5. TRANSPORT SYSTEM IN PLANTS

TEACHING TASK

Single corect answer MCQ's

1.Plants having how many types of tissues to transport.
Answer: A) 2
Explanation: Plants have two types of vascular tissues for transport: **xylem** (transports water and minerals) and **phloem** (transports food/sugars).

2.Xylem conducts
Answer: C) Water and minerals
Explanation: Xylem is responsible for conducting **water and dissolved minerals** from the roots to other parts of the plant. Food is transported by phloem, and gases are not primarily transported by xylem.

3.The plants take in water from the soil through their roots. This water is called
Answer: B) Xylem sap
Explanation: The water absorbed by roots, containing dissolved minerals, is referred to as **xylem sap** as it is transported through the xylem tissue.

4.What is the function of root hairs
Answer: D) Both B & C
Explanation: Root hairs increase the surface area for absorption and are responsible for absorbing **water** and **minerals** from the soil.

5.Water and minerals absorbed by the root hair by the process of.
Answer: C) Osmosis
Explanation: Water is absorbed by root hairs primarily through **osmosis**, driven by a concentration gradient. Minerals are absorbed via active transport or diffusion, but osmosis is the primary process for water.

6.How much percentage of water is used for photosynthesis
Answer: C) 1-2%
Explanation: Only **1-2%** of the water absorbed by plants is used for photosynthesis and other metabolic activities. The rest is lost through transpiration.

7.Excess water is lost by water vapour to the air through
Answer: A) Transpiration

Explanation: Transpiration is the process by which excess water is lost as water vapor through stomata in leaves.

8.Which substances are made in the tips of roots and shoots
Answer: B) Hormones
Explanation: The tips of roots and shoots (apical meristems) produce **plant hormones** (e.g., auxins) that regulate growth and development.

9.Water will be absorbed by root hair when
Answer: A) Concentration of solutes in the cell sap is high
Explanation: Water moves into root hairs by osmosis when the **concentration of solutes in the cell sap** (inside the root hair) is higher than in the soil solution, creating a water potential gradient.

10.Translocation of solutes primarily takes place through
Answer: A) Phloem
Explanation: Phloem is responsible for the **translocation** of organic solutes (e.g., sugars) from leaves to other parts of the plant.

11.Which of the following carries substances upwards as well as downwards in a plant.
Answer: C) Phloem
Explanation: Phloem transports food (sugars) both upwards (to growing shoots) and downwards (to roots or storage organs). Xylem primarily transports water upwards.

12.Which of the following is a complex permanent tissue
Answer: C) A & B
Explanation: Both **xylem** and **phloem** are complex permanent tissues, as they are composed of multiple cell types (e.g., xylem has tracheids, vessels; phloem has sieve tubes, companion cells).

Multiple Choice Questions (More than One Correct Answer)
13.Cells of phloem
Answer: C) i, ii, iii
Explanation: Phloem consists of **sieve cells**, **sieve tubes**, and **companion cells**, along with other cells like phloem parenchyma and fibers. Option iv ("None") is incorrect.

Assertion & Reasoning
14.A: Xylem and phloem are conductive tissue

R: These tissues supply the water and minerals and food from one part of the plant to another part respectively.
Answer: A) A and R are true and R explains A.
Explanation:
Assertion (A) is true: Xylem and phloem are conductive (vascular) tissues responsible for transport in plants.
Reason (R) is true: Xylem transports water and minerals, while phloem transports food (sugars).
R explains A: The reason correctly explains why xylem and phloem are considered conductive tissues.

Match the Following

15.Match the following:
Xylem vessels
Root hairs
Phloem tissue
Apical meristem
Options:
a. Diffusion
b. Xylem sap
c. Tip of the stem
d. Sieve tubes
Answer: B) 1-b, 2-a, 3-d, 4-c
Explanation:
1. Xylem vessels: Transport **xylem sap** (water and minerals) ’! Matches with **b**.
2. Root hairs: Absorb water and minerals, primarily through **diffusion** (for minerals) and osmosis (for water) ’! Matches with **a**.
3. Phloem tissue: Contains **sieve tubes** for translocation of sugars ’! Matches with **d**.
4. Apical meristem: Located at the **tip of the stem** (and roots) for growth ’! Matches with **c**.

Comprehensive Questions

16.Paragraph Analysis:
The paragraph describes the process of water and mineral absorption, transport via xylem, and water loss through transpiration. However, it contains an error: it states that water enters root hairs by **diffusion**, which is incorrect. Water enters primarily by **osmosis**, while minerals may enter via diffusion or active transport. The corrected understanding is applied below.

1)Water and minerals salts are absorbed by plants through
Answer: A) Root
Explanation: Water and mineral salts are absorbed by plants through their **roots**, specifically via root hairs.

2)Water and mineral salts are absorbed by root hair is referred as
Answer: B) Xylem sap
Explanation: The water and dissolved minerals absorbed by root hairs are collectively called **xylem sap**, which is transported through the xylem.

3)The process by which the root hairs absorbs water and mineral salts is called
Answer: C) Both A & B
Explanation: Water is absorbed by root hairs via **osmosis**, while mineral salts are absorbed via **diffusion** (passive) or active transport. Thus, both processes are involved.

4)Excess water is lost as water vapour through leaves by the process of
Answer: C) Transpiration
Explanation: Excess water is lost as water vapor through stomata in leaves via **transpiration**.

5)The percentage of water used by the plant absorbed for its metabolic activity is
Answer: A) 1-2%
Explanation: Only **1-2%** of the water absorbed by plants is used for photosynthesis and other metabolic activities, as stated in the paragraph.

LEARNERS TASK

Single correct answer MCQ's :
1.Large organisms need transport systems in their bodies to supply
Answer: D) all
Explanation: Large organisms require transport systems to supply food, oxygen, and water to all parts of their body to sustain life processes, as diffusion alone is insufficient over long distances.

2.What are needed for the transport of substances in plants and animals
Answer: A) special tissues and organs
Explanation: Plants and animals rely on specialized tissues (e.g., xylem and phloem in plants, blood vessels in animals) and organs (e.g., heart in animals, roots in plants) for efficient transport of substances.

3.Food materials are transferred to
Answer: C) stem and roots
Explanation: Food materials, primarily sugars produced in leaves via photosynthesis, are transported to non-photosynthetic parts like stems and roots for growth, storage, or metabolism. Flowers may also receive food, but stems and roots are the primary sinks.

4.Transport of food from the leaves to other parts of the plant is called
Answer: A) translocation
Explanation: Translocation is the process of moving organic compounds, especially sugars, from leaves (source) to other parts of the plant (sink) via the phloem.

5.The sugar made in leaves is loaded into the sieve tubes of phloem tissue by using energy from
Answer: B) ATP
Explanation: Loading sugars into the sieve tubes of phloem requires active transport, which uses energy from ATP to move sugars against a concentration gradient.

6.Water absorption through roots can be increased by keeping the potted plants
Answer: C) under the fan
Explanation: Placing plants under a fan increases air movement, which enhances transpiration. This creates a stronger pull (transpiration pull) that increases water absorption through the roots.

7.The phloem tissue in plants is responsible for the transport of
Answer: C) sugar
Explanation: Phloem transports organic compounds, primarily sugars 8.

8.Movement of water in the plant body takes place through
Answer: A) xylem
Explanation: Xylem is responsible for the transport of water and minerals from roots to other parts of the plant via transpiration pull and capillary action.

9.Prepared food is carried through
Answer: C) phloem
Explanation: Prepared food, such as sugars, is transported through the phloem tissue via translocation.

10.The absorption of water occurs by
Answer: B) osmosis

Explanation: Water absorption by roots occurs primarily through osmosis, where water moves from an area of higher water potential in the soil to lower water potential in the root cells.

11.The sieve tubes of plants are
Answer: C) phloem
Explanation: Sieve tubes are specialized cells in the phloem tissue responsible for transporting sugars and other organic compounds.

DESCRIPTIVE QUESTION

12.The transport system in plants consists of two kinds of tissues X & Y. The tissue X is made up of living cells and consists of two components A & B. The component A has tiny pores in its end wall and contains only cytoplasm but no nucleus. On the other hand, component B has cytoplasm as well as a nucleus. The tissue Y is made up of dead cells and consists of two components C & D. The component C has open ends whereas the component D does not have open ends. In flowering plants, either only C or both C & D transport water, but D is the only water-conducting tissue in non-flowering plants.
What is i. Tissue X, ii. Component A, iii. Component B?
Answer:
i. Tissue X: Phloem
ii. Component A: Sieve tubes
iii. Component B: Companion cells
Explanation: Tissue X is phloem, which consists of living cells. Component A, sieve tubes, are elongated cells with perforated end walls (sieve plates) and contain cytoplasm but lack a nucleus. Component B, companion cells, are nucleated cells that support sieve tubes by providing metabolic support.
What is i. Tissue Y, ii. Component C, iii. Component D?
Answer:
i. Tissue Y: Xylem
ii. Component C: Vessels (or vessel elements)
iii. Component D: Tracheids
Explanation: Tissue Y is xylem, composed of dead cells. Component C, vessels, are tube-like structures with open ends, facilitating water transport in flowering plants (angiosperms). Component D, tracheids, have closed ends with pits and are the primary water-conducting cells in non-flowering plants (e.g., gymnosperms).

MULTIPLE CORRECT ANSWER QUESTIONS

13.Which of the following statements is correct?

i. The hormones are present at the tips of roots.
ii. The transport of food from the leaves to the other parts of the plants is called transpiration.
iii. Only about 1-2% of water is utilized by the plants for photosynthesis.
iv. Phloem is non-living conductive tissue which has thick walls.
Answer: B) Both i & iii
Explanation:
i: Correct. Hormones like auxins and cytokinins are present at root tips, influencing growth.
ii: Incorrect. The transport of food is called translocation, not transpiration (transpiration is water loss).
iii: Correct. Only 1–2% of water absorbed by plants is used for photosynthesis; the rest is lost via transpiration or used in other processes.
iv: Incorrect. Phloem is a living conductive tissue, and its cells (sieve tubes) have thin walls, not thick.

14.Which among the following is incorrect?
i. The function of root hairs is to absorb water and minerals from the soil.
ii. Xylem vessels of the root of the plant are connected to the xylem vessels of its stem.
iii. The movement of food materials through phloem depends on the action of living cells called xylem fibres.
iv. The movement of food in phloem takes place without utilizing energy.
Answer: C) iii & iv
Explanation:
i: Correct. Root hairs absorb water and minerals via osmosis and active transport.
ii: Correct. Xylem vessels form a continuous network from roots to stems for water transport.
iii: Incorrect. Food movement through phloem depends on living cells called sieve tubes and companion cells, not xylem fibres (which are part of xylem and support water transport).
iv: Incorrect. Food movement (translocation) in phloem is an active process requiring energy from ATP for loading and unloading sugars.

15.Assertion and Reason Questions
Instructions:
A: Both A and R are true, and R explains A.
B: Both A and R are true, but R does not explain A.
C: A is true, R is false.
D: Both A and R are false.
A: Transpiration lowers down the plant temperature.

R: Transpiration reduces the concentration of mineral salts.
Answer: C) A is true, R is false
Explanation:
A: True. Transpiration cools the plant by releasing water vapor, which dissipates heat.
R: False. Transpiration does not directly reduce the concentration of mineral salts; it primarily affects water movement and may concentrate salts in remaining water.

16.A: Xylem carries the water and minerals.
R: Phloem carries the food materials.
Answer: B) Both A and R are true, but R does not explain A
Explanation:
A: True. Xylem transports water and minerals from roots to other parts.
R: True. Phloem transports food (sugars).
However, R does not explain A, as they describe functions of different tissues.

17.A: Transport means to carry things from one place to another.
R: The body of every organism is made up of cells.
Answer: B) Both A and R are true, but R does not explain A
Explanation:
A: True. Transport involves moving substances from one location to another.
R: True. All organisms are made of cells.
However, R is unrelated to explaining the concept of transport.

MATCH THE FOLLOWING QUESTIONS

18.Match the terms in Column I with their descriptions in Column II:
text
CollapseWrap
Copy
1. Xylem ( ) a. Transpiration
2. Phloem ( ) b. Upward movement of water
3. Stomata ( ) c. Conduction of water
4. Ascent of sap ( ) d. Conduction of food
Answer: A) 1-c, 2-d, 3-a, 4-b
Explanation:
Xylem: Conducts water (c).
Phloem: Conducts food (sugars) (d).
Stomata: Facilitates transpiration (a).
Ascent of sap: Refers to the upward movement of water through xylem (b).

19.Match the terms in Column I with their descriptions in Column II
text
CollapseWrap
Copy
1. Stomata ( ) a. Absorption of water
2. Xylem ( ) b. Transpiration
3. Root hairs ( ) c. Transport of food
4. Phloem ( ) d. Transport of water

Answer: A) 1-b, 2-d, 3-a, 4-c

Explanation:

Stomata: Involved in transpiration (b).

Xylem: Transports water (d).

Root hairs: Absorb water from the soil (a).

Phloem: Transports food (sugars) (c).

SINGLE CORRECT ANSWER QUESTIONS

20.Loss of water from the tips of leaves is called

Answer: B) guttation

Explanation: Guttation is the loss of water in liquid form from the tips or margins of leaves, typically through specialized structures called hydathodes, often under high humidity. Transpiration (D) is the evaporation of water from leaves, not specific to leaf tips.

21.Active transport of ions by the cell requires

Answer: B) ATP

Explanation: Active transport of ions (e.g., minerals in root cells) requires energy, which is provided by ATP, as it moves substances against their concentration gradient.

22.Transpiration will increase with the increase of

Answer: B) temperature

Explanation: Higher temperatures increase the rate of evaporation, thus increasing transpiration. High humidity (A) reduces transpiration, while carbon dioxide and sulfur dioxide do not directly affect it.