

SESSION 10: PLANT DIVERSITY

Key Concepts

In this session we will focus on summarising what you need to know about:

- Bryophytes
- Pteridiophytes
- Gymnosperms
- Angiosperms

Terminology & Definitions

Sexual reproduction: Reproduction involving the fusion of male and female gametes.

Asexual reproduction: Reproduction that does not involve gametes.

Haploid: Has one set of chromosomes.

Diploid: Have two sets of chromosomes.

Alternation of generations: Alternation between sporophyte and gametophyte generations.

Gametophyte: The gamete-producing phase in the life cycle of a plant.

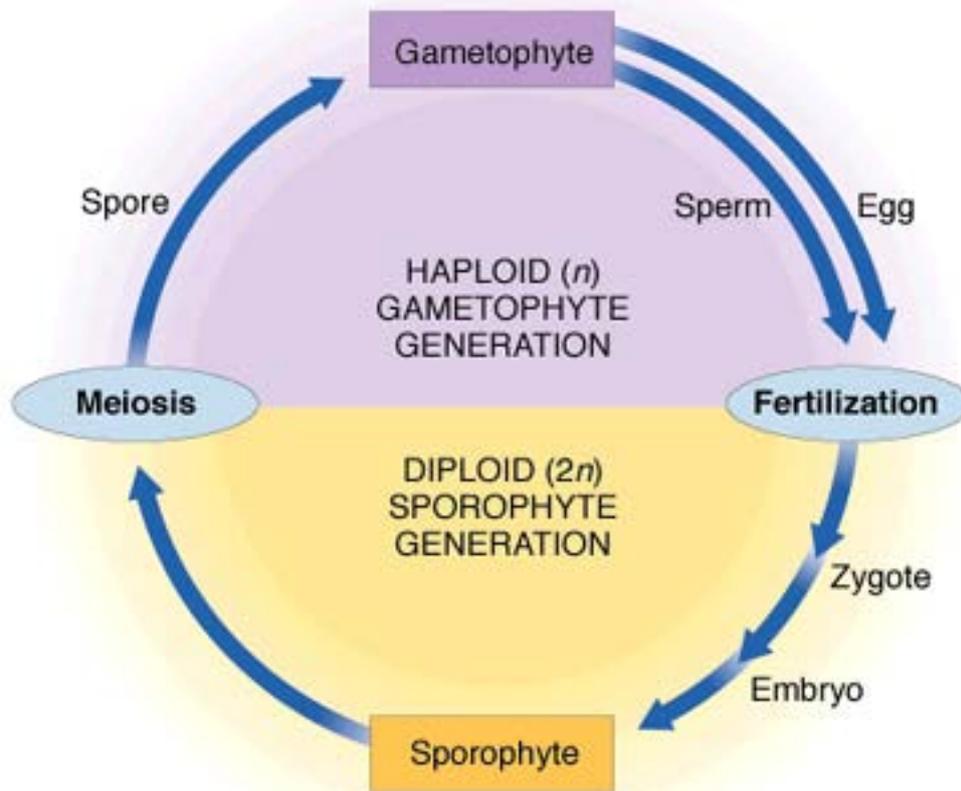
Sporophyte: The spore-producing phase in the life cycle of a plant.

Pollination: Transfer of pollen from the anther to the stigma of a plant.

Key Concepts / Diagram

Asexual reproduction does not involve any sex cells or gametes. Sexual reproduction involves the two alternating processes of meiosis and fertilisation. During meiosis, the chromosome number is reduced from the diploid to the haploid number. In fertilisation, the chromosome number increases from haploid to diploid.

Meiosis and fertilisation are represented in life cycles of organisms in two distinct generations. The **gametophyte** generation which produces gametes, and the **sporophyte** generation which produces spores. Cells that have a diploid number, undergo meiosis to reduce the number of chromosome while haploid cells fuse to increase the number of chromosomes.



Bryophytes

These are the most primitive plants. Most common example are mosses. They are found in moist, shady areas. These plants have no cuticle. Bryophytes have no true roots, stems, or leaves and are thus called a thallus. Owing to the absence of a vascular (transport) system, these plants are usually very small in size. They need water for reproduction and reproduce using spores - a water-proof single cell that can grow into a new organism.

Pteridiophytes

Most common examples are ferns. They are found in moist, shady areas. These plants have a thick cuticle. Pteridiophytes have true roots and stems. They have large leaves that are called fronds. They have a vascular system. They need water for reproduction and reproduces using spores. No fruit is produced.

Gymnosperms

Most common examples are pines and cycads. They are commonly known as conifers because their seeds are formed in male and female cones. The leaves have a thick, waxy cuticle and complex vascular (transport) system. They possess true roots, stems and leaves. The seeds produced are not enclosed in an ovary and, therefore, no fruit develops. They are wind pollinated

Angiosperms

They are commonly known as flowering plants. Examples include daisies and roses. These are the most advanced plants and the leaves have a varying cuticle thickness. They can be found in all types of environments. They can grow to enormous sizes due to the presence of a complex vascular (transport) system. Angiosperms have true roots, stems, and leaves. In these plants, seeds develop in an ovary and they produce the reproductive structures called flowers and fruits. Their reproduction is independent of water.

X-planation

The table below provides a summary of the most important content required for examination purposes.

Plant Group	Adaptations to a terrestrial life			
	Features	Vascular tissue	Fertilisation	Seeds or spores
Bryophytes (mosses and liverworts)	Simple , small plants, thallus with no true leaves and roots	None	Dependent on water	Spores
Pteridophytes (ferns)	Have large leaves. Roots present.	Xylem and phloem present	Dependant on water	Spores
Gymnosperms (yellow woods, cycads)	True leaves and roots	Xylem and phloem present	Independent of water	Seeds not enclosed in an ovary but in cones
Angiosperms (flowering plants)	True leaves, stems and roots	Xylem and phloem present	Independent of water	Seeds enclosed in an ovary. Produce flowers and fruit

X-ample Questions

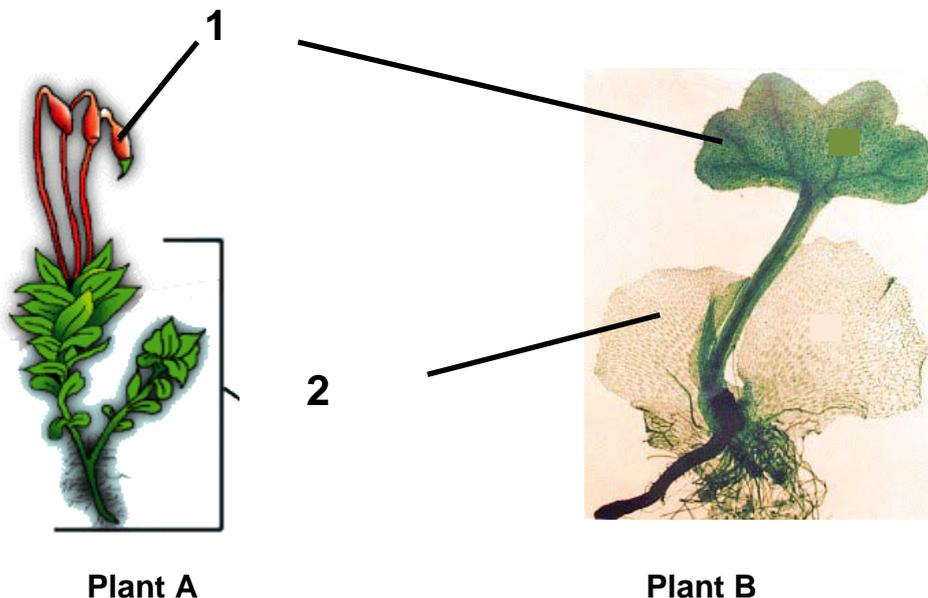
Question 1

- 1.1 Which one of the following is not involved in sexual reproduction?
- A. Sperm
 - B. Mitosis
 - C. Zygote
 - D. Meiosis
- 1.2 Which of the following are products of meiosis?
- A. male and female gametes.
 - B. different types of pollen.
 - C. microspores and megaspores.
 - D. diploid spores
- 1.3 Gymnosperms are heterosporous because they
- A. produce male and female gametes.
 - B. have different types of pollen.
 - C. produce microspores and megaspores.
 - D. produce haploid and diploid spores.
- 1.4 Which two features do angiosperms have that other plants do not ?
- A. Flowers and fruit
 - B. Leaves and fruit
 - C. Flowers and seeds
 - D. Fruit and seed.

(2 x 5)
[10]

Question 2

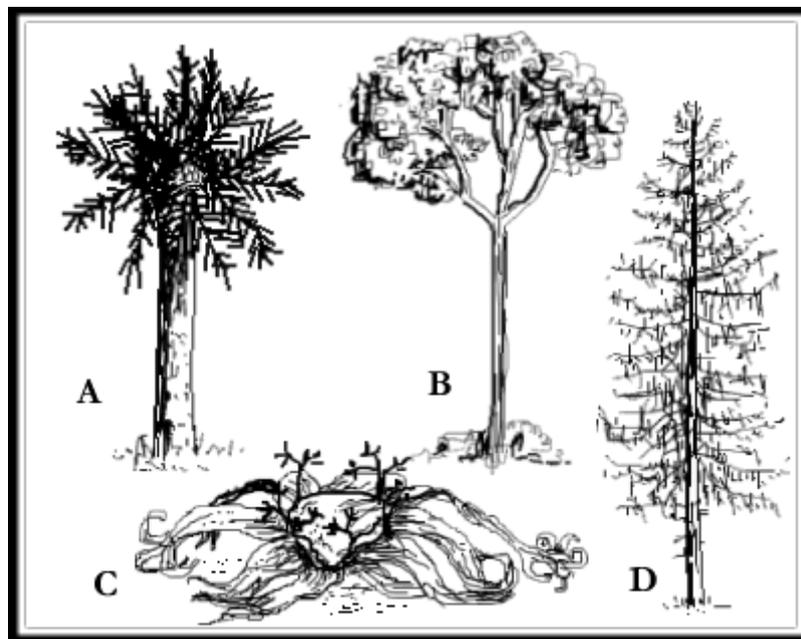
Study the diagram below and answer the questions that follow.



- 2.1 Identify the plants in A and B respectively. (2)
- 2.2 Which generations are represented by 1 and 2 in A? (2)
- 2.3 Which generations are represented by 1 and 2 in B? (2)
- 2.4 Which numbered structure in A is haploid? (2)
- 2.5 Which numbered structure in B is diploid? (2)
- 2.6 List one difference between the structures numbered 1 in A and B respectively. (4)

Question 3

Study the diagrams below and answer the questions that follow.



- 3.1 To which group of plants do all the plant species above belong? (1)
- 3.2 List the 5 most important characteristics of the plant mentioned in 3.1. (5)
- 3.3 Provide the full species name of the plant labelled C. (2)
- 3.4 What makes the plant labelled C unique? (2)

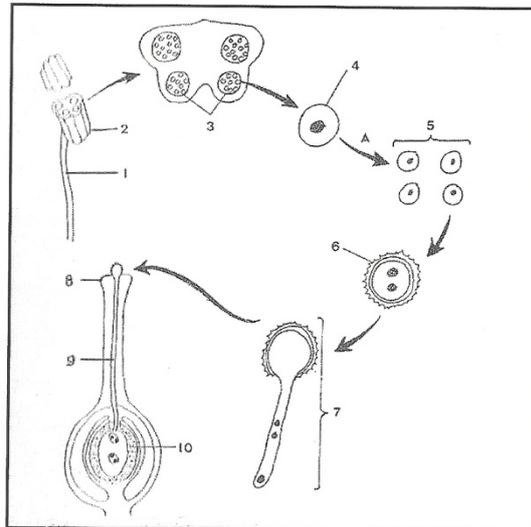
X-ercise

Question 1

- 1.1 Distinguish between sexual and asexual reproduction. (4)
- 1.2 What is the alternation of generations? (2)
- 1.3 Which generation is always haploid? (1)
- 1.4 Which generation always produces spores? (2)
- 1.5 List reasons why seeds are important to the plant that produces it. (2)

Question 2

Study the diagrams below and answer the questions that follow.



- 2.1 Distinguish between fertilisation and pollination. (4)
- 2.2 Provide labels for the parts numbered 1 to 10. (10)

Question 3

Compare the anatomy, vascular tissue and reproductive structures produced by mosses and yellow woods

(12)