NCERT Exemplar Solutions of Class 11 Biology – Chapter: 3 – Plant Kingdom

LONG ANSWER TYPE QUESTIONS

1. The gametophyte is a dominant phase in the life cycle of a bryophyte. Explain.

Solution:

Due to the alternation in the gametophytic and sporophytic life, Bryophyte shows haplodiplonic life cycle. The major part is dominated by the haploid gametophytic phase. They are independent, photosynthetic and haploid phase. Inside gametophyte, the antheridium and archegonia are formed. Later fertilization will occur and zygote will be formed. Zygote developed into sporophytes which is small & is dependent on the gametophyte for water and food.

Explanation: In bryophytes, the gametophyte is the main plant body that we observe, while the sporophyte remains attached to and dependent on the gametophyte throughout its life.

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2. With the help of a schematic diagram describing the haplo-diplontic life cycle pattern of a plant group.

Solution:

Alternation of generation takes place between gametophyte & sporophyte. i.e. the haploid & diploid phase hence called the haplodiplontic life cycle.

[The document includes a detailed life cycle diagram showing:

- Gametophyte (n) phase with Archegonium → Egg and Antheridium → Antherozoid
- Syngamy leading to Zygote (2n)
- Sporophyte (2n) phase with Embryo → Sporophyte → Strobilus → Sporophyll → Sporangium → Spore mother cells
- Meiosis producing Spores (n) that develop into Gametophyte]

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3. Lichen is usually cited as an example of 'symbiosis' in plants where an algal and a fungal species live together for their mutual benefit. Which of the following will happen if algal and fungal partners are separated from each other?

a. Both will survive and grow normally and independent of each other.

b. Both will die

c. The algal component will survive while the fungal component will die.

d. The fungal component will survive while the algal partner will die.

Based on your answer how do you justify this association as symbiosis?

Solution:

b. Both will die

In the symbiotic relationship between algae & fungi, both are dependent on each other for their basic needs essential for survival. Algal part synthesises food for fungi & fungi takes up water & minerals for algae. If separated, both will die.

Explanation: This demonstrates true mutualistic symbiosis where both partners have become so interdependent that neither can survive alone in their natural habitat.

4. Explain why sexual reproduction in angiosperms is said to take place through double fertilization and triple fusion. Also, draw a labelled diagram of embryo sac to explain the phenomena.

Solution:

The 2 male nuclei enter the embryo sac, one of the male gametes fuses with the egg to form a diploid zygote & the other male gamete fuses with a diploid secondary nucleus to form triploid primary endosperm nucleus (PEN). Therefore the two fusion is called double fertilization.

[The document includes a detailed diagram of embryo sac showing:

- Chalazal end with Antipodals
- Central cell and Polar cell
- Egg and Synergids
- Micropylar end with Filiform apparatus]

Explanation: Double fertilization is unique to angiosperms and ensures that endosperm formation occurs only when fertilization takes place, making reproduction more efficient.

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5. Draw labelled diagrams of

a. Female and male thallus of a liverwort.

b. Gametophyte and sporophyte of Funaria.

c. Alternation of generation in Angiosperm.

Solution:

A. Female and male thallus of liverwort: [Diagrams show both male and female thalli with labeled parts:

- Archegoniophore (in female) with Disc, Stalk, Gemma cup, Rhizoids
- Antheridia (in male) with similar structures]

B. Gametophyte and sporophyte of Funaria: [Diagram shows:

- Sporophyte: Capsule, Seta
- Gametophyte: Leaves, Main axis, Rhizoids]

C. Alternation of generation in Angiosperm: [Complex diagram showing complete angiosperm life cycle including:

- Flower structure with stigma, style, ovary
- Microsporangium and megasporangium
- Meiosis and mitosis processes
- Pollen development and fertilization
- Seed formation with endosperm and embryo]

Explanation: These diagrams illustrate the diversity of plant reproductive structures and life cycles, from simple bryophytes to complex flowering plants.