



Class: 9th

Subject: Biology

Chapter 9: PLANT PHYSIOLOGY



Exercise MCQs:

1. Which of the following plant nutrients is required in large amount?

- (a) Iron
- (b) Zinc
- (c) Potassium
- (d) Boron

2. Which element is required by plants for the formation of chlorophyll?

- (a) Phosphorus
- (b) Calcium
- (c) Magnesium
- (d) Sulphur





3. The primary function of root hairs is:

- (a) Transport of nutrients
- (b) Storage of food
- (c) Increase surface area for absorption
- (d) Synthesis of proteins

4. Root hairs absorb salts from soil by:

- (a) Diffusion
- (b) Osmosis
- (c) Active transport
- (d) Filtration

5. Water moves from the soil into root cells by:

- (a) Osmosis
- (b) Active transport
- (c) Diffusion
- (d) Bulk flow

6. The transpiration is regulated by:


- (a) Mesophyll
- (b) Guard cells



(c) Xylem

(d) Phloem

7. Under which condition there will be high rate of transpiration?



(a) High humidity

(b) Low light intensity

(c) Wind

(d) Waterlogged soil

8. Which ion plays a role in the opening of stomata?

(a) Sodium (Na^+)

(b) Potassium (K^+)

(c) Calcium (Ca^{2+})

(d) Magnesium (Mg^{2+})

9. In most plants the food is transported in the form of:

(a) Glucose

(b) Sucrose

(c) Starch





(d) Maltose

10. What is TRUE according to the pressure flow mechanism of food transport?

(a) Water enters the source, creating pressure

(b) Water is pulled from the sink

(c) Movement of food in phloem is due to gravity

(d) Solutes move from low to high concentration

11. Succulent organs are present in:

(a) Xerophytes

(b) Hydrophytes

(c) Mesophytes

(d) Halophytes

Important MCQs:

1. Which process allows plants to make their own food?

(a) Respiration

(b) Osmosis





(c) Photosynthesis

(d) Fermentation

2. Which of the following is a macronutrient required by plants?



(a) Iron

(b) Zinc

(c) Magnesium

3. The yellowing of leaves due to nitrogen deficiency is known as:

(a) Wilting

(b) Necrosis

(c) Blight

(d) Chlorosis


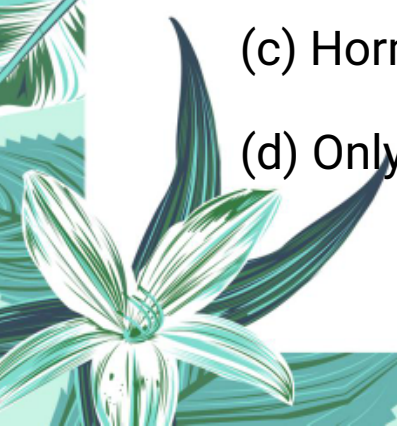
4. Nitrogen in plants helps in the production of:

(a) Fruits only

(b) Proteins and nucleic acids

(c) Hormones only


(d) Only chlorophyll





5. Magnesium is absorbed by plant roots in the form of:

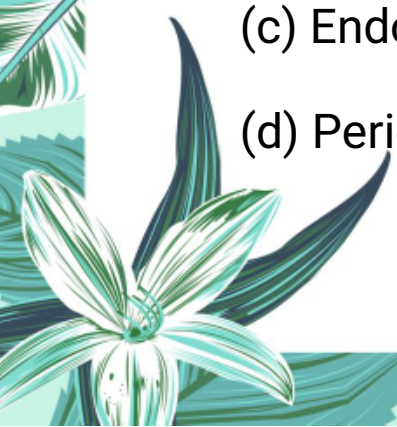
- (a) Mg
- (b) Mg^{2+}
- (c) Magnesium hydroxide
- (d) $MgCl_2$



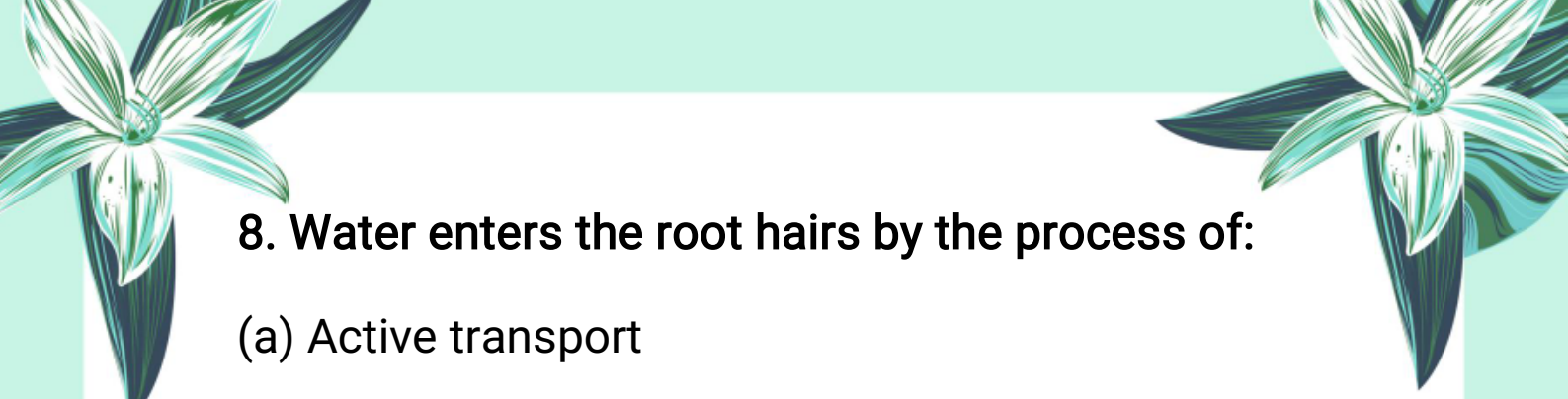
6. Which of the following tissues is responsible for the transport of water and salts in plants?

- (a) Phloem
- (b) Parenchyma
- (c) Xylem
- (d) Collenchyma

7. Which part of the root is in direct contact with soil water?

- (a) Cortex
 - (b) Root hairs
 - (c) Endodermis
 - (d) Pericycle
- 





8. Water enters the root hairs by the process of:

- (a) Active transport
- (b) Diffusion
- (c) Osmosis
- (d) Transpiration



9. What is the function of phloem in plants?

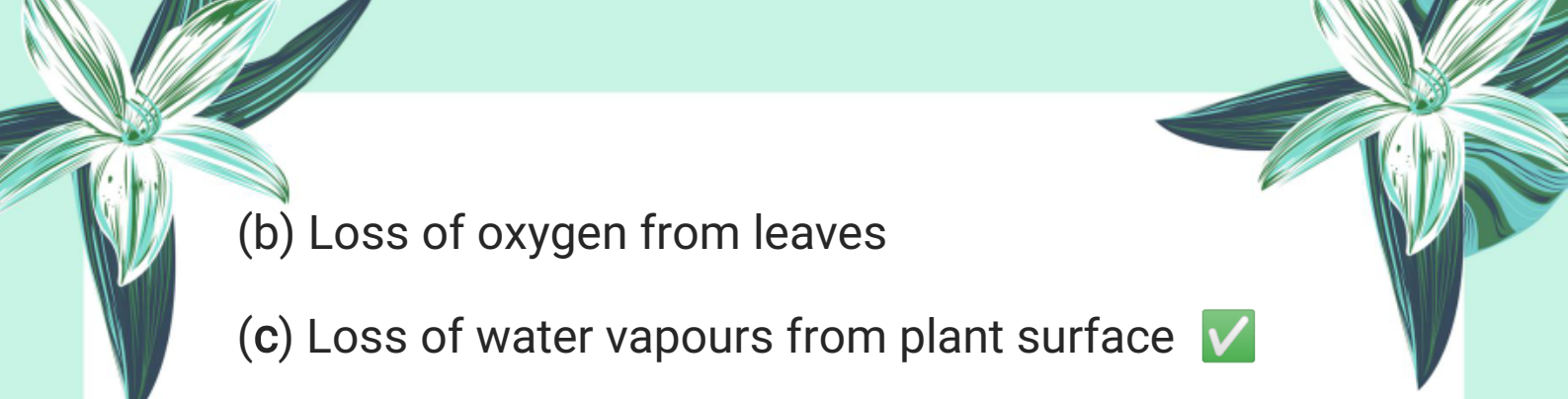
- (a) Absorbing water from soil
- (b) Transporting food
- (c) Producing hormones
- (d) Strengthening plant structure

10. Which layer of root receives water from the cortex and passes it to the pericycle?


- (a) Epidermis
- (b) Xylem
- (c) Endodermis
- (d) Phloem

11. What is transpiration?


- (a) Intake of water by roots
- 

- 
- (b) Loss of oxygen from leaves
 - (c) Loss of water vapours from plant surface
 - (d) Movement of salts from root to shoot

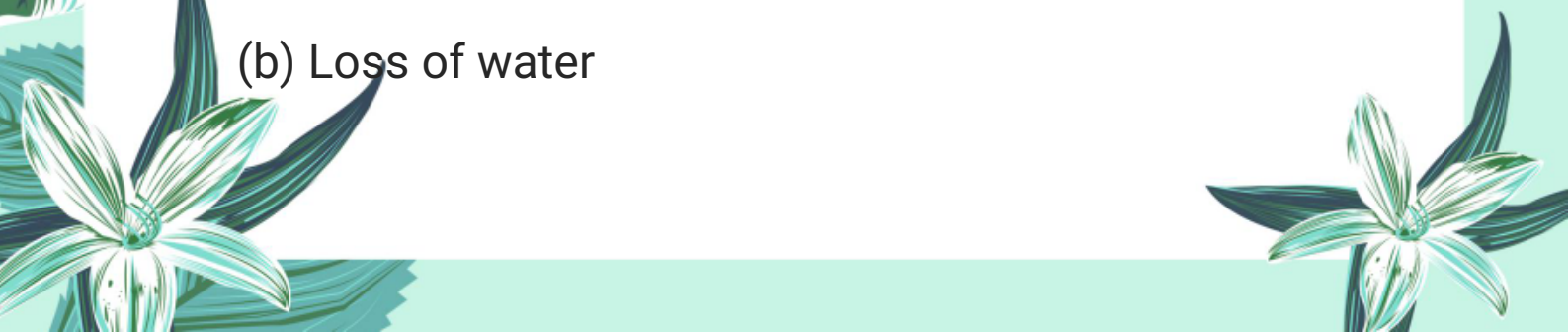
12. Most of the transpiration occurs through:

- 
- (a) Cuticle
 - (b) Lenticels
 - (c) Stomata
 - (d) Root hairs

13. The cells that control the opening and closing of stomata are called:

- 
- (a) Mesophyll cells
 - (b) Xylem cells
 - (c) Guard cells
 - (d) Epidermal cells

14. What causes guard cells to become turgid and open stomata?

- 
- (a) Increase in temperature
 - (b) Loss of water



(c) Intake of potassium ions

(d) Decrease in glucose

15. During evening, the stomata close because:

(a) Potassium ions enter guard cells



(b) Photosynthesis increases

(c) Glucose concentration increases

(d) Water moves out of guard cells

16. Which of the following increases the rate of transpiration?

(a) High humidity

(b) Wind

(c) Small leaf surface

(d) Stomata on upper surface only

17. Which factor decreases the rate of transpiration?

(a) Wind

(b) High temperature

(c) High humidity





(d) Large surface area of leaves

18. What creates the pulling force for water transport in plants?

(a) Root pressure

(b) Osmosis

(c) Transpirational pull

(d) Active transport



19. The continuous water column in xylem is maintained due to:

(a) Gravity

(b) Root hairs

(c) Cell division

(d) Cohesion and adhesion of water molecules

20. As water evaporates from mesophyll cells, it is replaced by:

(a) Water from cuticle

(b) Water from epidermis

(c) Water from phloem





(d) Water from xylem

21. The food in plants is transported through:

(a) Xylem

(b) Phloem



(c) Cambium

(d) Mesophyll

22. In pressure flow mechanism, food moves from:

(a) Sink to source

(b) Root to leaf

(c) Source to sink

(d) Stem to atmosphere

23. Which cells provide energy for active transport of food into phloem?

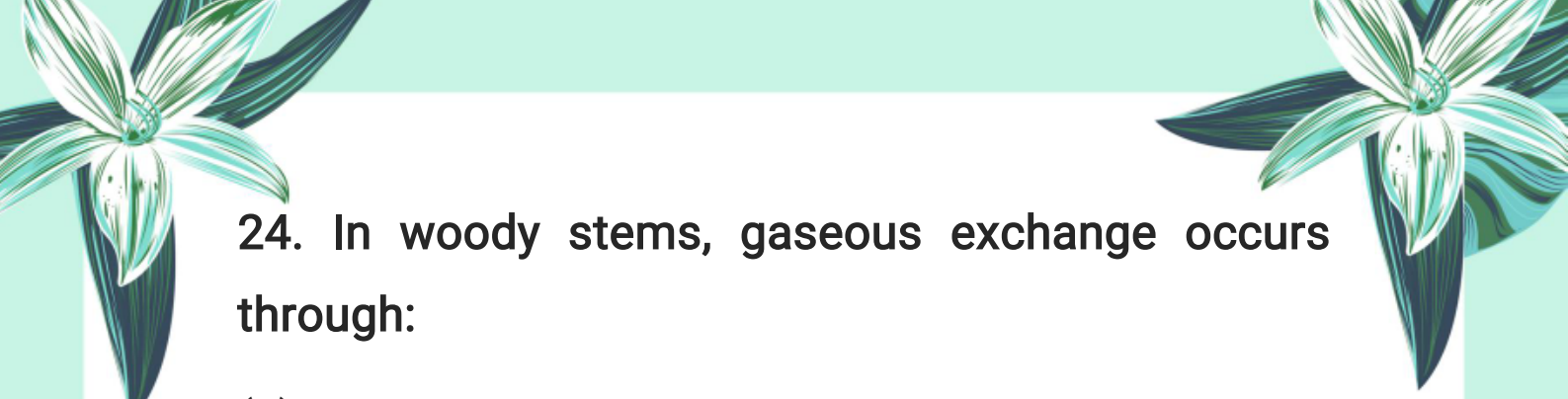
(a) Mesophyll cells

(b) Guard cells

(c) Companion cells

(d) Epidermal cells





24. In woody stems, gaseous exchange occurs through:

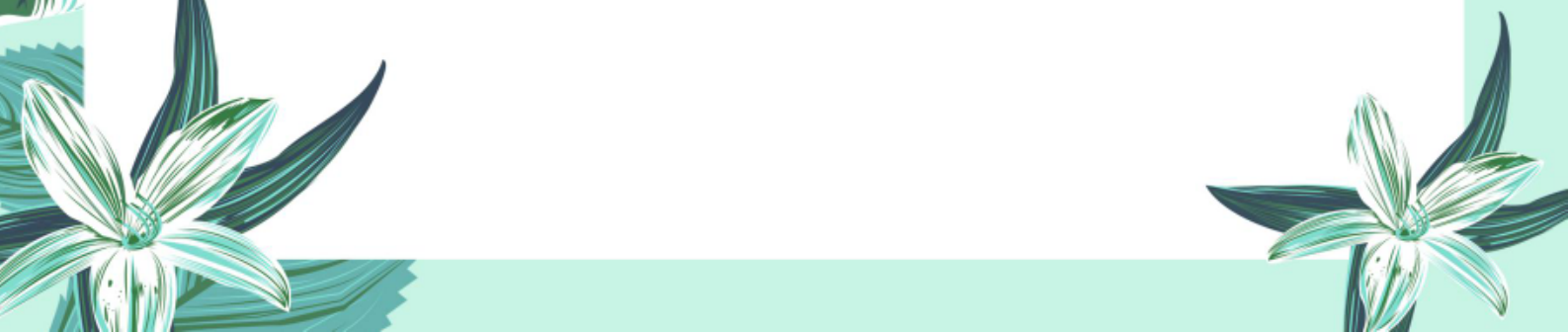
- (a) Stomata
- (b) Bark
- (c) Lenticels
- (d) Cuticle

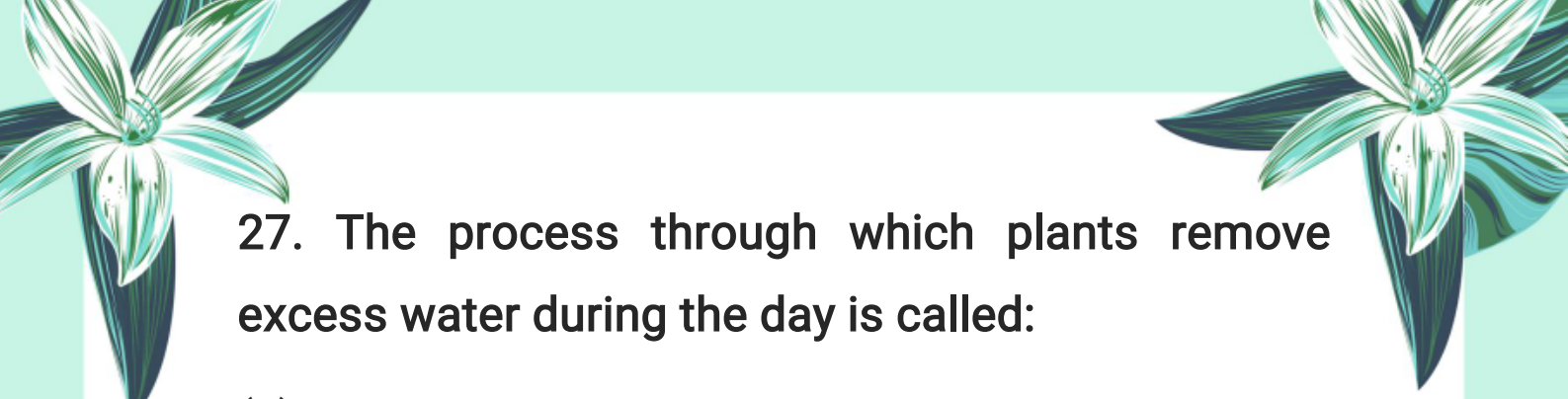


25. During daytime, leaves:

- (a) Take in oxygen and release carbon dioxide
- (b) Release oxygen and take in carbon dioxide
- (c) Perform only respiration
- (d) Perform no gaseous exchange

26. Plants excrete extra carbon dioxide at night through:

- (a) Roots
 - (b) General surfaces and stomata
 - (c) Cuticle
 - (d) Xylem vessels
- 




27. The process through which plants remove excess water during the day is called:

- (a) Respiration
- (b) Photosynthesis
- (c) Transpiration
- (d) Guttation



28. Guttation occurs mostly at:


- (a) Night
- (b) Noon
- (c) Morning
- (d) Evening



29. Guttation involves the release of water droplets through:

- (a) Stomata
- (b) Cuticle
- (c) Leaf veins
- (d) Special pores at leaf tips or edges





30. Which plant excretes latex as a metabolic waste?

- (a) Acacia
- (b) Rubber plant
- (c) Ladyfinger
- (d) Pine





31. Mesophytes are adapted to:

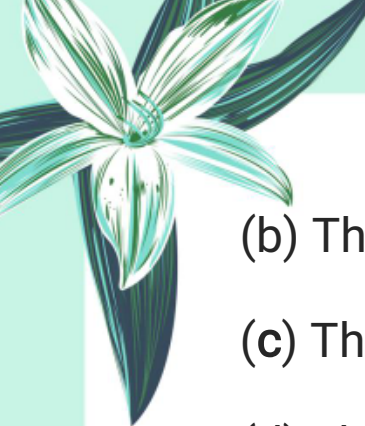

- (a) Very wet habitats
- (b) Salty habitats
- (c) Moderate environments
- (d) Dry deserts

32. In hydrophytes, water leaves the body through:


- (a) Stomata on lower surface
- (b) Stem pores
- (c) Stomata on upper surface
- (d) Salt glands

33. Xerophytes reduce water loss by having:


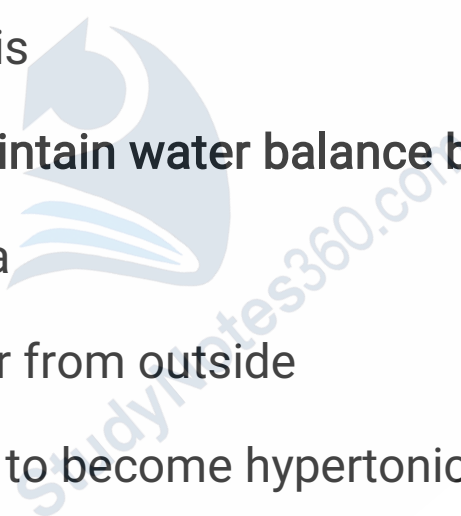
- (a) Many stomata
- 
- 

- 
- 
- (b) Thin cuticle
 - (c) Thick waxy cuticle
 - (d) Floating leaves

34. Succulent organs in xerophytes are meant for:

- 
- (a) Photosynthesis
 - (b) Salt absorption
 - (c) Water storage
 - (d) Protein synthesis

35. Halophytes maintain water balance by:

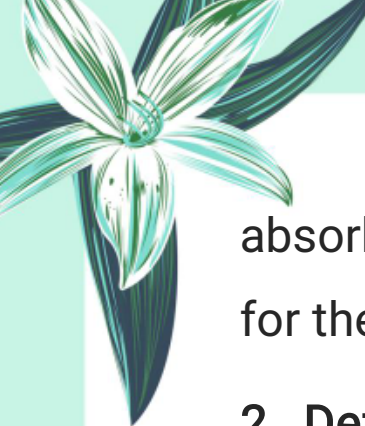
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- 
- (a) Closing stomata
 - (b) Absorbing water from outside
 - (c) Absorbing salts to become hypertonic
 - (d) Reducing photosynthesis

Exercise Short Questions:

1. Define mineral nutrition in plants.


Mineral nutrition is the process by which plants





absorb inorganic nutrients (minerals) from the soil for their growth and development.

2. Define macronutrients and micronutrients and give examples.



Macronutrients are nutrients required by plants in large amounts (e.g., Nitrogen, Potassium, Calcium).

Micronutrients are needed in small amounts (e.g., Iron, Zinc, Boron).

3. State the roles of nitrogen and magnesium in plants.

- Nitrogen is essential for protein and nucleic acid synthesis.
- Magnesium is necessary for chlorophyll formation and photosynthesis.

4. Define transpiration and its types.

Transpiration is the loss of water from aerial parts of plants in the form of water vapour.

Types:

i) Stomatal transpiration (through stomata)






ii) Cuticular transpiration (through cuticle)

iii) Lenticular transpiration (through lenticels)

5. How is the transpirational pull important in plants?



Transpirational pull helps in the upward movement of water and minerals from roots to leaves through xylem.

6. Transpiration is the loss of water from plants. Is it a harmful phenomenon? If no, what is its importance?

No, it is not harmful. Transpiration is important for:

- Cooling the plant
- Transporting minerals
- Creating transpirational pull
- Maintaining water balance


7. Differentiate between:

i. Xylem and Phloem

- Xylem transports water and minerals upward.
- 

- 
- 
- Phloem transports food in both directions.

ii. Transpiration and Guttation

- 
- Transpiration is water loss as vapour through stomata.
 - Guttation is the release of liquid water through pores at leaf edges.

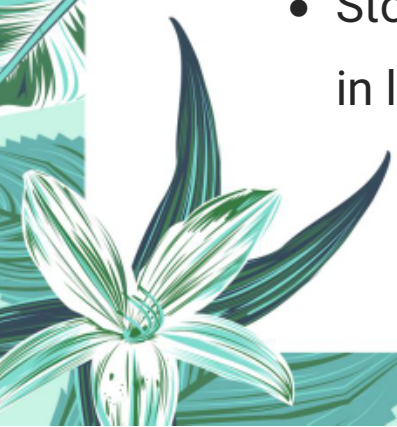

iii. Hydrophytes and Halophytes

- Hydrophytes live in fresh water.
- Halophytes live in salty environments.

iv. Hydrophytes and Xerophytes

- Hydrophytes are adapted to wet conditions.
- Xerophytes are adapted to dry environments.

v. Lenticular transpiration and Stomatal transpiration

- 
- 
- Lenticular transpiration occurs through lenticels in woody stems.
 - Stomatal transpiration occurs through stomata in leaves.



8. How do the plants of rubber and keekar excrete their wastes?

Rubber plant excretes waste in the form of latex, and Keekar (Acacia) excretes waste in the form of gums through special pores.



Important Short Questions:

1. What is mineral nutrition in plants?

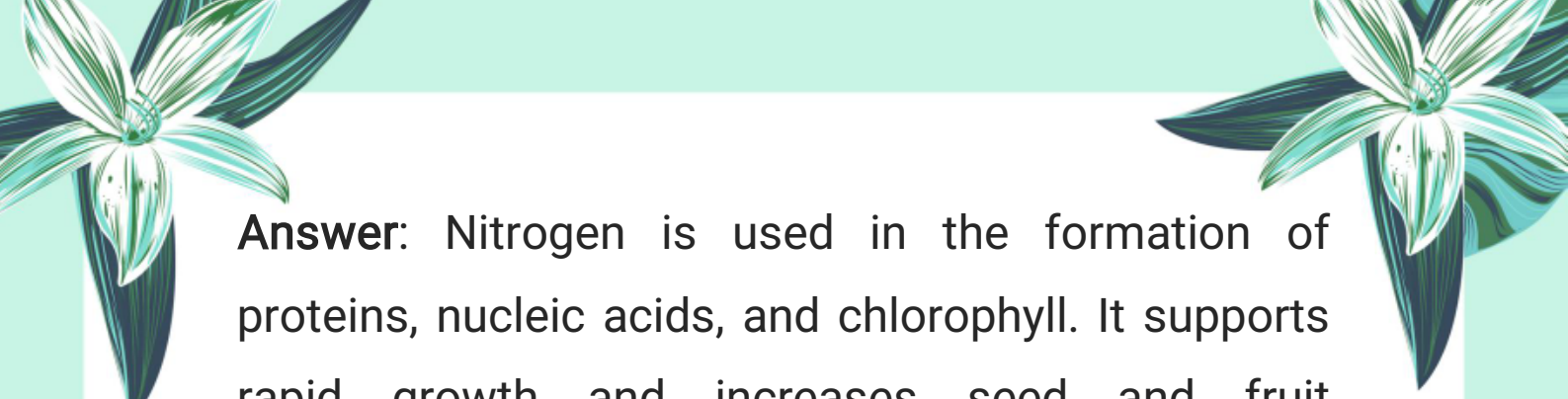
Answer: Mineral nutrition is the process by which plants absorb essential inorganic nutrients (minerals) from the soil for their growth and development.

2. What is the difference between macronutrients and micronutrients?

Answer: Macronutrients are required in large amounts (e.g., nitrogen, phosphorus), while micronutrients are needed in small amounts (e.g., iron, zinc).

3. What is the role of nitrogen in plants?





Answer: Nitrogen is used in the formation of proteins, nucleic acids, and chlorophyll. It supports rapid growth and increases seed and fruit production.



4. What happens to a plant if it is deficient in magnesium?

Answer: Magnesium deficiency causes chlorosis (yellowing of leaves) and may lead to leaf drop due to the breakdown of chlorophyll.

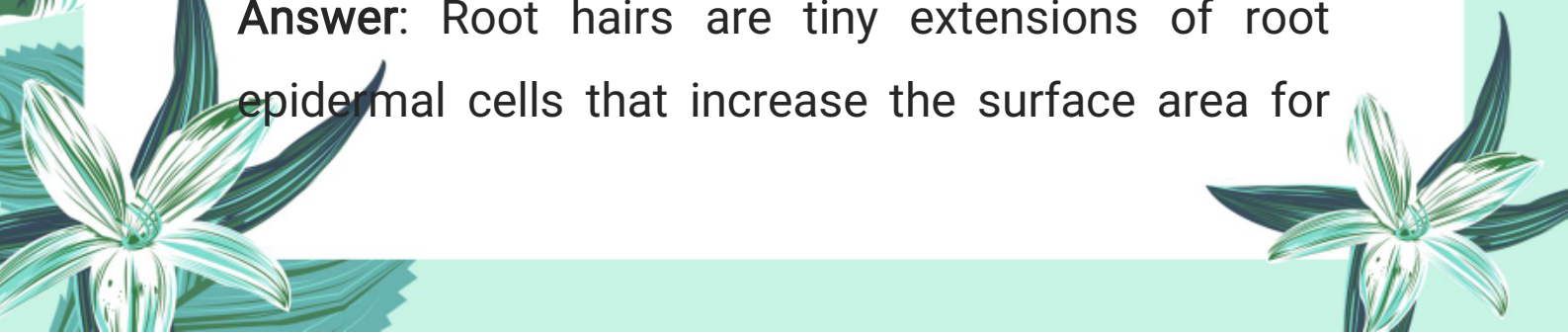
5. Name any three macronutrients and their functions.

Answer:

- **Potassium:** Regulates opening and closing of stomata.
- **Phosphorus:** Part of ATP and nucleic acids.
- **Calcium:** Component of cell walls and helps in water movement.

6. What are root hairs and what is their function?

Answer: Root hairs are tiny extensions of root epidermal cells that increase the surface area for





absorption of water and minerals from the soil.

7. How do root hairs absorb water and salts from the soil?

Answer: Root hairs absorb salts by active transport and water by osmosis due to the difference in salt concentration.



8. What is the function of xylem and phloem in plants?

Answer: Xylem transports water and salts, while phloem transports food to different parts of the plant.

9. What is the role of the cortex and endodermis in water transport?

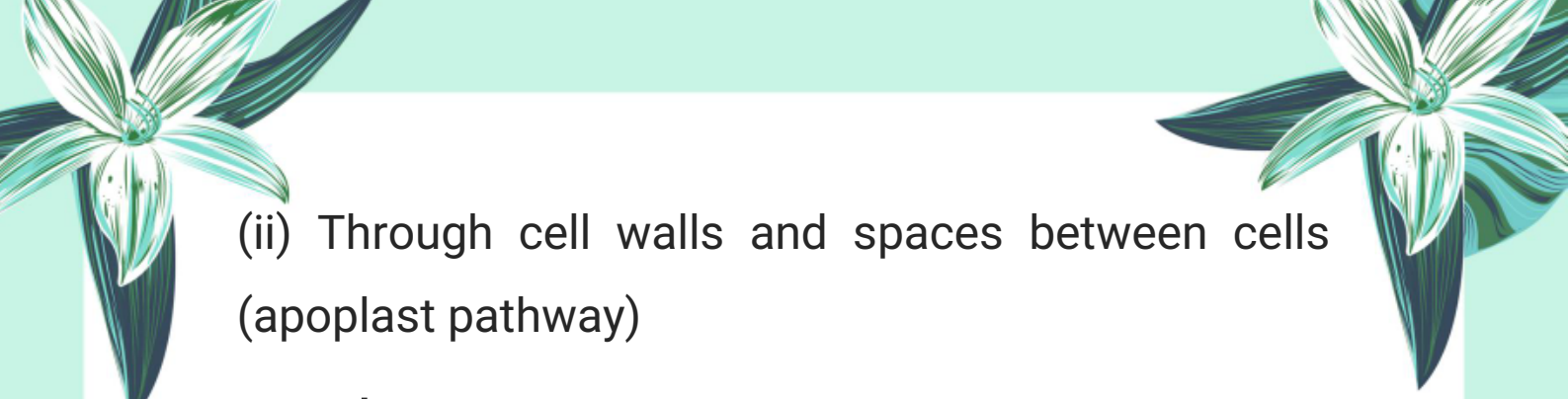
Answer: Water moves from the epidermis to the cortex and then to the endodermis, which directs it toward the vascular tissues.

10. What are the two pathways through which water moves inside the root?

Answer:


(i) Through the cells (symplast pathway)





(ii) Through cell walls and spaces between cells (apoplast pathway)

11. What is transpiration?



Answer: The loss of water in the form of vapours from plant surfaces (mainly leaves) is called transpiration.

12. What is stomatal transpiration?

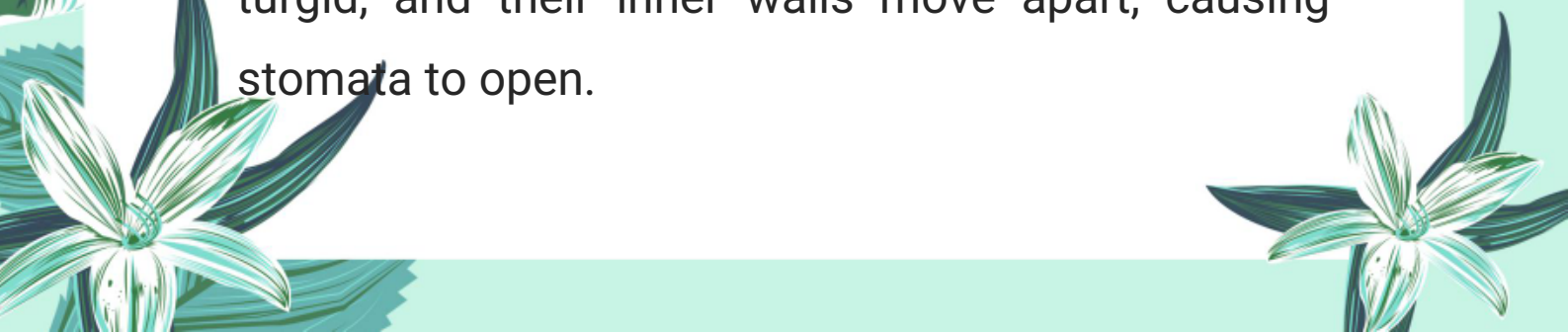
Answer: The loss of water vapours through stomata in the leaves is called stomatal transpiration. It is the major type of transpiration.

13. What are the three sites of transpiration in plants?

Answer: Transpiration occurs through stomata, cuticle (on leaf epidermis), and lenticels (on stem).

14. How do guard cells control the opening of stomata during daytime?


Answer: During daytime, guard cells absorb potassium ions and water by osmosis, become turgid, and their inner walls move apart, causing stomata to open.





15. Why do stomata close in the evening?

Answer: In the evening, potassium ions and glucose decrease, water moves out of guard cells, they lose turgor pressure, and the stomata close.



16. Name any three factors that affect the rate of transpiration.

Answer: Temperature, wind, and humidity affect the rate of transpiration.

17. How does wind affect transpiration?

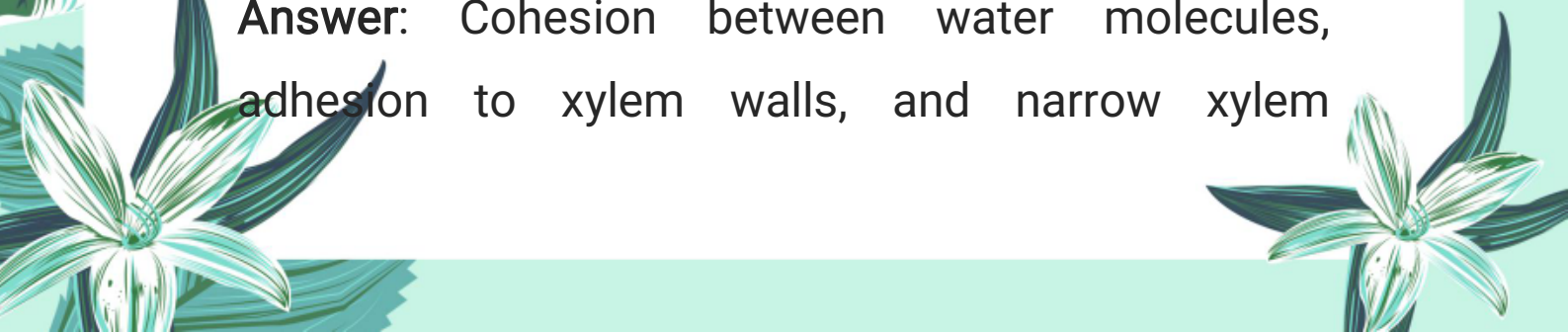
Answer: Wind increases transpiration by removing the humid air around leaves, allowing more water to evaporate.

18. What is transpirational pull?

Answer: The pulling force created in leaves due to transpiration, which draws water upward from roots through xylem, is called transpirational pull.

19. What helps maintain the continuous water column in xylem?

Answer: Cohesion between water molecules, adhesion to xylem walls, and narrow xylem





diameter maintain the continuous water column.

20. How does transpiration help in water transport in plants?

Answer: Transpiration from leaves creates tension in the water column of xylem, pulling water upward from roots to leaves.



21. What is the function of phloem in plants?

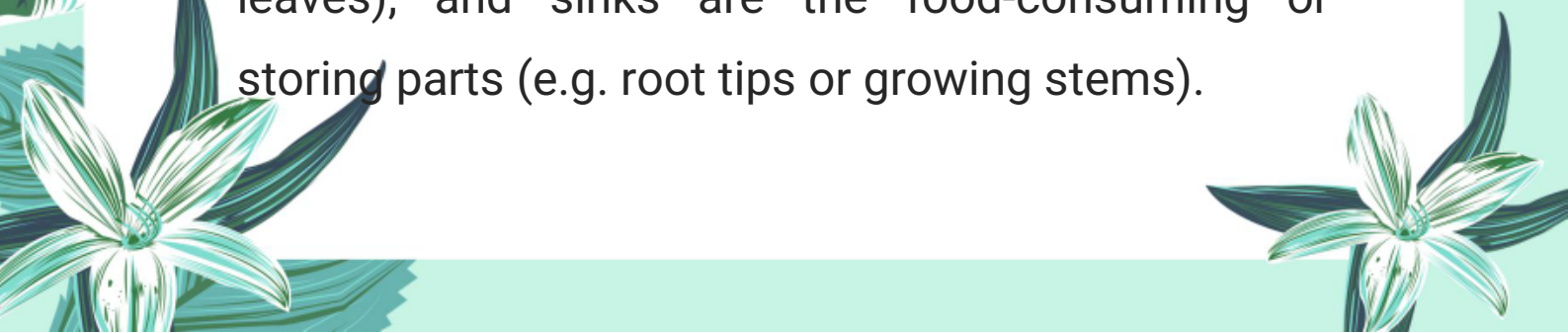
Answer: Phloem transports food (mainly sucrose) in both directions—from source to sink—inside the plant.

22. What is the difference between xylem and phloem in terms of transport?

Answer: Xylem transports water and salts in one direction (roots to leaves), while phloem transports food in both directions.

23. What is meant by source and sink in phloem transport?


Answer: Sources are the food-producing parts (e.g. leaves), and sinks are the food-consuming or storing parts (e.g. root tips or growing stems).





24. What is the pressure flow mechanism?

Answer: It is the mechanism of food transport in phloem, where dissolved food moves from high-pressure source to low-pressure sink.



25. How is sucrose loaded into the sieve tubes of phloem?

Answer: Sucrose enters sieve tubes from source tissues by active transport, using energy provided by companion cells.


26. How is water involved in the transport of food through phloem?

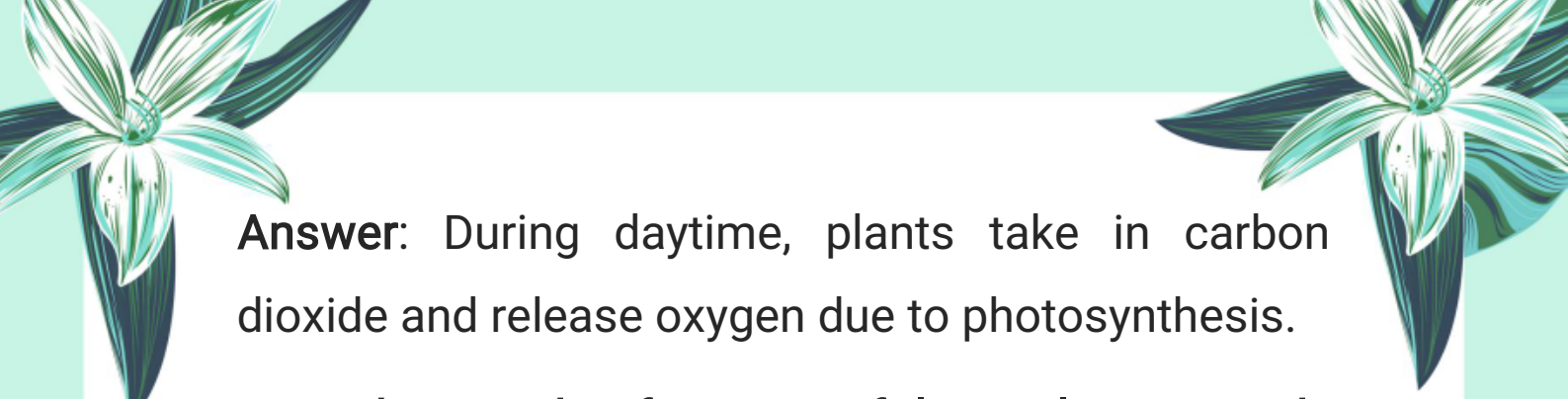
Answer: Water enters sieve tubes by osmosis from nearby xylem due to high solute concentration, creating pressure that drives food transport.

27. What happens at the sink during translocation?

Answer: Sucrose is actively removed from sieve tubes, water also exits by osmosis, reducing pressure and drawing more food flow.


28. What gases are exchanged by plants during the daytime?





Answer: During daytime, plants take in carbon dioxide and release oxygen due to photosynthesis.

29. What is the function of lenticels in woody stems?



Answer: Lenticels are pores in the bark of woody stems that allow gaseous exchange between internal tissues and the environment.

30. Through which structures does gaseous exchange occur in leaves and young stems?

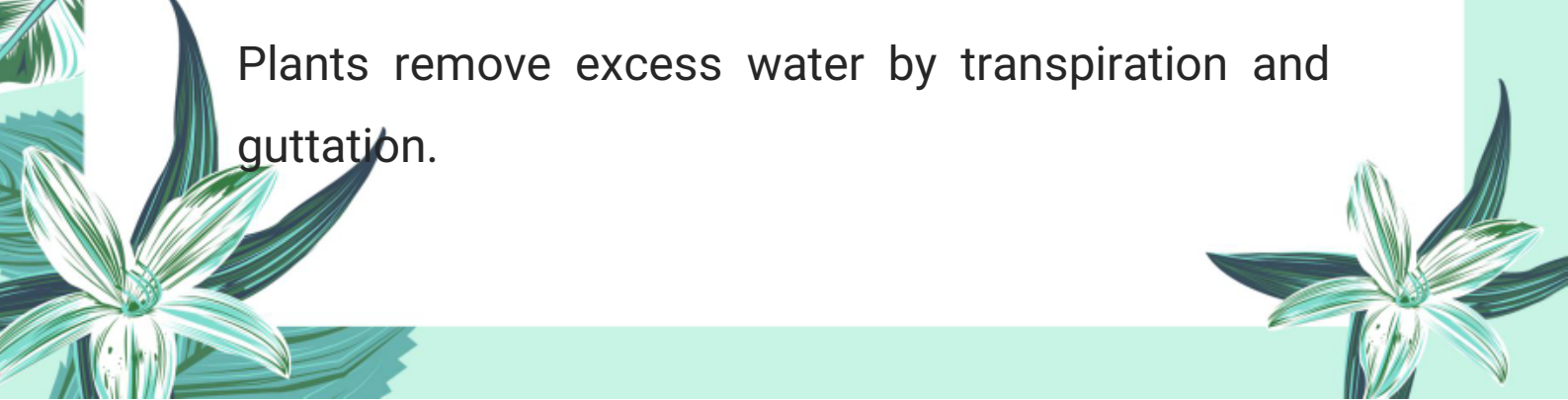
Answer: Gaseous exchange in leaves and young stems occurs through stomata present in the epidermis.

31. What happens to the extra oxygen produced during photosynthesis?

The extra oxygen is released into the atmosphere through the stomata.

32. Name two methods by which plants remove excess water.


Plants remove excess water by transpiration and guttation.





33. What is guttation and when does it occur?

Guttation is the release of water droplets through special pores at leaf edges. It occurs at night when stomata are closed.



34. How do rubber plant and Acacia excrete their metabolic wastes?

Rubber plant excretes latex, and Acacia (keekar) tree excretes gum as metabolic wastes.

35. What are mesophytes? Give one example.

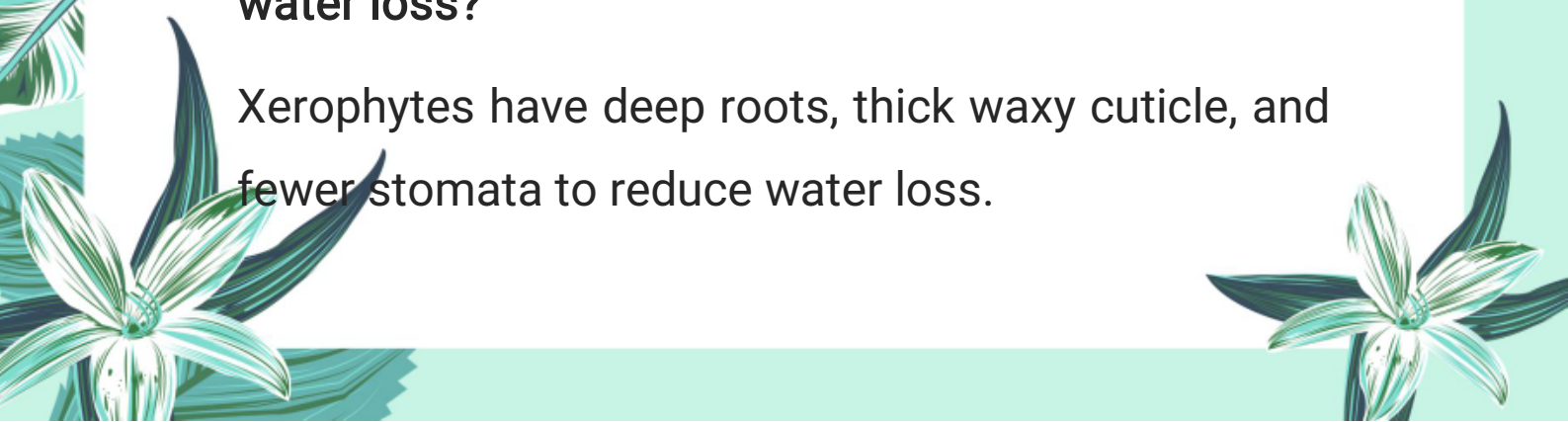
Mesophytes are terrestrial plants adapted to moderate environments. **Example:** Rose.

36. How do hydrophytes remove extra water from their bodies?

Hydrophytes remove extra water through numerous stomata present on the upper surface of their floating leaves.

37. What adaptations help xerophytes reduce water loss?

Xerophytes have deep roots, thick waxy cuticle, and fewer stomata to reduce water loss.





38. What are succulent organs? Give one example.

Succulent organs are soft and juicy structures (stems or roots) that store water. Example: Cactus stem.



39. How do halophytes prevent water loss in salty environments?

Halophytes absorb salts to make their bodies hypertonic and may excrete excess salts through salt glands on leaves.

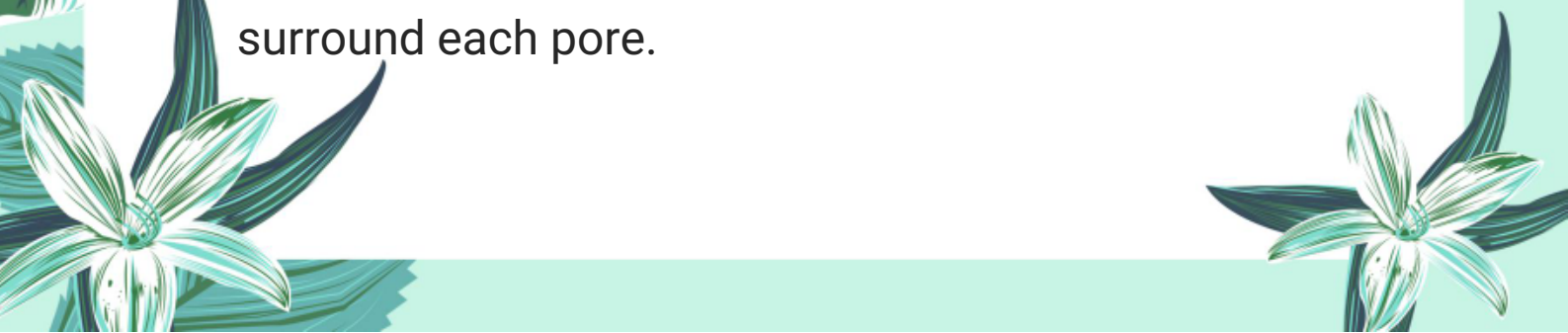


Important Long Questions:

Q1: Describe the events involved in the opening and closing of stomata.


Answer:

Stomata are small pores found mainly on the underside of leaves. They control gas exchange and water loss in plants. The opening and closing of stomata is regulated by the guard cells that surround each pore.





Opening of stomata:



During the daytime, guard cells actively transport potassium ions (K^+) into their cytoplasm. This increases their internal solute concentration. Water then enters guard cells by osmosis, causing them to swell and become turgid. Due to their kidney shape and uneven wall thickness, they bend and create an opening in the middle.

Closing of stomata:

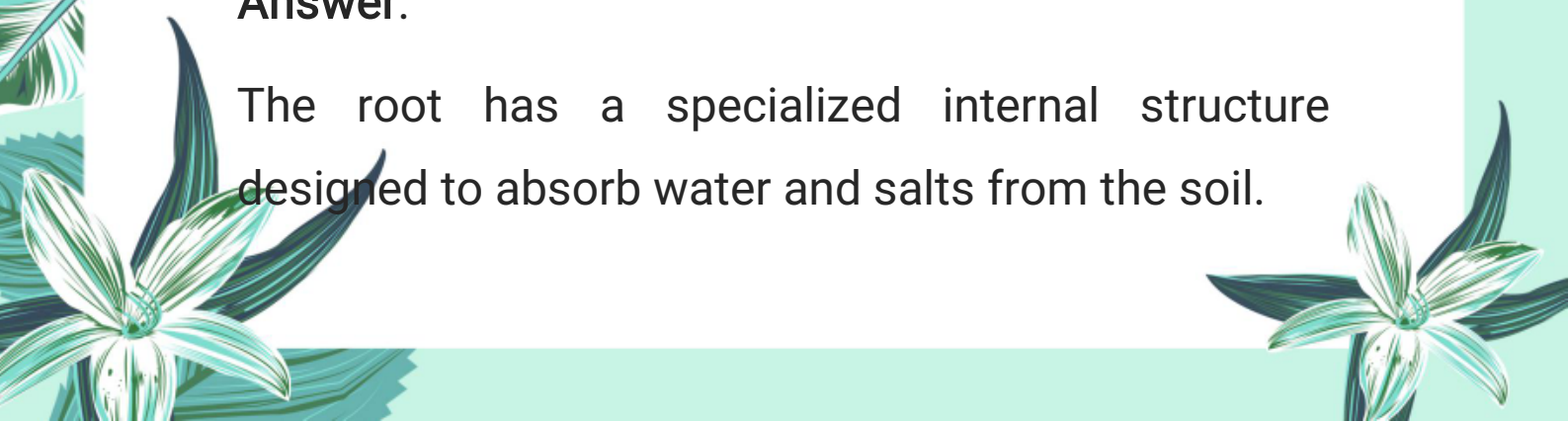
At night or under water stress, potassium ions leave the guard cells, making them lose water by osmosis. As a result, the guard cells become flaccid, and the stomatal pore closes.

This mechanism helps plants regulate transpiration and gas exchange efficiently.

Q2: Explain the internal structure of root and describe the uptake of salt and water by root.

Answer:

The root has a specialized internal structure designed to absorb water and salts from the soil.






Root Structure:

- The outermost layer is the epidermis, which has root hairs that increase surface area for absorption.
- Beneath the epidermis lies the cortex, which stores food and transports water and salts inward.
- The endodermis regulates the flow of substances into the vascular bundle.
- The central stele contains xylem (for water transport) and phloem (for food transport).



Uptake of Water and Salts:

- Water enters the root hairs by osmosis because the cell sap of root hairs is more concentrated than the surrounding soil water.
- Salts are absorbed by active transport, using energy to move them from the soil into the root cells against their concentration gradient.
- Once inside, water and salts move through the cortex and endodermis into the xylem, from



where they are transported to the rest of the plant.

Q3: Describe temperature, wind, and humidity as the factors affecting the rate of transpiration.



Answer:

Transpiration is the loss of water vapours from plant surfaces, mainly through stomata. Its rate is affected by several environmental factors:

Temperature:

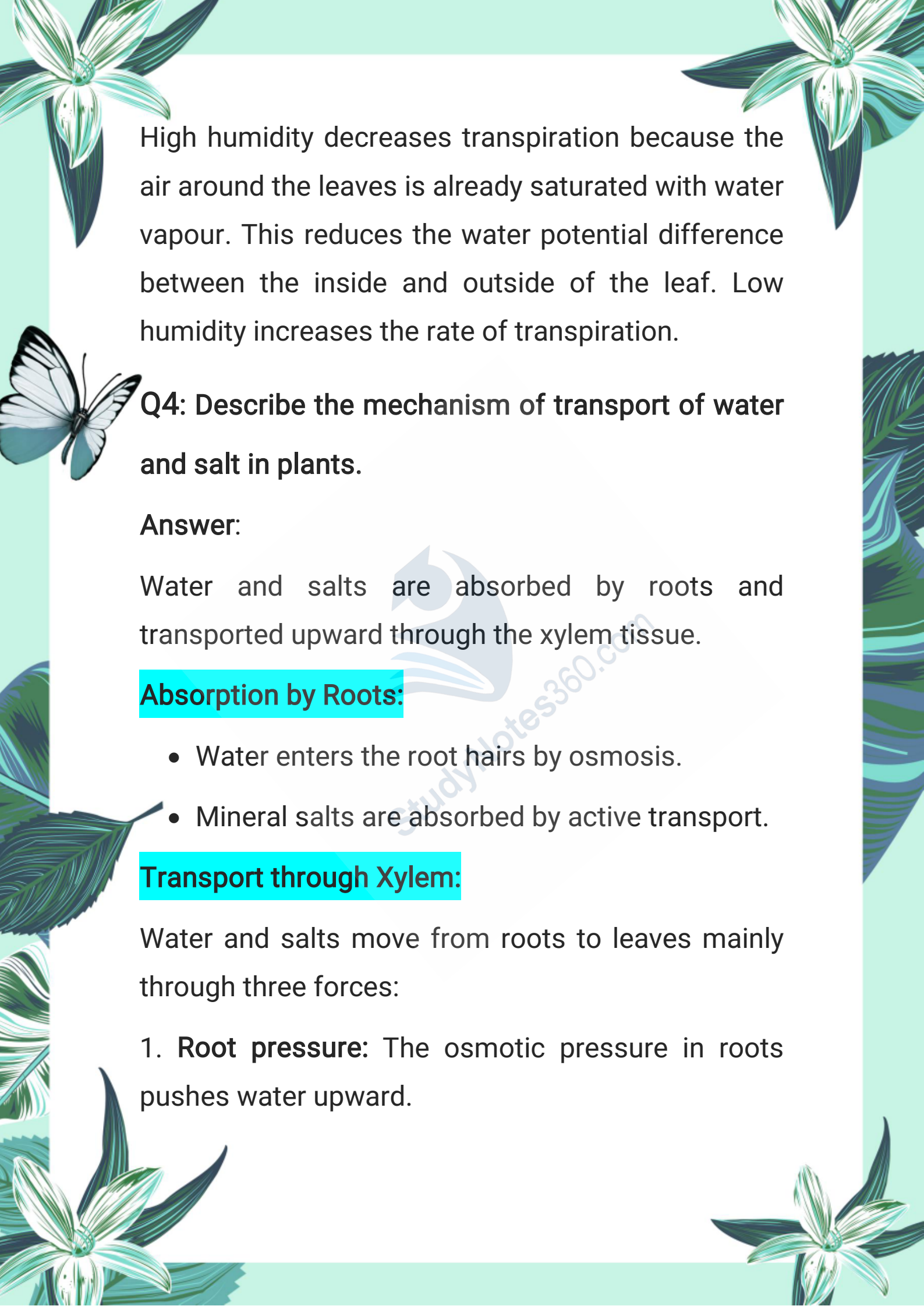
Higher temperature increases the rate of transpiration because it causes more water to evaporate from leaf surfaces. It also increases the kinetic energy of water molecules.

Wind:

Wind removes the moist air from around the leaf surface, increasing the diffusion gradient and thus enhancing the rate of transpiration. Stronger wind = faster transpiration.

Humidity:



The page is decorated with various botanical and nature-themed illustrations. In the top corners, there are stylized flowers with long, pointed petals. On the left side, a butterfly with white wings and dark markings is shown in flight. The background is a light green color with darker green accents and patterns, particularly on the right side where there are abstract, leaf-like shapes. The text is centered in a clean, black font.

High humidity decreases transpiration because the air around the leaves is already saturated with water vapour. This reduces the water potential difference between the inside and outside of the leaf. Low humidity increases the rate of transpiration.

Q4: Describe the mechanism of transport of water and salt in plants.

Answer:

Water and salts are absorbed by roots and transported upward through the xylem tissue.

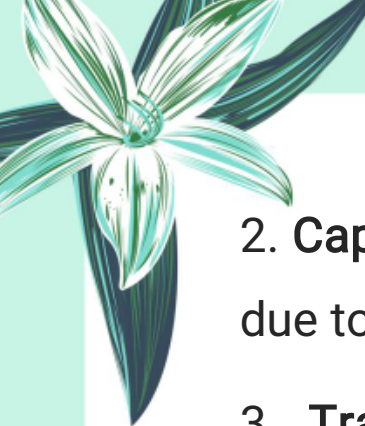
Absorption by Roots:

- Water enters the root hairs by osmosis.
- Mineral salts are absorbed by active transport.

Transport through Xylem:


Water and salts move from roots to leaves mainly through three forces:

1. **Root pressure:** The osmotic pressure in roots pushes water upward.



2. **Capillary action:** Water rises in thin xylem vessels due to adhesion and cohesion.

3. **Transpiration pull:** As water evaporates from leaves, it creates a suction force that pulls more water upward.



Together, these processes transport water and salts to all parts of the plant to support photosynthesis, cooling, and growth.

Q5: Explain the mechanism of food translocation by Pressure Flow Mechanism.

Answer:

The process of transporting food (mainly sucrose) in plants is called translocation, and it occurs through the phloem. The widely accepted model to explain this is the Pressure Flow Mechanism.

Source and Sink:

- The source is a region where food is produced or stored (e.g., leaves).
- The sink is where food is needed (e.g., growing



tips, roots).

Steps in the Mechanism:

1. At the source, sucrose is actively loaded into the sieve tubes of phloem by companion cells using energy.
2. This increases solute concentration, causing water to enter by osmosis from the nearby xylem.
3. Due to high pressure, the sugar solution moves through the sieve tubes toward the sink.
4. At the sink, sucrose is unloaded actively, and water moves back into the xylem, reducing pressure.

This pressure difference between source and sink causes the bulk flow of food from where it is produced to where it is needed.

Q6: How do the plants excrete extra water and salts from their bodies?

Answer:

Plants excrete extra water and salts using specialized mechanisms:



Extra Water:

1. Transpiration:

During the daytime, plants lose excess water through transpiration. Water evaporates from the surfaces of leaves, especially through stomata.


There are three types of transpiration:

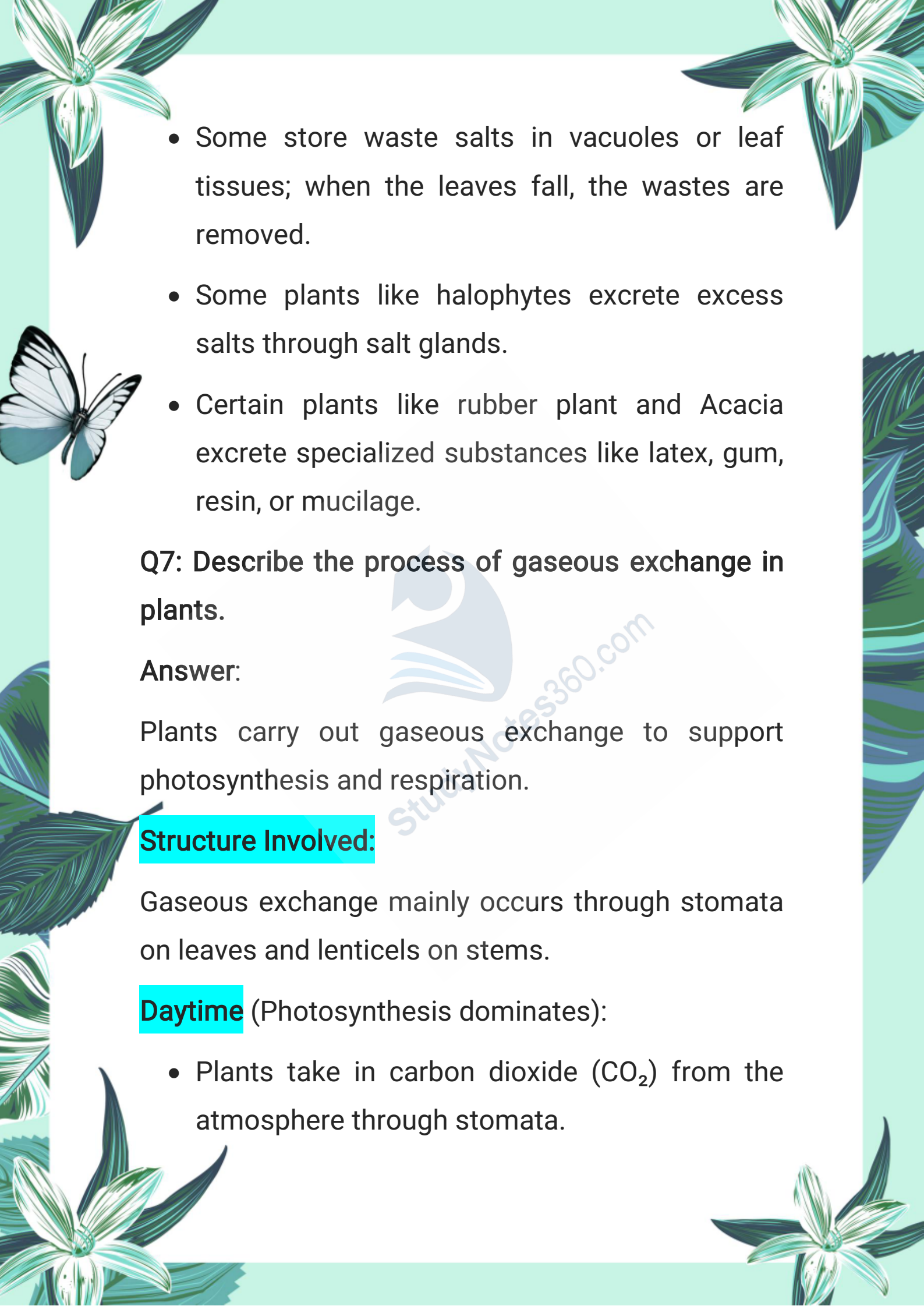
1. Stomatal transpiration (via stomata)
2. Cuticular transpiration (through the waxy cuticle)
3. Lenticular transpiration (through lenticels on stems)

2. Guttation:

At night, when stomata are closed, some plants remove water in the form of droplets from special pores at leaf tips or edges. This process is called guttation and is seen in plants like grasses. It occurs due to root pressure and helps maintain water balance.

Salts and Metabolic Wastes: Plants excrete salts and other wastes in various ways:



- 
- The page is decorated with various botanical and nature-themed illustrations. In the top corners, there are stylized flowers with long, pointed petals. On the left side, a butterfly is shown in flight. The bottom corners also feature floral designs. The background is a light, solid color.
- Some store waste salts in vacuoles or leaf tissues; when the leaves fall, the wastes are removed.
 - Some plants like halophytes excrete excess salts through salt glands.
 - Certain plants like rubber plant and Acacia excrete specialized substances like latex, gum, resin, or mucilage.

Q7: Describe the process of gaseous exchange in plants.

Answer:

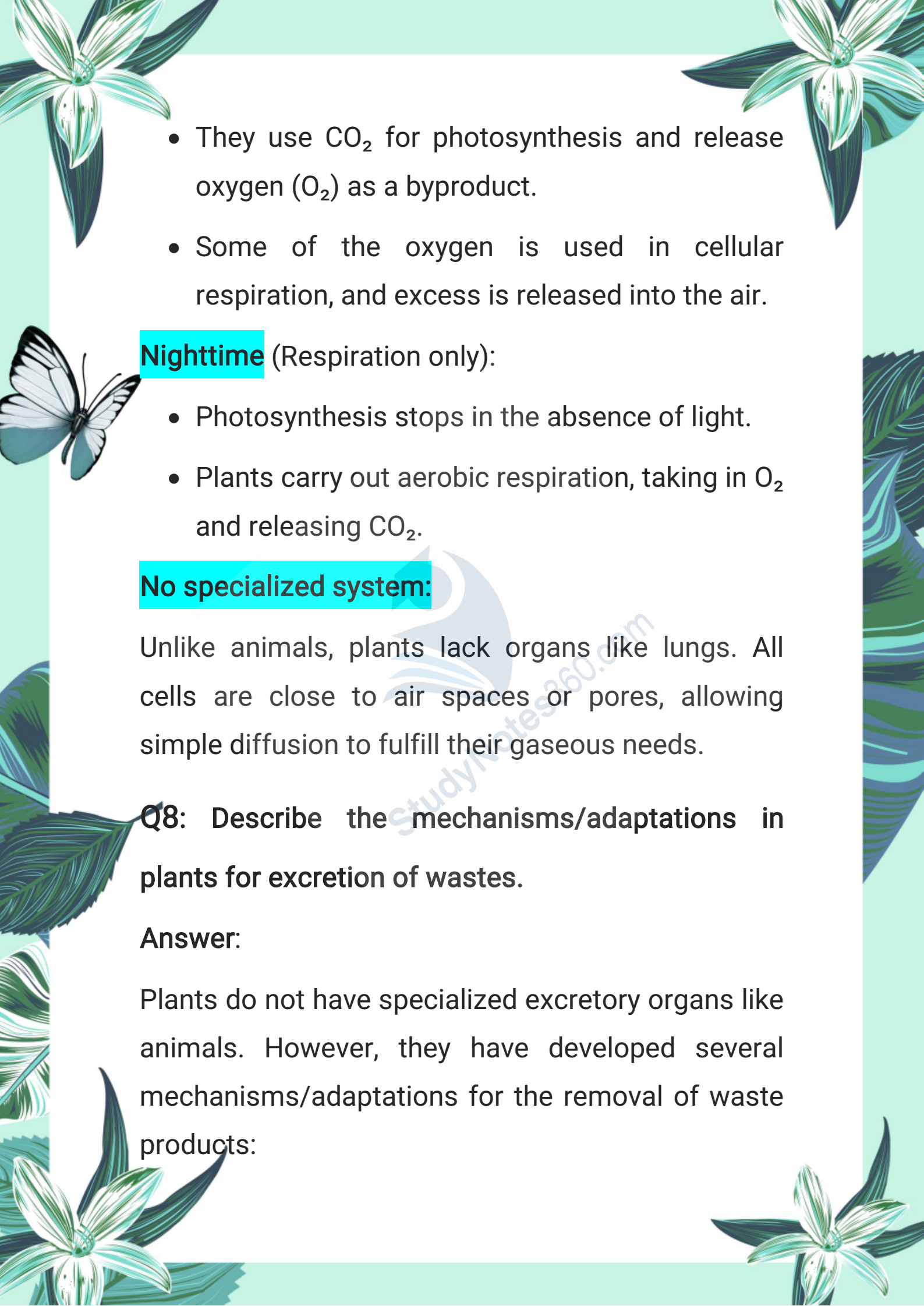
Plants carry out gaseous exchange to support photosynthesis and respiration.

Structure Involved:

Gaseous exchange mainly occurs through stomata on leaves and lenticels on stems.

Daytime (Photosynthesis dominates):

- Plants take in carbon dioxide (CO_2) from the atmosphere through stomata.

- 
- The page is decorated with various botanical and nature-themed illustrations. In the top corners, there are stylized flowers with long, narrow petals. On the left side, a butterfly with white wings and black markings is shown. The bottom corners also feature floral designs. The background is a light green color with a subtle pattern of leaves and flowers.
- They use CO_2 for photosynthesis and release oxygen (O_2) as a byproduct.
 - Some of the oxygen is used in cellular respiration, and excess is released into the air.

Nighttime (Respiration only):

- Photosynthesis stops in the absence of light.
- Plants carry out aerobic respiration, taking in O_2 and releasing CO_2 .

No specialized system:

Unlike animals, plants lack organs like lungs. All cells are close to air spaces or pores, allowing simple diffusion to fulfill their gaseous needs.

Q8: Describe the mechanisms/adaptations in plants for excretion of wastes.

Answer:

Plants do not have specialized excretory organs like animals. However, they have developed several mechanisms/adaptations for the removal of waste products:



1. Storage in Vacuoles or Leaves:

- Wastes like tannins, calcium oxalate, and salts may be stored in vacuoles or old leaves.
- When leaves fall (a process called abscission), wastes are removed from the plant body.



2. Excretion through Stomata and Lenticels:


Gaseous wastes like oxygen (from photosynthesis) and carbon dioxide (from respiration) are released through stomata and lenticels.

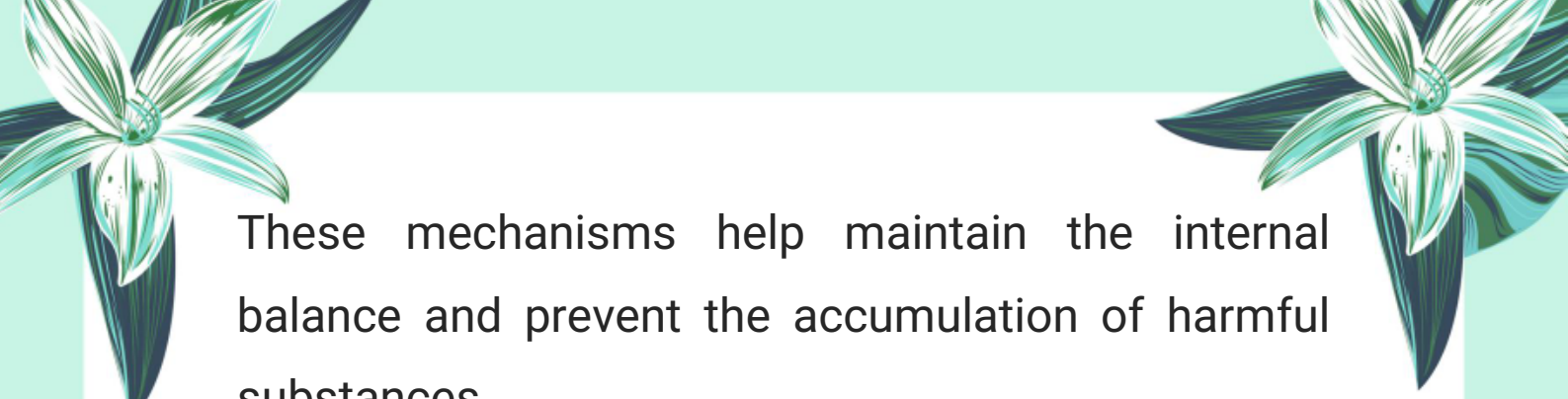
3. Guttation:

Excess water is released in the form of liquid droplets through special pores (hydathodes), usually at night.

4. Secretion of Substances:

Some plants produce and excrete:

- Latex (e.g., rubber plant)
 - Gums (e.g., Acacia)
 - Resins (e.g., coniferous trees)
 - Mucilage (e.g., ladyfinger)
- 



These mechanisms help maintain the internal balance and prevent the accumulation of harmful substances.

Q9: Explain osmotic adjustments in hydrophytes, xerophytes, and halophytes.



Answer:

Osmotic adjustment refers to the way plants adapt to different water conditions by controlling the movement of water and solutes in their cells. Based on habitat, plants make specific adjustments:

1. Hydrophytes (Water Plants):

- Live in freshwater habitats (e.g., water lilies).
- Absorb water through the entire body surface.
- To prevent excess water buildup, they have:
 - Floating leaves with stomata on upper surfaces.
 - Broad leaves for water loss via transpiration.
 - Water moves out through stomata and lenticels.


2. Xerophytes (Desert Plants):

Adapted to extremely dry conditions (e.g., cacti).








Prevent water loss through:

- Deep roots to absorb water from deep soil.
 - Thick waxy cuticle on the surface.
 - Reduced number of stomata.
 - Succulent stems/leaves that store water.
 - These adaptations reduce transpiration and maintain water inside cells.
- 

3. Halophytes (Saltwater Plants):

- Live in salty environments like seashores (e.g., sea grasses).
 - Their surroundings are hypertonic, so water tends to leave their cells.
 - To prevent water loss, they:
 - Absorb salts to make their cytoplasm hypertonic, keeping water in.
 - Store excess salts in vacuoles or excrete them through salt glands on leaves.
- 
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Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.

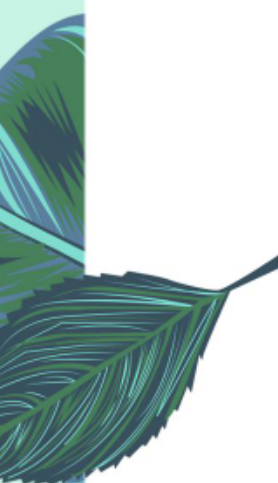
Author: Muhammad Asghar

Purpose: To contribute to education by offering insightful, valuable content that enhances learning and understanding.

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