

ANSWER KEY & MARKING SCHEME · CBSE CLASS 11**Plant Kingdom**

Biology · Chapter 3 · Use this with the Board Paper · Companion to Quick Drill

HOW TO USE

Attempt the Board Paper first (closed-book, full time). Then come here. For 2-mark+ questions, compare your answer to the model. For 3-4 mark questions, also consult the **Topper Templates** below — these show the exact step-by-step structure that scores full marks per CBSE marking-scheme conventions.

MODEL ANSWERS · BOARD PAPER**Section A — 1-mark questions****Q1. Name the pigment responsible for the brown colour of Phaeophyceae. [1 mark]****Ans:** Fucoxanthin — a brown carotenoid accessory pigment.**Q2. Why are bryophytes called 'amphibians of the plant kingdom'? Answer in one line. [1 mark]****Ans:** Because they live on land but require water for sexual reproduction, as the flagellated antherozoid must swim to the egg.**Q3. What is meant by a 'naked seed' in gymnosperms? [1 mark]****Ans:** A seed not enclosed within an ovary or fruit — the ovule and seed lie exposed on the cone scale (megasporeophyll).**Q4. From which group of algae is agar obtained? [1 mark]****Ans:** Red algae (Rhodophyceae) — chiefly Gelidium and Gracilaria.**Section B — 2-mark questions****Q5. Distinguish monocotyledons from dicotyledons on the basis of cotyledon number, venation, root type and floral symmetry. [2 marks]****Ans:** Monocots — one cotyledon, parallel venation, fibrous roots, trimerous flowers (parts in multiples of 3).
Dicots — two cotyledons, reticulate venation, taproots, tetra/pentamerous flowers (parts in multiples of 4 or 5). 0.5 mark per cleanly contrasted feature.**Q6. Why is the leafy moss plant called the gametophyte? State its relationship with the sporophyte. [2 marks]****Ans:** The dominant, green, photosynthetic, leafy moss body is haploid (n) and bears the sex organs (antheridia and archegonia), so it is the gametophyte. The sporophyte ($2n$) is small, consists of foot, seta and capsule, and grows on the gametophyte, depending on it for nutrition. 1 mark for identification + 1 mark for the dependent-sporophyte relationship.**Q7. State two economic uses of algae with the algal source for each. [2 marks]****Ans:** (i) Agar — from red algae (Gelidium, Gracilaria) — used in culture media and jellies. (ii) Algin — from brown algae (Laminaria) — used as a food thickener. (Alternatively: Porphyra/Laminaria as food; Chlorella as protein supplement.) 1 mark per valid use + source.**Section C — 3-mark questions****Q8. Define alternation of generations and distinguish haplontic, diplontic and haplo-diplontic life cycles with one example each. [3 marks]****Ans:** Alternation of generations: the regular alternation of a haploid gametophyte (n) and a diploid sporophyte ($2n$) generation in a plant's life cycle, with meiosis switching $2n$ to n and fertilisation switching n to $2n$. Haplontic — dominant free-living gametophyte; the zygote is the only diploid stage (e.g. Volvox, Spirogyra). Diplontic — dominant free-living sporophyte; gametes are the only haploid stage (e.g. Fucus, angiosperms). Haplo-diplontic — both gametophyte and sporophyte are multicellular (e.g. bryophytes, pteridophytes). 1 mark for definition + 1 mark for both haplontic and diplontic + 1 mark for haplo-diplontic with examples.

Q9. Differentiate gymnosperms and angiosperms on the basis of (i) seed, (ii) flowers/fruit, and (iii) fertilisation, with one example of each. [3 marks]

Ans: (i) Seed — Gymnosperm: naked, borne exposed on cone scales; Angiosperm: enclosed within the ovary/fruit. (ii) Flowers/fruit — Gymnosperm: no flowers, no fruit (reproductive cones only); Angiosperm: flowers present, ovary ripens into fruit. (iii) Fertilisation — Gymnosperm: single fertilisation, no triploid endosperm; Angiosperm: double fertilisation (egg → zygote $2n$; polar nuclei → endosperm $3n$). Examples — Gymnosperm: Cycas / Pinus; Angiosperm: mango / wheat. 1 mark per row.

Q10. Describe the life cycle of a pteridophyte (fern), naming the dominant generation, the spore-bearing structures and the gametophyte. [3 marks]

Ans: The dominant body is the diploid SPOROPHYTE (the large fern frond). Meiosis inside sporangia — clustered into sori on the underside of fronds — produces haploid spores. A spore germinates into a small, heart-shaped, free-living haploid GAMETOPHYTE called the prothallus, bearing antheridia and archegonia. Water-borne flagellated antherozoids fertilise the egg in the archegonium, producing a diploid zygote that grows into a new sporophyte. (Ferns are haplo-diplontic, sporophyte-dominant.) 1 mark each for sporophyte dominance, spores/sori, and prothallus + fertilisation.

Section D — 5-mark question

Q11. Compare the THREE classes of algae — Chlorophyceae, Phaeophyceae and Rhodophyceae — on the basis of common name, major pigments, stored food, cell wall, and one example each. Present your answer as a table. [5 marks]

Ans: Open with: 'Algae are chlorophyll-bearing, simple, thalloid, autotrophic plants classified into three classes on the basis of dominant pigment, stored food and cell-wall composition.' Then present a 4-column × 5-row table — Feature × {Chlorophyceae, Phaeophyceae, Rhodophyceae}. Row 1 Common name: Green / Brown / Red algae. Row 2 Major pigments: Chlorophyll a, b / Chlorophyll a, c + fucoxanthin / Chlorophyll a, d + r-phycoerythrin. Row 3 Stored food: Starch / Mannitol (laminarin) / Floridean starch. Row 4 Cell wall: Cellulose / Cellulose + algin / Cellulose + pectin + polysulphate esters. Row 5 Example: Spirogyra (or Ulva) / Fucus (or Laminaria) / Polysiphonia (or Porphyra). Close with one economic note (e.g. agar from red algae). 0.5 opening + 4 marks table (pigment + stored-food rows carry most) + 0.5 closing.

Q12. Explain alternation of generations in plants. With the help of labelled flow, describe the bryophyte life cycle and state why the gametophyte is dominant. [6 marks]

Ans: Alternation of generations: a haploid gametophyte (n) generation alternates with a diploid sporophyte ($2n$) generation; meiosis converts $2n$ spores-mother-cells to n spores, and fertilisation restores $2n$. Bryophyte cycle: the dominant, green, leafy/thalloid GAMETOPHYTE (n) bears antheridia (producing flagellated antherozoids) and archegonia (each with an egg). In the presence of a water film, an antherozoid swims to and fertilises the egg → diploid zygote → a small dependent SPOROPHYTE (foot, seta, capsule). Meiosis in the capsule yields haploid spores, which germinate (via a protonema in mosses) into new gametophytes. The gametophyte is dominant because it is the larger, free-living, photosynthetic phase, while the sporophyte is reduced and nutritionally dependent on it. Award marks: 1.5 for alternation definition + 3 for the labelled cycle (gametophyte → gametes → fertilisation → sporophyte → meiosis → spores) + 1.5 for explaining gametophyte dominance.

★ TOPPER ANSWER TEMPLATES

2 TEMPLATES · MEMORISE THE FORMAT

MARKING SCHEME — GENERAL NOTES

- Section D algae question MUST be answered as a TABLE — paragraph answers lose at least 2 marks no matter how detailed.
- Pigment and stored-food rows are the most-mistaken: brown = fucoxanthin + mannitol/laminarin; red = phycoerythrin + floridean starch; green = chlorophyll b + starch. Penalise each swap 0.5 mark.
- For the bryophyte 'amphibian' question, the answer MUST mention water being needed for the antherozoid to swim — without it, award 0 of the mark.
- For the gymnosperm vs angiosperm question, the words 'naked seed' (gymnosperm) and 'double fertilisation' (angiosperm) each carry an independent mark — missing either loses that mark.
- For alternation of generations, both meiosis and fertilisation must be named as the switches between $2n$ and n ; one example per life-cycle type is required for full marks.
- Spelling of scientific names is examiner-discretion but accept any phonetic close form (Spirogyra / Spyrogyra etc.); penalise only if the genus is unrecognisable.
- Bonus consideration (no extra marks): mentioning heterospory in Selaginella as a precursor to the seed habit signals depth and may tip borderline scripts up half a mark.