BIOLOGY

BOOKS - CENGAGE BIOLOGY

TRANSPIRATION IN PLANTS

Question

1. Out of the three kinds of transpiration, which one is maximum _____

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2. Out of the three kinds of transpiration, which one is minimum _____

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3. List any three factors affecting transpiration.

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Mandatory Exercise

1. Answer in one or two word:

A chemical normally used to test the rate of transpiration on either side of a leaf.

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2. Answer in one or two word:

The structure through which guttation takes place.

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3. Answer in one or two word:

The kidney-shaped cells present in stoma.

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4. Answer in one or two word:

A chemical used to prevent excessive transpiration in plants.

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5. Answer in one or two word:

Mention one condition in which the stomatal opening gets closed.

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6. State the internal factors responsible for transpiration.

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7. Mention the advantages of transpiration.

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8. Would the rate of transpiration be more in sunlight or in the shade?

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9. The rate of transpiration of a plant would gradually increase if

A. the relative humidity increases.

B. the relative humidity decreases.

C. the relative humidity remain unchanged.

D. the water potential gradient remain unchanged.

Answer: B

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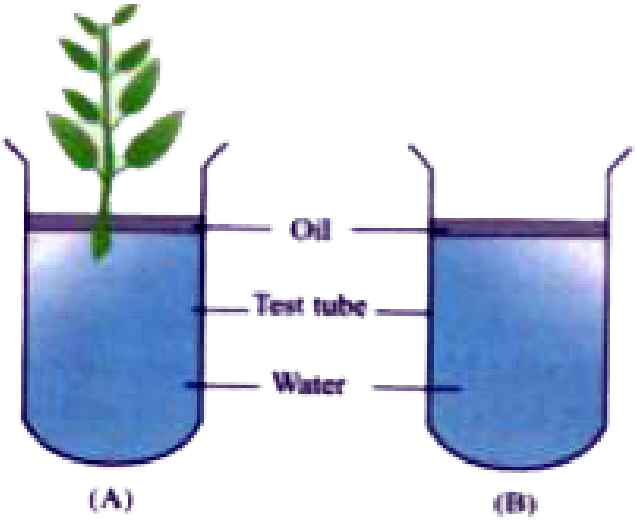
10. The figure given below represents the set up at the start of certain experiment to demonstrate an activity of plants:



What is the aim of the experiment?

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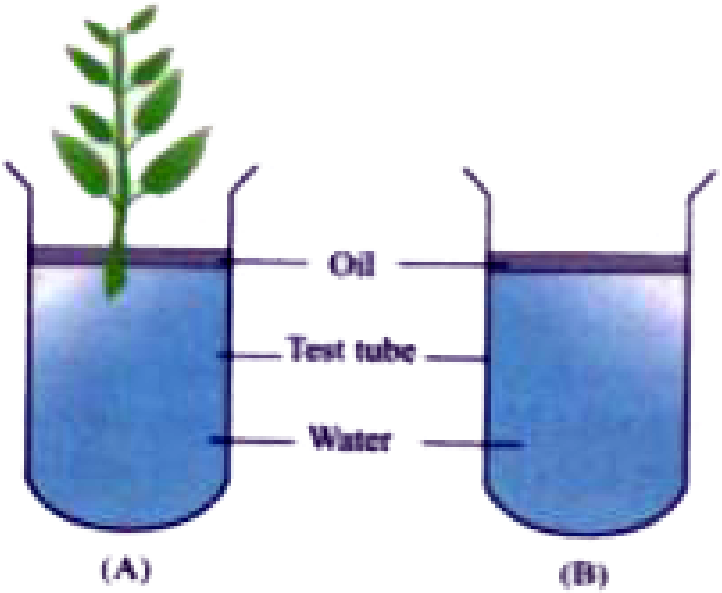
11. The figure given below represents the set up at the start of certain experiment to demonstrate an activity of plants:



Why has oil been put in each test-tube?

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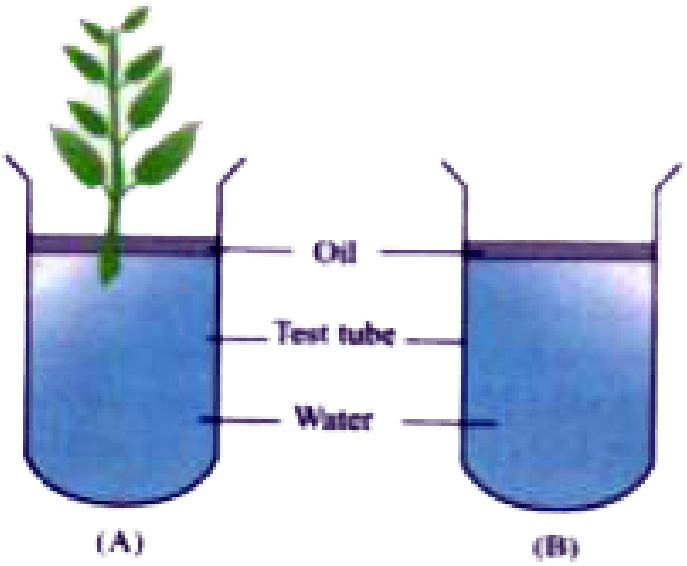
12. The figure given below represents the set up at the start of certain experiment to demonstrate an activity of plants:



What will be the observation in the two test tubes after about 2-3 days?

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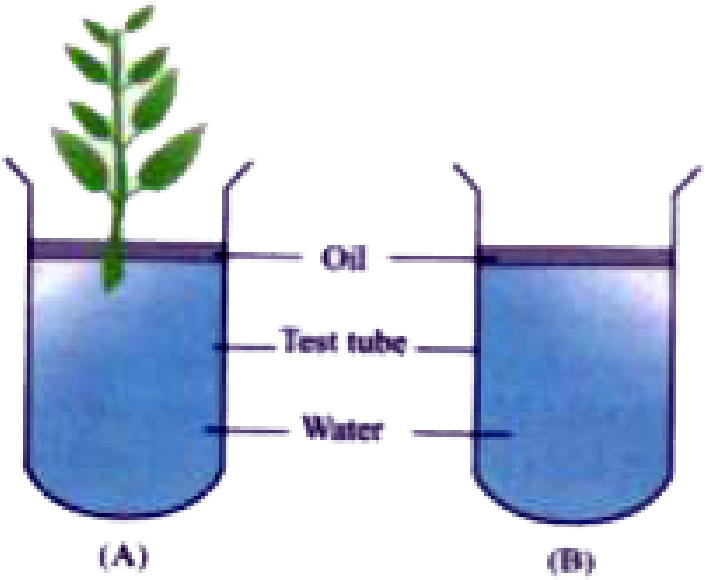
13. The figure given below represents the set up at the start of certain experiment to demonstrate an activity of plants:



Give reason to explain any change observed as answered in (c) above.

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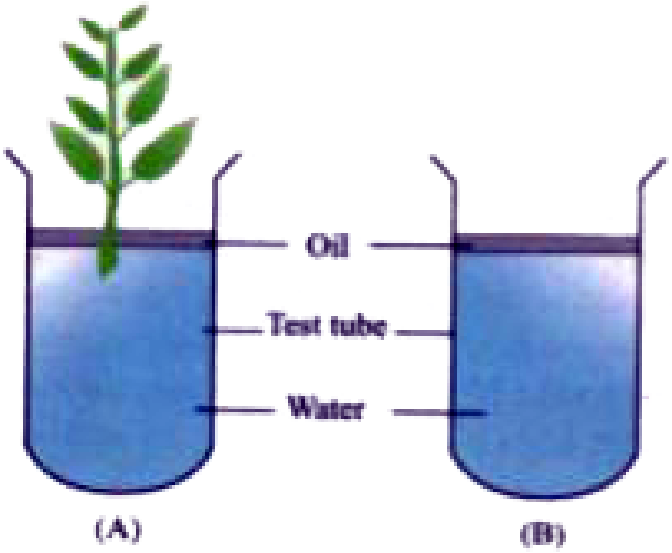
14. The figure given below represents the set up at the start of certain experiment to demonstrate an activity of plants:



Why has the test-tube B without the plant been taken in the experiment?

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15. Potometer works on the principle of

A. osmotic pressure

B. amount of water absorbed equals to the amount transpired

C. root pressure

D. potential difference between the tip of the tube and that of the plant

Answer: B

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16. Does a plant lose water by some means other than transpiration?

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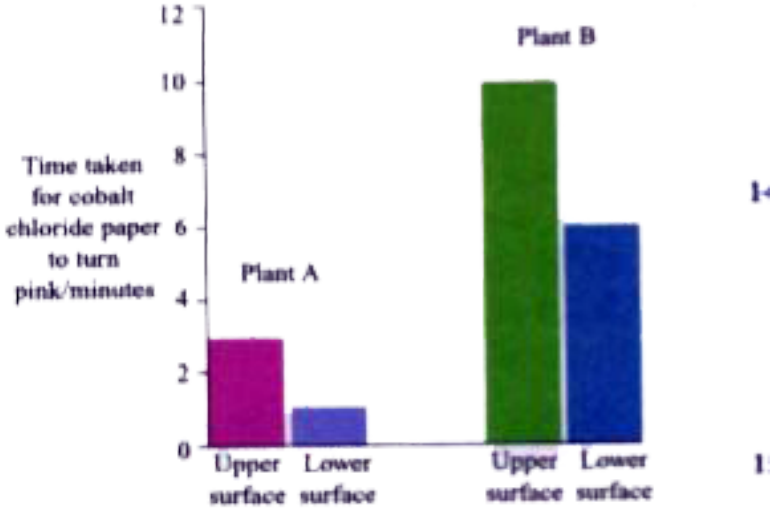
Consolidated Exercise

1. A special kind of paper, called cobalt chloride paper, is blue when dry but turns pink when wet. It can be used to show the presence of

moisture. In an experiment, some dry, blue cobalt chloride paper was attached to the upper and lower surfaces of a leaf on plants A and B. The graph given below shows the results for the upper and lower surface of each plant, A and B. The y axis shows the time taken for the cobalt chloride paper to turn pink. Look at the graph and answer these questions.



Which surface lost water faster - the upper surface or lower surface?

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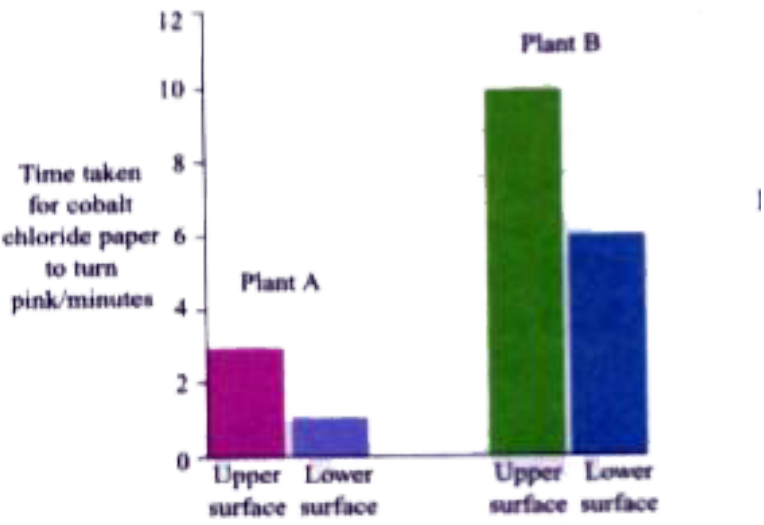
2. A special kind of paper, called cobalt chloride paper, is blue when dry but turns pink

when wet. It can be used to show the presence of moisture. In an experiment, some dry, blue cobalt chloride paper was attached to the upper and lower surfaces of a leaf on plants A and B. The graph given below shows the results for the upper and lower surface of each plant, A and B. The y axis shows the time taken for the cobalt chloride paper to turn pink. Look at the graph and answer these questions.



Suggest a reason to explain this difference in water loss between the upper and lower leaf surfaces.

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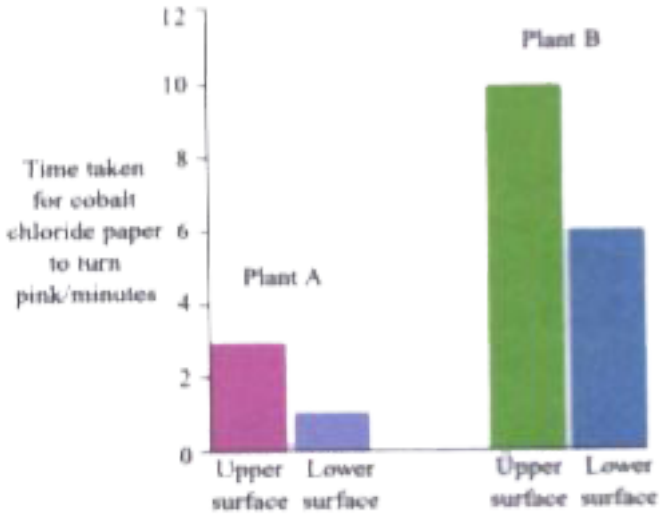
3. A special kind of paper, called cobalt chloride paper, is blue when dry but turns pink when wet. It can be used to show the presence of moisture. In an experiment, some dry, blue cobalt chloride paper was attached to the upper and lower surfaces of a leaf on plants A and B. The graph given below shows the results for the upper and lower surface of each plant, A and B. The y axis shows the time taken for the cobalt chloride paper to turn pink. Look at the graph and answer these questions.



Plant A loses water more quickly than plant B.

Suggest two features of the leaves of plant A which would explain this difference.

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4. Match with one or more than one correct answer.

Column A	Column B
(a) Guttaion	(i) Root pressure
(b) Transpiration	(ii) Silicon oil
(c) Antitraspirants	(iii) Lenticels
	(iv) Hydathodes
	(v) Potometer
	(vi) CO_2
	(vii) Aspirin

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Consolidated Exercise Mcq

1. The cause of guttation is mainly

A. root pressure

B. osmosis

C. transpiration pull

D. cohesive force

Answer: A

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2. Transpiration takes place through

A. stomata

B. lenticels

C. epidermis

D. cuticle

Answer: A::B::D

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3. If you could override the control mechanisms that open stomata and force them to remain closed, what would you expect to happen to the plant?

A. Sugar synthesis would likely slow down.

B. Water transport would likely slod down.

C. Sugar synthesis would likely increase.

D. Water transport would likely increase.

Answer: A::B

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4. In which of the following plants, there will be no transpiration?

A. Aquatic, submerged plants

B. Plants living in deserts

C. Aquatic plants with floating leaves

D. Plants growing in willy regions

Answer: A

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5. The rate of transpiration of a plant would gradually increase if

A. the relative humidity increases

B. the relative humidity decreases

C. water holding capacity of air increases

D. water holding capacity of air decreases

Answer: B::C

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6. The rate of transpiration will be very less in a situtation where

A. ground water is sufficiently available

B. wind is blowing

C. environment is very hot and dry

D. relative humidity is very high

Answer: D

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7. Stomata open at night and close during day time in

A. Xerophytes

B. Mesophytes

C. Succulents

D. Hydrophytes

Answer: C

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8. Transpiration is measured by

A. Potometer

B. Porometer

C. Osmometer

D. Test tube

Answer: A

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9. Phenyl Mercuric Acetate (PMA) is a

A. Anti-transpirant

B. Increased transpirant

C. Increased ascent of sap

D. None of these

Answer: A

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10. The rate of temperature is reduced with

A. Increase in temperature

B. Decrease in light intensity

C. Increase in wind velocity

D. Increase in water uptake

Answer: B

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11. Elements involved in opening and closing of stomata is

A. Zn

B. Mg

C. K

D. Fe

Answer: C

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12. Wilting appears due to excessive

A. Respiration

B. Photosynthesis

C. Absorption

D. Transpiration

Answer: D

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13. Major loss of water in transpiration occurs through

A. Cuticle

B. Bark

C. Hydathodes

D. Stomata

Answer: D

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14. Enzyme which is connected with stomatal opening is

A. Pyruvic kinase

B. Cytochrome oxidase

C. PEP carboxylase

D. RuBisCO

Answer: C

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15. The oozing out of water drops from injured edges or tips of a plant is

A. Bleeding

B. Guttation

C. Transpiration

D. Oozation

Answer: A

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16. Which is not related to transpiration pull

A. Capillarity

B. Adhesion

C. Cohesion

D. Ascent of sap

Answer: A

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17. Stomatal opening and closing is due to

A. Change in turgidity of guard cells

B. Cellulose microfibrils of guard cells oriented radially

C. The inner wall of each guard cell is thick and less elastic

D. All of the above

Answer: D

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18. The active spectrum of transpiration is

A. Green and ultraviolet

B. Orange and red

C. Blue and far red

D. Blue and red

Answer: D

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19. When stomata are present exclusively on the upper surface of the leaves, it is called

A. Hypostomatic

B. Epistomatic

C. Amphistomatic

D. Astomatic

Answer: B

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20. Conversion of starch of organic acid is required for

A. Stomatal opening

B. Stomatal closing

C. Stomatal formation

D. Stomatal activity

Answer: A

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21. Guard cells differ from epidermal cells in having

A. Mitochondria

B. Vacuoles

C. Cell wall

D. Chloroplast

Answer: D

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22. The loss of water is the form of vapour is called

A. Wilting

B. Guttation

C. Transpiration

D. Ascent of sap

Answer: C

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Olympiad And Ntse Level Exercises

1. If a dried cobalt chloride paper is clipped on the under surface of a leaf, its colour changes from blue to pink because

A. it reacts with the chlorophyll of the leaf

B. the clipper puts a pressure on the paper

C. paper is moistened by the transpiring water

D. it comes in contact with green leaf

Answer: C

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2. In which of the following plants do you expect transpiration to occur only from the upper surface of the leaf?

A. Land plants

B. Xerophytic plants

C. Aquatic plants with floating leaves

D. Aquatic submerged plants

Answer: C

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3. Which of the following options best describes the mechanism that causes a stoma to open?

A. K^+ enters the guard cells and water follows passively, making the cells turgid.

B. K^+ activates water pumps in the guard cell membrane that make them turgid.

C. K^+ leaves the guard cells and water follows passively, making the cells flaccid.

D. Loss of K^+ from guard cells creates positive pressure and expands the guard cells.

Answer: A

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4. Path of water movement from soil to xylem is

A. Metaxylem $\rightarrow$ Protoxylem $\rightarrow$ Cortex $\rightarrow$ Soil $\rightarrow$ Root hair

B. Cortex $\rightarrow$ Root hair $\rightarrow$ Endodermis $\rightarrow$ Pericycle $\rightarrow$ Protoxylem $\rightarrow$ Metaxylem

C. Soil $\rightarrow$ Root hair $\rightarrow$ Cortex $\rightarrow$ Endodermis $\rightarrow$ Pericycle $\rightarrow$

Protoxylem $\rightarrow$ Metaxylem

D. Pericycle $\rightarrow$ Soil $\rightarrow$ Root hair $\rightarrow$ Cortex $\rightarrow$ Endodermis $\rightarrow$ Protoxylem `to Metaxylem

Answer: C

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5. Assertion (A): The rate of transpiration decreases in dry atmosphere.

Reason (R): In humid atmosphere, the rate of transpiration decreases.

A. If both A and R are true: R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false.

D. If A is false but R is true.

Answer: D

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6. Plant stems bend toward a light source as a result of increased

A. chlorophyll synthesis on the side of the stem near the light source

B. cell division on the side of the stem near the light source

C. cell elongation on the side of the stem away from the light source

D. cell elongation on the side of the stem toward from the light source

Answer: D

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7. Assertion (A): Movement of materials inside phloem is bidirectional i.e., it can be both upward or downward.

Reason (R): Movement of molecules inside xylem is unidirectional i.e., always upwards

A. If both A and R are true: R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false.

D. If A is false but R is true.

Answer: B

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8. Identify the correct statement from the following.

A. Xylem is the water conducting tissue in plants.

B. The shrinkage of protoplasm, when a cell is kept in hypotonic solution.

C. The cell wall of the root cell is a differentially permeable membrane.

D. A plant cell placed in hypotonic solution gets plasmolysed.

Answer: A

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Challenging Exercise

1. What causes the opening and closing of guard cells of stomata during transpiration?

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2. Describe two adaptations that affect the rate of transpiration in desert plants.

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