Plant Kingdom

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. Plants called the amphibians of the plant kingdom are:
   (a) gymnosperms **(b)** algae **(c)** pteridophytes **(d)** bryophytes

2. Laminaria belongs to the:
   (a) brown algae (Phaeophyceae) **(b)** pteridophytes
   (c) gymnosperms **(d)** bryophytes (mosses)

3. In Chlorophyceae (green algae), the pigments are:
   (a) chlorophyll a and d, phycoerythrin **(b)** chlorophyll a and c, fucoxanthin
   (c) chlorophyll b and c **(d)** chlorophyll a and b

4. In a flowering plant (angiosperm) with n = 5, the number of chromosomes in the embryo is:
   (a) 10 **(b)** 5 **(c)** 15 **(d)** 20

5. The life cycle of Fucus is:
   (a) diplontic **(b)** haplo-diplontic
   (c) haplontic **(d)** triplontic

6. Carrageen comes from:
   (a) Brown algae **(b)** Ferns
   (c) Red algae **(d)** Unicellular algae

7. Which of these is heterosporous (makes microspores and megaspores)?
   (a) Adiantum **(b)** Psilotum **(c)** Lycopodium **(d)** Salvinia

8. Assertion (A): In a flowering plant whose leaf cells have 36 chromosomes, the endosperm cells have 36 chromosomes.
   Reason (R): The endosperm forms when a male gamete fuses with the two polar nuclei (triple fusion).
   (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 — Short answer — 8 × 2 = 16 marks

9. Why are bryophytes called amphibians of the plant kingdom?

10. In a flowering plant (angiosperm), the pollen grain has 21 chromosomes. How many chromosomes are there in the synergid, the zygote, the leaf cell?

11. To which group of plants does Cedrus belong?

12. Volvox is an alga. Name its class, its pigments and its stored food.

13. What type of life cycle does Ectocarpus have? Explain.

14. Name a useful product obtained from unicellular algae, and one use of it.

15. In a flowering plant, what is the sporophyte, and which generation is dominant?

16. Is Pteris homosporous or heterosporous? What does that mean?

Section C — Word problems — 4 × 4 = 16 marks

17. Compare the three classes of algae: pigments, stored food, cell wall, flagella and habitat.

18. In a moss, the haploid number is n = 21. Give the chromosome number and ploidy of: spore mother cell, spore, antherozoid, protonema cell, capsule wall. Which of these are formed by meiosis?

19. Compare Chlorophyceae (green algae) and Rhodophyceae (red algae) for pigments, stored food, cell wall and flagella, and give two examples of each.

20. Name the group of each plant and give one feature of that group: Chara, Funaria, Laminaria, Cedrus.

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Answer key

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Q	Answer	Working
1	**(d) bryophytes**	they live in soil but need water for fertilisation
2	**(a) brown algae (Phaeophyceae)**	—
3	**(d) chlorophyll a and b**	—
4	**(a) 10**	the embryo is diploid (2n)
5	**(a) diplontic**	the dominant plant is the diploid sporophyte; the gametophyte is reduced to a few cells
6	**(c) Red algae**	—
7	**(d) Salvinia**	—
8	**(d) A is false, but R is true.**	A is false: n = 18, so the endosperm (3n) has 54. R is true.
9	**They live in soil but need water for the sperms (antherozoids) to swim to the egg, so they depend on both land and water.**	—
10	**synergid 21; zygote 42; leaf cell 42**	n = 21; haploid n, diploid 2n, triploid 3n
11	**Gymnosperms**	—
12	**Chlorophyceae; chlorophyll a and b; starch**	—
13	**Haplo-diplontic: both the haploid gametophyte and the diploid sporophyte are multicellular stages**	—
14	**Protein-rich food supplements (Chlorella, Spirulina)**	—
15	**The plant itself; the diploid sporophyte**	—
16	**Homosporous: it makes only one kind of spore**	—
17	**Chlorophyceae: chlorophyll a, b; starch; cellulose wall; 2–8 equal apical flagella; fresh water, brackish and salt water. Phaeophyceae: chlorophyll a, c, fucoxanthin; mannitol and laminarin; cellulose and algin; two unequal lateral flagella; mostly marine. Rhodophyceae: chlorophyll a, d, phycoerythrin; floridean starch; cellulose, pectin and polysulphate esters; no flagella; mostly marine, often in deep water.**	—
18	**spore mother cell 42 (2n); spore 21 (n); antherozoid 21 (n); protonema cell 21**	gametes and gametophytes are haploid; the sporophyte is diploid; the angiosperm endosperm is triploid

Q	Answer	Working
	(n); capsule wall 42 (2n); spores are formed by meiosis	
19	**pigments: chlorophyll a and b / chlorophyll a and d, phycoerythrin; stored food: starch / floridean starch; cell wall: cellulose / cellulose, pectin and polysulphate esters; flagella: 2–8, equal, apical / absent. Examples: Chlamydomonas and Chara; Gelidium and Porphyra.**	—
20	**Chara: green algae (Chlorophyceae); Funaria: bryophytes (mosses); Laminaria: brown algae (Phaeophyceae); Cedrus: gymnosperms**	algae: thalloid; bryophytes: dominant gametophyte; pteridophytes: vascular, no seeds; gymnosperms: naked seeds