats; they store food for the young seedling; the hard coat protects the embryo; dormancy lets them survive unfavourable conditions; being products of sexual reproduction they carry new genetic combinations. [1]

OR (b) (i) Autogamy: pollen reaches the stigma of the same flower. Geitonogamy: pollen reaches another flower of the same plant. Xenogamy: pollen reaches the stigma of a flower of a different plant (the only type that brings genetically different pollen). [1½] Cleistogamous flowers never open, so they are always self-pollinated and set seed even without pollinators (e.g. Viola, Oxalis, Commelina); they do not allow cross-pollination. [1½]

(ii) The pistil recognises compatible pollen, which germinates and grows a pollen tube through the style to the ovule; incompatible pollen is rejected by stopping germination or tube growth. [1] Self-incompatibility is a genetic mechanism that prevents pollen from the same flower or plant from fertilising the ovules. [1]

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