CHAPTER 1

NUTRITION IN PLANTS

2mark questions:

1. Why do organisms take food?

Answer:

All organisms require energy for their life processes. Plants prepare their food and acquire nutrients from abiotic components like soil, air, water and sunlight. On the other hand, animals need to get food from either plants or other animals to obtain nutrients; hence, animals need to take food to acquire nutrients and energy.

2. Distinguish between a parasite and a saprophyte.

Answer:

Saprophytes	**Parasites**
Acquire nutrients from dead and decaying matter.	Parasites live on or in a host and get their food at the expense of their host.
Example: Fungi	Example: Roundworm

3.How do plants obtain the raw materials for photosynthesis?

Answer:

Plants absorb water and minerals from the soil through their roots, and they take in carbon dioxide from the air through tiny pores called stomata on the surface of leaves.

4.Explain the role of chlorophyll in photosynthesis.

Answer:

Chlorophyll is a green pigment in leaves that captures sunlight. This energy is used to combine carbon dioxide and water to produce carbohydrates during photosynthesis.

5.What is the significance of photosynthesis for living organisms?

Answer:

Photosynthesis is crucial as it produces food (carbohydrates) and oxygen. Almost all living organisms directly or indirectly depend on the food made by plants, and oxygen, essential for survival, is a byproduct.

6.Why do some plants, like Cucuta, not carry out photosynthesis?

Answer:

Plants like Cucuta lack chlorophyll and, therefore, cannot synthesize their own food. They are dependent on other plants as hosts from which they extract ready-made nutrients.

5-mark questions:

1. How would you test the presence of starch in leaves?

Answer:

Take two potted plants of the same kind. Keep one in the dark for 72 hours and the other in the sunlight. Perform the iodine test with the leaves of both plants as given below. Now, leave the pot, which was earlier kept in the dark, undisturbed for 3–4 days and perform the iodine test again on its leaves.

Iodine test:

Put iodine solution on the leaf.

Observation:

Blue-black color will be observed on the leaves of the plant kept in sunlight, which indicates the presence of starch.

Blue-black color will not be observed on the leaves of plants kept in the darkroom. This indicates the absence of starch.

2. Give a brief description of the process of synthesis of food in green plants.

Answer:

Green plants use a process called photosynthesis to prepare their food. The process is as follows

- Water is taken from the roots of the plant, and it is transported to the leaves of the plant.

- Carbon dioxide from the air enters the leaves through pores called stomata. This diffuses the cell containing chlorophyll.
- Water molecule is broken down into Hydrogen and Oxygen with the help of sunlight.
- Hydrogen combines with Oxygen and Hydrogen to form carbohydrates.
- Photosynthesis is represented by the following equation.

$$\text{Carbon dioxide} + \text{water} \xrightarrow[\text{chlorophyll}]{\text{sunlight}} \text{Carbohydrate} + \text{oxygen}$$

3.Show with the help of a sketch that plants are the ultimate source of food.

Answer:

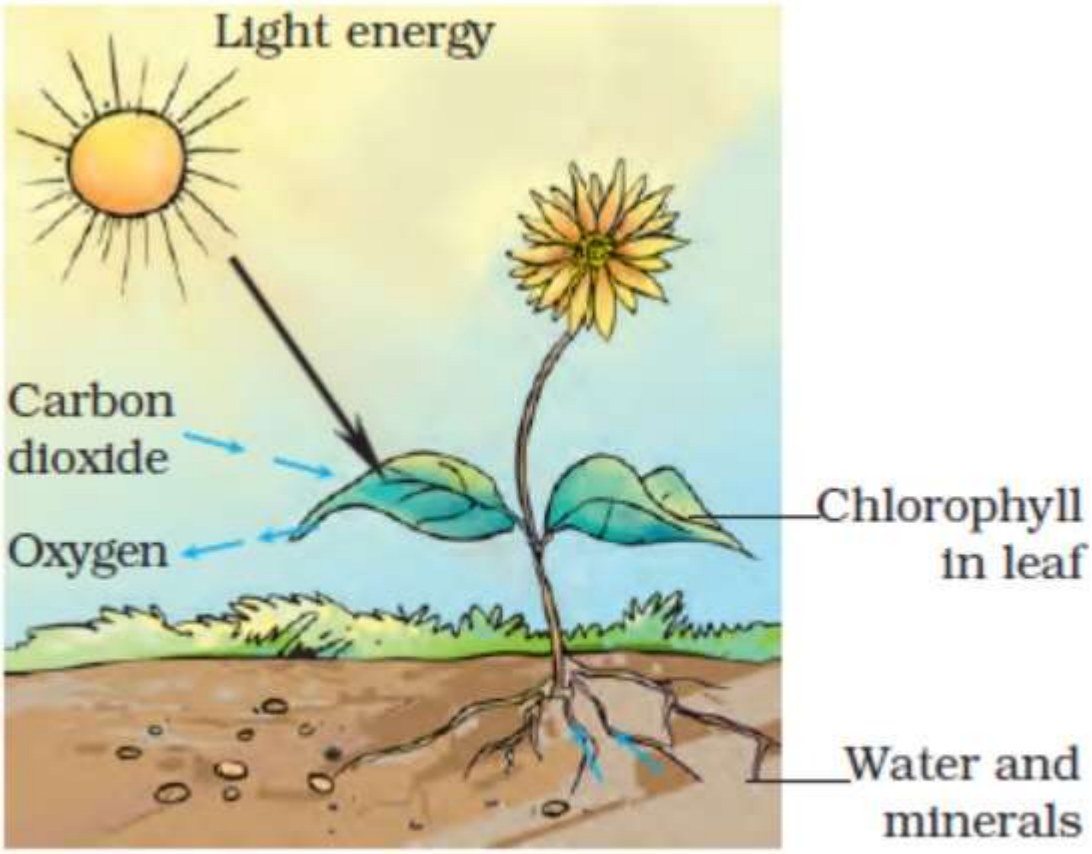

Fig. 1.3 Diagram showing photosynthesis

3.compare and contrast autotrophic and heterotrophic nutrition in plants, providing examples of each.

Answer:

Autotrophic and heterotrophic nutrition are two distinct modes of obtaining food in the plant kingdom. Autotrophic nutrition refers to the ability of certain organisms, particularly plants, to produce their own food using external resources like sunlight. This process

is exemplified by photosynthesis, where plants convert light energy into chemical energy in the form of carbohydrates. Examples of autotrophs include green plants, algae, and some bacteria. In contrast, heterotrophic nutrition involves organisms that cannot produce their own food and must obtain it from external sources. Most animals, including humans, are heterotrophs and rely on consuming other organisms or organic matter for their nutritional needs. Herbivores, for instance, obtain nutrition by consuming plants, while carnivores feed on other animals.

4.Discuss the unique nutritional strategies of insectivorous plants and saprotrophs. Provide examples of each.

Answer:

Insectivorous plants and saprotrophs are fascinating examples of how plants have evolved distinct nutritional strategies. Insectivorous plants, such as the pitcher plant, employ a carnivorous approach by capturing and digesting insects. The modified leaves of the pitcher plant form a pitcher-like structure, often with a lid that opens and closes. Insects are attracted to the

plant, and once inside the pitcher, they are trapped and digested by the plant's enzymes.

On the other hand, saprotrophs, like mushrooms, are organisms that obtain nutrition by decomposing dead organic matter. These organisms play a vital role in recycling nutrients in ecosystems. Mushrooms release enzymes that break down complex organic compounds into simpler forms, making the nutrients available for absorption. This decomposition process is essential for the nutrient cycling in ecosystems.

6. Fill in the blanks.

(a) Green plants are called _____ since they synthesise their own food.

(b) The food synthesised by plants is stored as _____.

(c) In photosynthesis, solar energy is absorbed by the pigment called _____.

(d) During photosynthesis, plants take in _____ and release _____ gas.

Solution:

(a) Green plants are called **autotrophs** since they synthesise their food.

(b) The food synthesised by plants is stored as **starch**.

(c) In photosynthesis, solar energy is absorbed by the pigment called **chlorophyll.**

(d) During photosynthesis, plants take in **carbon dioxide** and release **oxygen** gas.

7. Name the following.

(I) A parasitic plant with a yellow, slender and branched stem.

(ii) A plant that is partially autotrophic.

(iii) The pores through which leaves exchange gases.

Solution:

I) Cucuta

ii) Pitcher plant

iii) Stomata

8. Tick the correct answer.

(a) Cucuta is an example of:

(I) autotroph

(ii) parasite

(iii) saprotroph
(iv) host

(b) The plant which traps and feeds on insects is:

(I) Cucuta

(ii) China rose

(iii) pitcher plant

(iv) rose

Solution:

(a) (ii) Parasite

(b) (iii) pitcher plant

9. Match the items given in Column I with those in Column II.

Column-I	Column-II
Chlorophyll	Rhizobium
Nitrogen	Heterotrophs
Cucuta	Pitcher plant
Animals	Leaf
Insects	Parasite

Answer:

Column-I	Column-II
Chlorophyll	Leaf
Nitrogen	Rhizobium

Cucuta	Parasite
Animals	Heterotrophs
Insects	Pitcher plant

10. Mark 'T' if the statement is true and 'F' if it is false.

(I) Carbon dioxide is released during photosynthesis. (T/F)

(ii) Plants which synthesise their food are called saprotrophs. (T/F)

(iii) The product of photosynthesis is not a protein. (T/F)

(iv) Solar energy is converted into chemical energy during photosynthesis. (T/F)

Answer:

1. False
2. False
3. True
4. True

11. Choose the correct option from the following:

Which part of the plant takes in carbon dioxide from the air for photosynthesis?

(I) Root hair (ii) Stomata (iii) Leaf veins (iv) Petals

Answer:

The answer is (ii) Stomata

Choose the correct option from the following:

Plants take carbon dioxide from the atmosphere mainly through their:

(I) roots (ii) stem (iii) flowers (iv) leaves

Solution:

The answer is (iv) leaves

13. Why do farmers grow many fruits and vegetable crops inside large greenhouses? What are the advantages to the farmers?

Solution:

Fruits and vegetable crops are grown in large greenhouses because it protects crops from external climatic conditions and provides suitable temperature for the growth of crops.

Advantages to farmers while growing fruits and vegetable crops inside greenhouses are

- It protects crops from diseases and adverse climatic conditions.

Summary:

Photosynthesis is a vital process in plants where they use chlorophyll to capture sunlight, combining it with carbon dioxide and water to produce carbohydrates and release oxygen. This process is essential for plant nutrition and provides the foundation of the food web, sustaining both plants and animals.

Plants exhibit autotrophic nutrition, producing their own food through processes like photosynthesis. Examples include green plants and algae. In contrast, heterotrophic nutrition involves organisms, like animals, relying on external sources for food. Herbivores feed on plants, while carnivores consume other animals.

Insectivorous plants, like the pitcher plant, capture and digest insects as a unique nutritional strategy. Saprotrophs, exemplified by mushrooms, decompose dead organic matter, playing a crucial role in nutrient cycling in ecosystems.

These processes highlight the diverse ways in which plants obtain nutrition and contribute to the interconnectedness of life on Earth.