



BIOLOGY

BOOKS - KUMAR PRAKASHAN KENDRA

BIOLOGY (GUJRATI ENGLISH)

TRANSPORT IN PLANTS

**Section A Exam Oriented Questions Answers
From Darpan**

1. How one can think to explain transport in plants ?



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2. What should be remembered in the matter of Transport/movement ?



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3. What is Translocation ? Explain.



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4. Explain : The direction of transport in plants.



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5. Write means of Transport.



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6. Give definition of diffusion and write its properties.



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7. Explain : Facilitated Diffusion and its properties.



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8. Explain : Passive Symports and antiports.



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9. Explain : Active Transport.



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10. Compare various / different transport processes.



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11. Describe water relations of a plant.



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12. Explain : Water Potential.



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13. Describe : Osmosis



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14. Explain : Plasmolysis.



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15. Describe the process/ mechanism of plant cell plasmolysis with example and labelled diagram.



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16. What occupies the space between the cell wall and the shrunken protoplast in the plasmolysed cell ?



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17. Explain : Imbibition



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18. Explain how long distance transport of water is caused ?



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19. How do plants absorb water ?



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20. How water and ions are absorbed in roots ? Explain with diagram.



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21. Explain : Root Pressure.



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22. Describe : Transpiration Pull.



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23. Describe : Transpiration.



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

Describe point wise.



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25. Present cohesion-tension-transpiration pull model of water transport.



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26. The process of photosynthesis requires water. The system of xylem vessels from the root to the leaf vein can supply the needed water. But what force does a plant use to move water molecules into the leaf parenchyma cells where they are needed ?



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27. Transpiration and Photosynthesis a compromise. Give explanation.



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28. Write a short note on uptake of mineral ions.



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29. Explain : Translocation of mineral ions.



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30. Explain phloem transport.



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31. Explain flow from source to sink.



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32. Explain pressure flow hypothesis of translocation of sugar in plants.



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33. What is uni-directional transport ?



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34. Whose transport is multi-directional



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35. Write importance of nutrients in plants.



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36. What is meant by passive movement ?



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37. Why is diffusion important in plants ?



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38. On what the rate of diffusion depend ?



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39. Diffusion of which substances is difficult ?



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40. Facilitated diffusion :



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41. Facilitated diffusion :



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42. Write importance of porins.



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43. Write importance of pump .



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44. In plants, when is the transport maximum
?



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45. Active transport :



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46. Why is water essential for plants ?



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47. Write absorption of water in plant of maize and mustard.



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48. Who decides water potential ?



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49. Why is water potential more in pure water ?



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50. Why is water potential of pure water is zero ?



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51. Write relation between pure water and water potential.



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52. Give effect of water potential in plant cell.



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53. By what pressure potential is shown ?



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54. Write a formula of water potential of water.



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55. Write importance of vacuole.



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56. Write characteristics of osmosis.



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57. How semi-permeable membrane is obtained from the egg ?





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58. What is required to remember in the experiment of thistle funnel ?



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59. What is osmotic pressure ?



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60. Explain three types of solutions.



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61. When does plasmolysis occur ?



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62. How water comes out from the cell ?



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63. What is meant by flaccid state of the cell ?



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64. What is turgor pressure explain.



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65. Write importance of turgor pressure .



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66. Why does imbibition diffuses ?



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67. Explain usefulness of imbibition .



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68. What is required for germination ?



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69. Why does imbibition diffuses ?



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70. Give the condition of diffusion.



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71. Why is vascular system necessary ?



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72. Give peculiarities of bulk or mass flow system.



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73. Give the function of xylem.



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74. Give the function of phloem.



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75. Explain apoplast pathway



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76. Give characteristics of apoplast pathway



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77. Why are adhesive and cohesive forces seen
?



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78. Write importance of plasmodesmata.



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79. What is casparian strip ?



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80. How helpful is the relation of mycorrhiza in absorption of water and minerals in plants ?



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81. Why is mycorrhizae symbiotic ?



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82. What is meant by root pressure ?



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83. When root pressure can be observed ?



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84. What is guttation ?



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85. What role is played by Root pressure in transport of water in plants ?



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86. On which matter researchers have agreed upon regarding water transport in plants ?



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87. What are called stomata ?



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88. How do stomata open ?



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89. When do stomata close ?



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90. Which are the factors affecting transpiration ?



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91. Explain the terms cohesion force, Adhesive force, surface tension force.



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92. Write the uses of capillarity.



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93. Present cohesion-tension-transpiration pull model of water transport.



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94. Explain : transpiration is an unavoidable event.



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95. Why is active transport done in root ?



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96. Write function of root hair .



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97. Write functional characteristic of cells of endodermal.



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98. Why transport occurs in one direction in endodermal layer ?



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99. Towards what uptake of mineral elements is done ?



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100. Explain flow from source to sink.



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101. Explain: The relation of source and sink is variable.

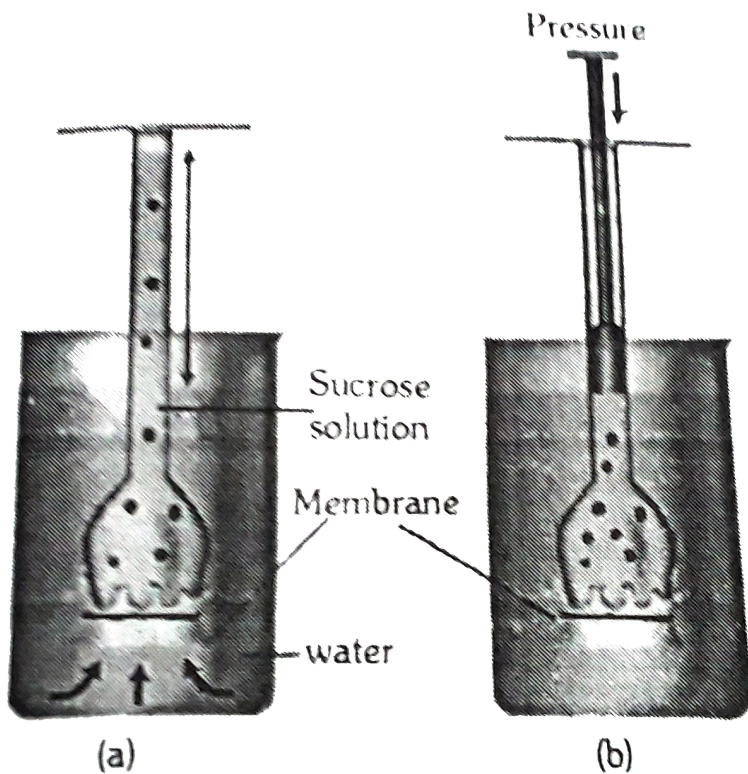


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102. What is transported by phloem ?



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Study the given figure carefully and select the true and false statement(s) in this demonstration.

(a) Numerically this external pressure in figure

(b) is equivalent to the osmotic potential of a solution, but the sign is opposite.

(b) Osmotic pressure is due to the solute concentration.



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2. Plasmolysis is possible in plant cell while not possible in animal cell.



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3. Door-window of house swell in monsoon.



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4. Explain : transpiration is an unavoidable event.



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5. Water is life for plants.



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6. Ascent of sap is done by xylem tissue.



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Section C Definition Explanation Terms Location Function

1. Define : Diffusion.



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2. Facilitated diffusion :



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3. Define : Uniport .



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4. Define : Symport .



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5. Define : Antiport .



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6. Active transport :



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7. Explain : Water Potential.



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8. Define : Translocation of substances .



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9. Describe : Osmosis



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10. What is osmotic pressure ?



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11. Explain : Plasmolysis.



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12. Define: Deplasmolysis.



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13. Explain : Imbibition



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14. Explain apoplast pathway



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15. Define : Symplast pathway.



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16. Explain : Root Pressure.



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17. Define : Guttation .



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18. Describe : Transpiration.



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19. Explain the terms cohesion force, Adhesive force, surface tension force.



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20. Explain the terms cohesion force, Adhesive force, surface tension force.



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21. Define: Ascent of sap .



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22. Explain phloem transport.



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23. Write importance of vacuole.



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24. Write importance of plasmodesmata.



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25. What are called stomata ?



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Section D Textual Exercise

1. On what the rate of diffusion depend ?



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



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3. Describe the role played by protein pumps during active transport in plants.



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4. Why is water potential more in pure water ?



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



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



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7. Describe the process/ mechanism of plant cell plasmolysis with example and labelled diagram.



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8. How helpful is the relation of mycorrhiza in absorption of water and minerals in plants ?



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9. What is meant by root pressure ?



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10. Present cohesion-tension-transpiration pull model of water transport.



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11. Discuss the factors responsible for ascent xylem sap in plants.



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



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



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14. Explain pressure flow hypothesis of translocation of sugar in plants.



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15. What causes the opening and closing of guard cells of stomata during transpiration ?
Describe point wise.



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1. Which of the following statements does not apply to reverse osmosis ?

A. It is used for water purification

B. In this technique, pressure greater than osmotic pressure is applied to the system

C. It is a passive process

D. It is an active process

Answer: D





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2. Which one of the following will not directly affect transpiration ?

A. Temperature

B. Light

C. Wind speed

D. Chlorophyll content of leaves

Answer: D



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3. The lower surface of leaf will have more number of stomata in a

A. dorsiventral leaf

B. isobilateral leaf

C. Both (A) and (B)

D. None of these

Answer: A



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4. The form of sugar transported through phloem is

A. glucose

B. fructose

C. sucrose

D. ribose

Answer: C



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5. What is guttation ?

- A. when the root pressure is high and the rate of transpiration is low.
- B. when the root pressure is low and the rate of transpiration is high.
- C. when the root pressure equals the rate of transpiration.
- D. when the root pressure as well as rate of transpiration are high.

Answer: A



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6. Which of the following is an example of imbibition ?

- A. Uptake of water by root hair
- B. Exchange of gases in stomata
- C. Swelling of seed when put in soil
- D. Opening of stomata

Answer: C



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7. When a plant undergoes senescence, the nutrients may be

- A. accumulated
- B. bound to cell wall
- C. translocated
- D. None of these

Answer: C



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8. Water potential of pure water at standard temperature is equal to

A. 10

B. 20

C. 0

D. None of these

Answer: C



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9. Choose the correct option mycorrhiza is a symbiotic association of fungus with root system which helps in

(a) absorption of water, (b) mineral nutrition ,
(c) translocation ,(d) gaseous exchange

A. Only (a)

B. Only (b)

C. Both (a) and (b)

D. Both (b) and (c)

Answer: C



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10. Mark the mismatched pair.

A. Amyloplast - Store protein granule

B. Elaioplast - Store oils or fats

C. Chloroplasts - Contain chlorophyll
pigments

D. Chromoplasts - Contain coloured
pigments other than chlorophyll

Answer: A



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Section E Ncert Exemplar Very Short Answer

1. 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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2. 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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3. 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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4. A flowering plant is planted in an earthen pot and irrigated. Urea is added to make the

plant grow faster, but after sometime the plant dies. This may be due to



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5. Absorption of water from soil by dry seeds increases the, thus helping seedlings to come out of soil.



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6. Water moves up against gravity and even for a tree of 20 m 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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7. 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



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



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



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10. Identify the process occurring in I, II and III.



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11. Given below in a table. Fill in the gaps.



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12. Define water potential and solute potential.



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13. Why is solute potential always negative ?

Explain $\Psi_W = \Psi_S + \Psi_p$.





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14. An onion peel was taken and (a) placed in salt solution for five minutes. (b) after that it was placed in distilled water. When seen under the microscope what would be observed in (a) and (b) ?



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15. Differentiate between apoplast and symplast pathways of water movement. Which

of these would need active transport ?



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



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



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18. Differentiate between guttation and transpiration.



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19. Explain : transpiration is an unavoidable event.



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



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21. A gardener forgot 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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22. Identify a type of molecular movement which is highly selective and requires special membrane proteins, but does not require energy.



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23. Correct the statements.

(a) Cells shrink in hypotonic solutions and swell in hypertonic solutions.

(b) Imbibition is a special type of diffusion

when water is absorbed by living cells.

(c) Most of the water flow in the roots occurs via the symplast.



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Section E Ncert Exemplar Short Answer

1. 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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2. 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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3. 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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4. Do different species of plant a growing in the same area show the same rate of transpiration at a particular time ? Justify your answer.



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



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



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



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8. 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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9. 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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10. How can plants be grown under limited water supply without compromising on metabolic activities ?



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11. Will the ascent of sap be possible without the cohesion and adhesion of the water molecules ? Explain.



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12. Keep some freshly cut flowers in a solution of food colour. Wait for sometime for the days 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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13. When a freshly collected spirogyra filament is kept in a 10% potassium nitrate solution, it is observed that the protoplasm shrinks in size

(a) What is this phenomenon called ?

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



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



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



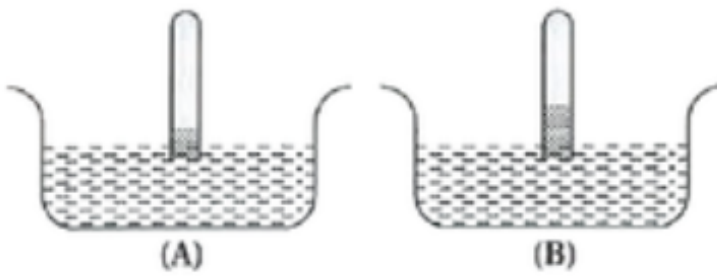
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16. What is the chemical composition of xylem and phloem sap ?



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17. 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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18. What are 'aquaporins' ? How does presence of aquaporins affect osmosis?



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19. ABA (Abscissic Acid) is called a stress hormone.

(a) How does this hormone overcome stress conditions ?

(b) From where does this hormone get released in leaves ?



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20. 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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21. How is facilitated diffusion different from diffusion ?



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22. Explain pressure flow hypothesis of translocation of sugar in plants.



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23. Observe the diagram and answer the following.



(a) Are these types of guard cells found in monocots or dicots ?

(b) Which of these shows a higher water content (i) or (ii) ?

(c) Which element plays an important role in the opening and closing of stomata ?



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24. Define : Uniport .



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Section E Ncert Exemplar Long Answer

1. Minerals are present in the soil in sufficient amounts. Do plants need to adjust the type 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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2. 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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3. Which of these is a Semipermeable Membrane (SP) and which is Selectively Permeable (SL) ?

(a) Animal bladder, (b) Plasmalemma, (c) Tonoplast, (d) Parchment membrane, (e) Egg membrane



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4. Halophytes may show precell pressure very much higher than atmospheric pressure.

Explain how this can happen ?



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5. The radio labelled carbon in carbon dioxide supplied to potato plants in an experiment was seen in the tuber eventually. Trace the movement of the labelled carbon dioxide.



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

How will you explain this property of water with reference to upward movement of water ? Comment on the upward movement of water given the inter molecular hydrogen bonding in water.



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7. Comment on the experimental setup.



(a) What does the setup demonstrate ?

(b) What will happen to the level of water if a blower is placed close to setup ?

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



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1. _____ is type of protein, which forms big size pores in pigment cells, Mitochondria and cell membrane of bacteria.



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2. In _____ two molecules pass through membrane in one direction, where as in .___ they pass against each other.



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3. Which are main factors to determine water potential.



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4. What is isotonic solution ?



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5. Inner layer of cortex, impermeable to water and having suberin is called ____ ?





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6. Give difference:

(1) Diffusion and osmosis

(2) Guttation and evaporation



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7. What role is played by Root pressure in transport of water in plants ?



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

Describe point wise.



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



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