



BIOLOGY

BOOKS - MBD

Transport in Plants

Example

1. How do the passage of material into and out of cell is carried out?



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2. What is diffusion ?



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3. Is diffusion a passive or active process?



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4. Define aquaporins.



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5. What a facilitated diffusion?



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6. Write two differences between facilitated transport and active transport .



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7. What is symport?



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8. Define antiport.



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9. What is uniport?



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10. What are the factors affecting the rate of diffusion?



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11. Exchange of gases in photosynthesis and respiration take place by the principle of :

A. Active transport

B. Osmosis

C. Imbibition

D. Independent diffusion.

Answer:



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12. What will happen to a cell placed in a solution of higher concentration?



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13. What is guttation ? How does it differ from transpiration?



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14. Explain what will happen to a plant cell if it is kept in a solution having higher water potential.



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15. Is water potential measurable ? How is it represented and measured?



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16. Sir J.C. Bose proposed a theory to explain the process of ascent of sap. Name the theory.



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17. Name the structure through which ascent of sap takes place.



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18. What is active absorption of water?



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19. What is bleeding in plants?



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20. How aeration affects the process of absorption of water?



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21. What forces are involved in the soil by root hairs?



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22. What are the forces that maintain the continuity of water column during ascent of sap?



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23. Name the theory proposed by Dixon for ascent of sap.



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24. What is root pressure?



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25. What is sap?



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26. What is ascent of sap?



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27. A well watered potted herbaceous plant shows wilting in the afternoon of a dry sunny day. Why?



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28. How root/shoot ratio affects transpiration?



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29. A plant is transpiring rapidly. Will it show root pressure also?



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30. Who said that "transpiration is a necessary evil"?

A. Bose

B. Steward

C. Anderson

D. Curtis

Answer:



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31. Which one will reduce rate of transpiration?

A. Rise in temperature

B. Increase in water uptake

C. Increase in wind velocity

D. Decrease in light intensity

Answer:



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32. Rate of transpiration is highest when:

A. Soil is wet and air is dry

B. Soil is wet and air is humid

C. Soil is dry and air is humid

D. Both soil and air are dry

Answer:



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33. Rate of transpiration is measured by



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34. List any two anti-transpirants.



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35. Translocation of solutes can occur in which direction.



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36. Translocation of solutes occur through which tissue.



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37. Name the scientist who put forward Mass flow hypothesis.



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38. Where is sugar synthesized?



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39. What is the purpose of ringing experiment?



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40. Name the cells through which minerals absorbed are transferred from xylem to phloem.



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41. How does water enter the sieve tube from adjacent cells?



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42. Glucose is synthesised in leaves during photosynthesis. It is transported to other parts in which form?



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43. What is water potential?



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44. List three factors which influence water potential.



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45. What do the terms Ψ_s , Ψ_p and Ψ_g denotes?



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46. Fill in the blanks:

.....is the number of stomata per square mm of leaf surface.



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47. Fill in the blanks:

More is the leaf area,is the rate of transpiration.



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48. Fill in the blanks:

Transpiration isproportional to humidity.



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49. Fill in the blanks:

Guttation occurs through the pores called.....



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50. Fill in the blanks:

During passive absorption, water is absorbed as a result of tension created by.....



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51. True or False

In a symport both in molecules cross the membrane in the same direction termed symport and if they move in opposite direction it is termed antiport.



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52. True or False

The more the solute molecules, the lower is Y_s

.



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53. True or False

Water and minerals and food are generally moved by a mass or bulkflow system.



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54. True or False

Two factors which affect water potential are the amount of solutes and external pressure.



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55. True or False

In plant cell, the elastic wall exerts a counter pressure to imbibitional pressure called wall pressure.



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56. True or False

The guard cell walls surrounding the aperture are thicker than outer wall.



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57. True or False

The stomata open when guard cells take up Ca^{++} from the surrounding cells.



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58. Give the technical terms used for the following:

The loss of water in the form of vapours from the aerial parts of the plant.



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59. Give the technical terms used for the following:

Transport over long distances proceeds through the vascular system.





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60. Give the technical terms used for the following:

The loss of water in the form of droplets along margins of leaves through special pores called hydathodes.



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61. Give the technical terms used for the following:

The chemicals which can be sprayed on the leaves to either bring about closure of stomata or to form a film on their surface to check transpiration.



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62. Give the technical terms used for the following:

The difference between chemical potential of water at any point in a system and that of pure water under standard conditions.



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63. Give the technical terms used for the following:

The cell wall being rigid exerts an equal pressure to turgor pressure in opposite direction.



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64. Give the technical terms used for the following:

It is the pressure development in tracheary elements of xylem as a result of metabolic activities of root and considered to be an active process.



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65. What are the factors affecting the rate of diffusion?



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66. What are porins? What role do they play in diffusion?



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67. Describe the role played by protein pumps during action transport in plants.



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68. Explain why pure water has the maximum water potential.



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69. Differentiate between diffusion and osmosis.



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70. Differentiate between the following:

Transpiration and Evaporation



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71. Differentiate between the following:

Osmotic Pressure and Osmotic Potential



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72. Differentiate between the following:

Imbibition and Diffusion



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73. Differentiate between the following:

Apoplast and Symplast pathways of movement of water in plants.



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74. Differentiate between guttation and transpiration.



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75. Briefly describe water potential. What are the factors affecting it? Explain the relationship between water potential, solute potential and pressure potential.



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76. What happens when a pressure greater than the atmospheric pressure is applied to pure water or a solution?



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77. With the help of well-labeled diagrams. Describe the process of plasmolysis in plants, giving appropriate examples.



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78. Explain what will happen to a plant cell if it is kept in a solution having higher water potential.



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79. How is the mycorrhizal association helpful in absorption of water and minerals in plants?



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80. What role does root pressure play in water movement in plants?



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81. Describe transpiration pull model of water transport in plants. What are the factors influencing transpiration? How is it useful to plants?



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82. Discuss the factors responsible for ascent of xylem sap in plants.



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83. What essential role does the root endodermis play during mineral absorption in plants?



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84. Explain why xylem transport is unidirectional and phloem transport bi-directional.



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85. Explain pressure flow hypothesis of translocation of sugars in plants.



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



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87. Smaller, lipid soluble molecules diffuse faster through cell membrane, but the movement of hydrophilic substances are facilitated by certain transporters which are chemically.....



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88. In a passive transport across a membrane, when two protein molecules move in opposite direction and independent of each other. It is called as



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89. Osmosis is a special kind of diffusion in which water diffuses across the cell membrane. The rate and direction of osmosis depends upon both.....



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90. A flowering plant is planted in an earthen pot and irrigated. Urea is added to make the plant grow faster, but after some time the plant dies. This may be due to



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91. Absorption of water from soil by dry seeds increases thethus helping seedlings to

come out of soil.



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92. Water moves up against gravity and even for a tree of 20m height, the tip receives water within two hours. The most important physiological phenomenon which is responsible for the upward movement of water is



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93. The plant cell cytoplasm is surrounded by both cell wall and cell membrane. The specificity of transport of substances are mostly across the cell membrane because of



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94. The C_4 plants are twice as efficient as C_3 plants in terms of fixing CO_2 but lose onlyas much water as C_3 plants for the same amount of CO_2 fixed.



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95. Movement of substances in xylem is unidirectional. Explain.



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96. What is solute potential?



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97. Why is solute potential always negative?



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98. An onion peel was taken and

Placed in salt solution for five minutes.



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99. An onion peel was taken and

After that it was placed in distilled water.



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100. Differentiate between apoplast and symplast pathways of water movement. Which of these would need active transport?



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101. How does most of the water moves within the root?



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102. Give the location of casparian strip and explain its role in the water movement.



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103. Differentiate between guttation and transpiration.



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104. Transpiration is a necessary evil in plants .

Explain.



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105. Describe briefly the three physical properties of water which helps in ascent of water in xylem.



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106. A gardener forget to water a potted plant for a day during summer. What will happen to the plant? Do you think it is reversible? If yes, how?



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107. Identify a type of molecular movement which is highly selective and requires special membrane proteins, but does not require energy.





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108. Correct the statement

Cells shrink in hypotonic solutions.



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109. Correct the statement

imbibition is a special type of diffusion when water is absorbed by living cells.



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110. Correct the statement

Most of the water flow in the roots occurs via the symplast.



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111. Minerals absorbed by the roots travel up the xylem. How do they reach the parts where they are needed most? Do all the parts of the plant get the same amount of the minerals?



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112. If one wants to find minerals and in the form they are mobilised in the plant, how will an analysis of the exudate help?



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113. From your knowledge of physiology can you think of some method of increasing the life of cut plants in a vase?



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114. Do different species of plants growing in the same area show the same rate of transpiration at a particular time? Justify your answer.



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115. Water is indispensable for life. What properties of water make it useful for all biological processes on the earth?



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116. How is it that the intracellular levels of K^+ are higher than extracellular levels in animal cells?



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117. Cut pieces of beetroot do not leave colour in cold water but do so in hot water. Explain.



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118. In a girdled plant, when water is supplied to the leaves above the girdle, leaves may remain green for sometime then wilt and ultimately die. What does it indicate?



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119. Various types of transport mechanisms are needed to fulfil the mineral requirements of a plant. Why are they not fulfilled by diffusion alone?



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120. How can plants be grown under limited water supply without compromising on metabolic activities?



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121. Will the ascent of sap be possible without the cohesion and adhesion of water molecules comments.



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122. Keep some freshly cut flowers in a solution of food colour. Wait for sometime for the dye to rise in the flower, when the stem of the flower is held up in light, coloured strands can be seen inside. Can this experiment demonstrate which tissue is conducting water up the stem?



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123. When a freshly collected Spirogyra filament is kept in a 10% potassium nitrate solution, it is observed that the protoplasm shrinks in size:

What is this phenomenon called?



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124. When a freshly collected Spirogyra filament is kept in a 10% potassium nitrate solution, it is observed that the protoplasm

shrinks in size:

What will happen if the filament is replaced in distilled water?



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125. Sugar crystals do not dissolve easily in ice cold water. Explain.



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126. Salt is applied to tennis lawns to kill weeds. How does salting of tennis lawns help in killing of weeds of without affecting the grass?



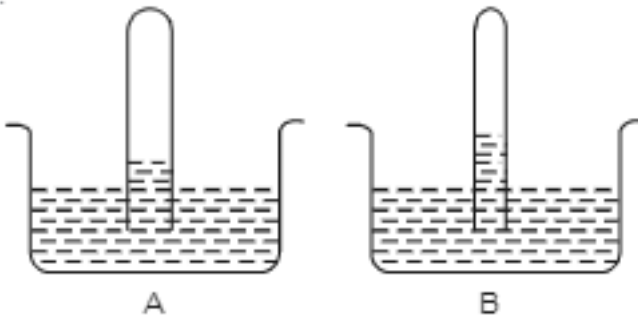
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127. What is the chemical composition of xylem and phloem sap?



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128. If you are provided with two tubes (A and B). Where one is narrow and the other is relatively wider and if both are immersed in a beaker containing water as shown in the figure.



Why does B show higher water rise than A?



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129. What are aquaporins? How does presence of aquaporins affect osmosis?



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130. ABA (Abscisic acid) is called a stress hormone

How does this hormone overcome stress conditions?



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131. ABA (Abscisic acid) is called a stress hormone

From where does this hormone get released in leaves?



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132. We know that plants are harmed by excess water. But plants survive under flooded condition. How are they able to manage excess water?



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133. Differentiate between diffusion and translocation in plants.



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134. How is facilitated diffusion different from diffusion?



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135. Explain the mass flow hypothesis of transport in phloem.

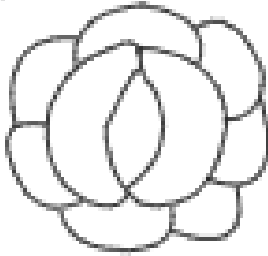


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136. Observe the diagram and answer the following:

Are these types of guard cells found in

monocots or dicots?



(i)



(ii)

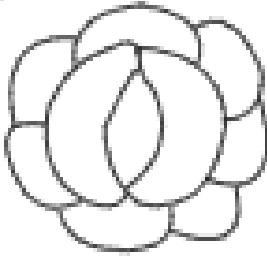


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137. Observe the diagram and answer the following:

Which of these shows a higher water content

(i) or (ii)



(i)



(ii)



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138. Define uniport symport and antiport. Do they require energy?



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139. Minerals are present in the soil in sufficient amounts. Do plants need to adjust the types of solutes that reach the xylem? Which molecules help to adjust this? How do plants regulate the type and quantity of solutes that reach xylem?



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140. Plants show temporary and permanent wilting. Differentiate between the two. Do any

of them indicate the water status of the soil.



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141. Which of these is a semipermeable membrane (S.P.) and which is selectively permeable(S.L.)

Animal Bladder



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142. Which of these is a semipermeable membrane (S.P.) and which is selectively permeable(S.L.)

Plasmalemma



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143. Which of these is a semipermeable membrane (S.P.) and which is selectively permeable(S.L.)

Tonoplast





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144. Which of these is a semipermeable membrane (S.P.) and which is selectively permeable(S.L.)

Parchment membrane



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145. Which of these is a semipermeable membrane (S.P.) and which is selectively

permeable(S.L.)

Egg membrane?



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146. Water molecules is very polar. Polar end of molecule attracts opposite charges on another water molecules (acts like magnet).

How will you explain this property of water with refrence to upward movement of water?

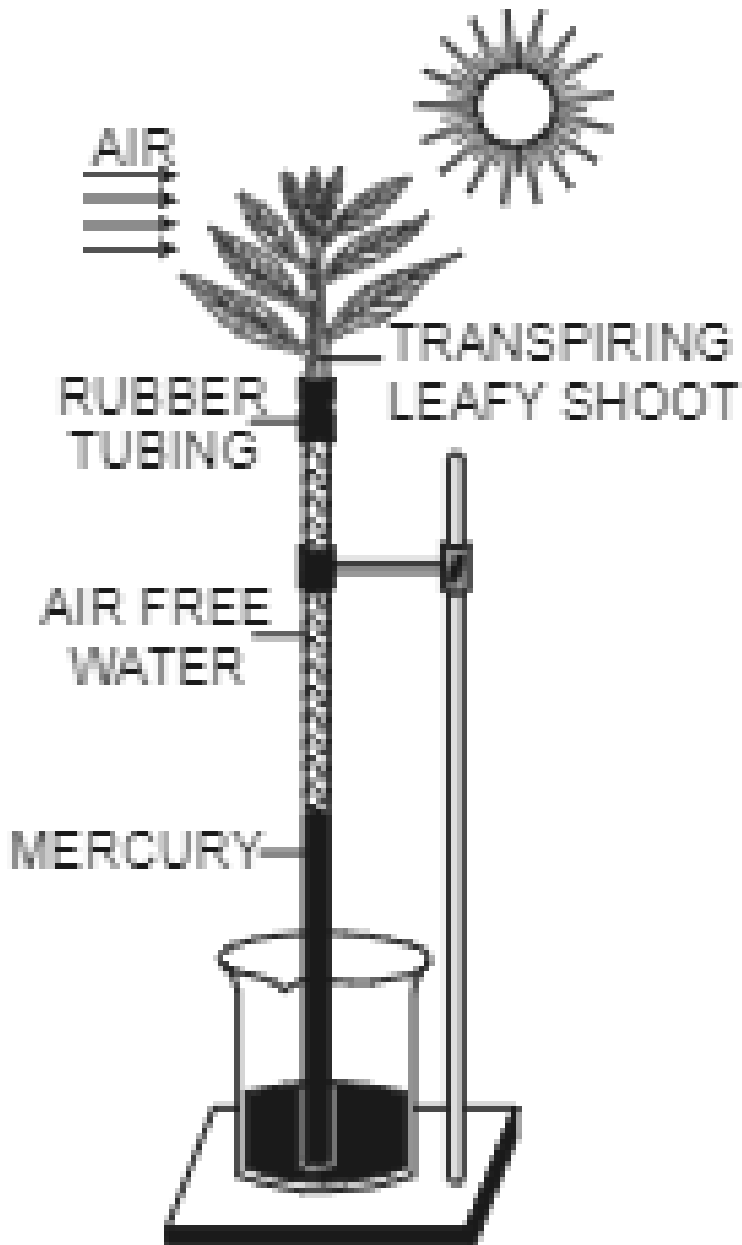
Comment on the upward move-ment of water

given the intermolecular hydrogen bonding in water.



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147. Comment on the experimental set up.

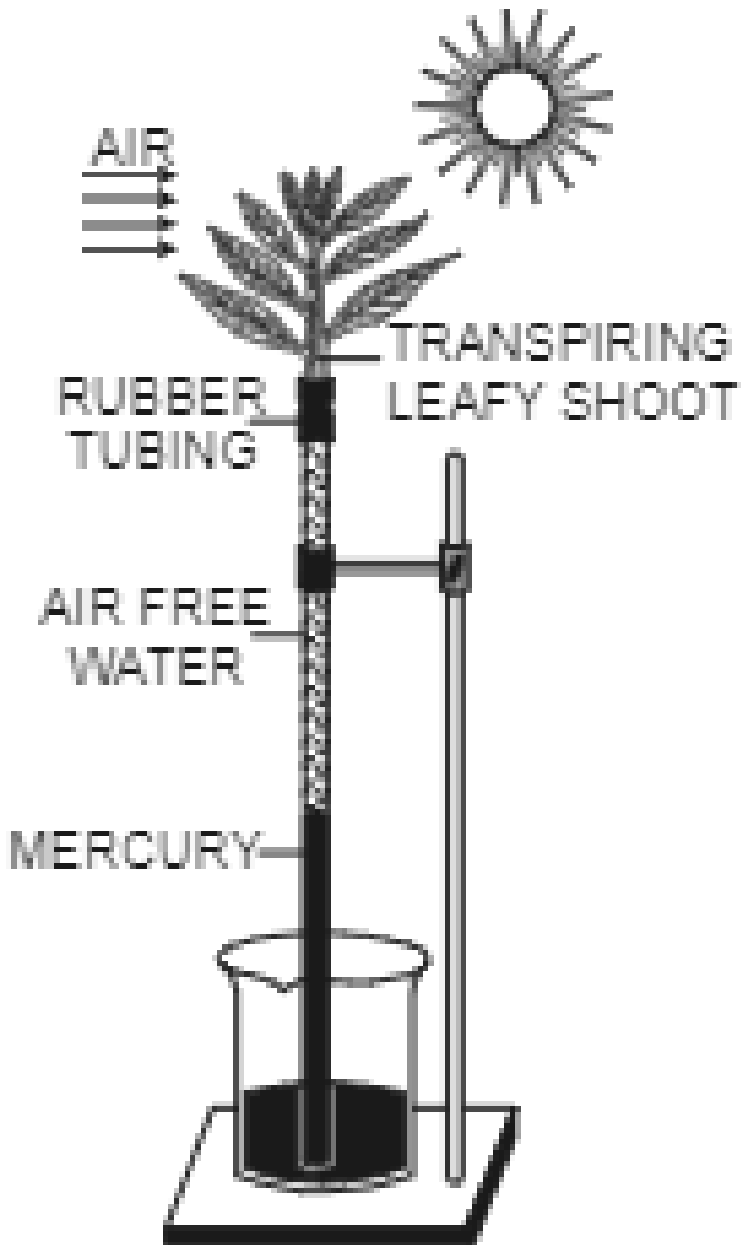


What will happen to the level of water if a blower is placed close to set up.



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148. Comment on the experimental set up.



Will the mercury level fluctuate (go up/down) if phenyl mercuric acetate is sprayed on leaves?



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149. Name the universal solvent.



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150. Why is water essential for plant activities?



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151. What is protoplast?



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152. What is protoplasm?



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153. How are protoplasm of two adjacent cells connected to each other?



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154. Which of the following show unidirectional or multidirectional transport in flowering plants? Water, minerals, organic, nutrients, mineral nutrients



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155. What is water potential?



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156. Name the measurement unit of water potential.



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157. List three factors which influence water potential.



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158. What do the terms Ψ_s , Ψ_p and Ψ_g denotes?



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159. Name the structures which absorb water from soil.



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160. What are the two pathways through which water moves?



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161. Define transmembrane pathway.



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162. What are the subsidiary cells?



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163. Does exomosis increase or reduce the wall pressure?



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164. Explain symport, antiport and uniport with the help of sketch only.



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165. List the factors which affect water potential. Write value of water potential of pure water.



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166. Explain matric potential, solute potential and pressure potential. How will you calculate the water potential of cell contents?



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167. Differentiate diffusion pressure deficit and water potential.



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168. What is turgor pressure? How is it maintained in plants ? What will happen when wall pressure equals to turgor pressure?



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169. How is water absorbed by plants?



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170. What is osmotic pressure? List any three conditions on which osmotic pressure depends.



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171. Define imbibition. What are two conditions for imbibition to take place?



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172. Diagrammatically show the role of potassium, chloride and malate ions in stomatal opening.



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173. Discuss the effect of CO_2 concentration on opening and closing of stomata.



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174. Write two conditions which lead to guttation.



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175. Show the water movement in the leaf with the help of figure.



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176. Comment "Transpiration and photosynthesis- a Compromise".



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177. Explain active absorption of minerals.



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178. Distinguish between:

Osmotic potential and matric potential.



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179. Distinguish between:

Osmosis and imbibition.



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180. Describe the theories related to translocation of water. Give a brief account of mechanism of stomatal movement.



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181. What is structure of stoma? Explain opening and closing of stomata.



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182. Give scientific reasons to the following:

Why guttation usually occurs during humid periods at night or early in the morning?



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183. Give scientific reasons to the following:

Plant cells get plasmoyosed when placed in hypertonic solution.



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184. Why root pressure is not an important factor for upward movement of water in the tall trees.



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185. Explain why:

Water can reach upto endodermis through apoplast but it moves through the endodermis by symplast.



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186. Explain why:

Primary xylem in root is exarch and in stem it is endarch.



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Exercise

1. Differentiate apoplast and symplast.



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2. Briefly describe water potential. What are the factors affecting it?



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3. What is solute potential?



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4. Define imbibition. Give an example?



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5. Name the element which plays an important role in opening and closing of stomata.



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6. Water is indispensable for life. What properties of water make it useful for all biological processes on the earth?



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7. Explain why xylem transport is unidirectional and phloem transport bi-directional.



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8. What essential role does the root endodermis play during mineral absorption in plants?



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9. How does most of the water moves within the root?



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10. Transpiration is a necessary evil in plants .
Explain.



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11. What is turgor pressure? How is it maintained in plants ?



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12. Explain absorption of water in the plants.



Watch Video Solution

13. Discuss the effect of CO_2 concentration on opening and closing of stomata.



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14. Give an account of factors affecting transpiration.



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