



## BIOLOGY

### BOOKS - PRADEEP BIOLOGY (HINGLISH)

#### TRANSPORT IN PLANTS

##### Ncert Exercise

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

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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. Explain why pure water has the maximum water potential.



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5. Differentiate between the following:

(a) Diffusion and Osmosis

(b) Transpiration and Evaporation

(c) Osmotic Pressure and Osmotic Potential

(d) Imbibition and Diffusion

(e) Apoplast and Symplast pathways of movement of water in plants.

(f) Guttation and Transpiration.



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



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



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8. (a) With the help of well-labelled diagrams, describe the process of plasmolysis in plants, giving appropriate examples.

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



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

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

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

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



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14. Explain why xylem transport is unidirectional and phloem transport bidirectional.



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



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



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## Additional Question Very Short Answer Question

1. Why do plants die in water logged soil?



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2. If the concentration of salt in the soil is too high the plants may wilt even if the field is thoroughly irrigated Explain



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3. What is the process of loss of small quantities of water in droplet form from tip of some leaves called



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



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



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6. What will happen to a plant cell if it is kept in a solution having higher water potential ?



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7. Which fraction of soil water is available to plants for absorption by roots ?



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8. What happens to plant cell when it is placed in a hypotonic solution?



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9. Define transpiration



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10. Define wall pressure



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11. What are hydathodes ?



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12. A plant cell when kept in a certain solution got plasmolysed what was the nature of the solution?

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13. Why is energy required to develop root pressure ?

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14. Name the plant process carried by hydathodes

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15. A cell has osmotic pressure of 10 bars and its turgor pressure is 6 bars find its DPD

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16. Name the pores through which guttation occurs



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17. Name the pore through which guttation takes place



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18. Who proposed  $K^+$  exchange hypothesis for the opening and closing of stomato?



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19. What are antitranspirants ?



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20. What will happen if the transpiration exceeds the amount of water absorbed?

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21. Some plants close their stomata to conserve water under severe drought conditions. Name the phytohormone that helps them to do so

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22. 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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23. In a passive transport across a membrane when two protein molecules move in opposite directions and independent of each other it is called as .....

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24. A flowering plant is planted in an earthen pot and irrigated urea is added to make the plant flourish but the plant dies after some time. This may be due to.....

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### Additional Question Short Answer Question

1. Define osmosis

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2. What is wilting ?

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3. What is an isotonic solution ?

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4. Define plasmolysis ?

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5. Define imbibition.

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6. Suggest two types of treatments for reducing transpiration in plants in a field

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7. Describe the two conditions which lead to guttation

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8. A farmer observed drops of water along the margins of leaves of tomato plants growing in his well irrigated field on a winter morning. Give reasons for this occurrence. Why had the water drops appeared only along the leaf margins?

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9. List any four mechanism that contribute to the ascent of sap in tall trees

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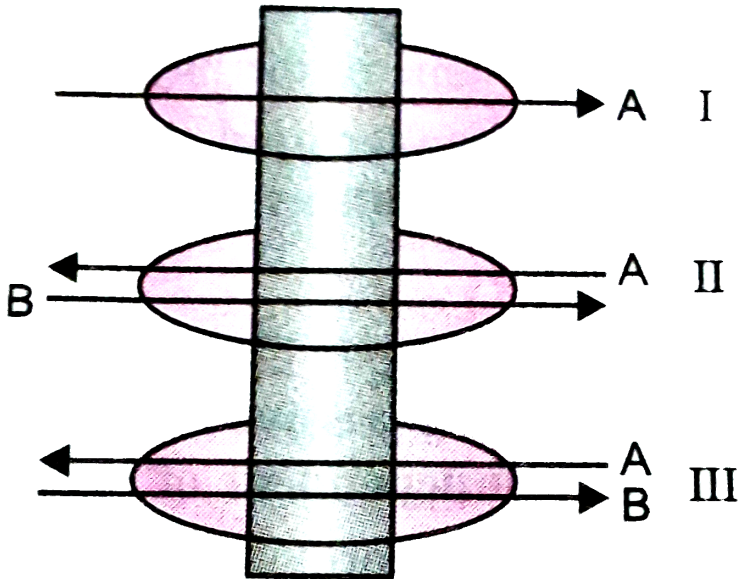
10. What will happen if the transpiration exceeds the amount of water absorbed ?

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11. How does gravitational water differ from capillary water in the soil ?  
Which of these is available to the plant?

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



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13. Differentiate between guttation and transpiration.

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14. Define water potential and solute potential.





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15. A write name of the hormone responsible for closure of stomata  
B who proposed relay pump theory for ascent of sap?  
C what is incipient plasmolysis  
D define the terms symplast and apoplast in relation to translocation of water



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16. What are the two kinds of interactions of water molecules that allow water to travel upward in plants? What other physical process aids in water transport to tops of trees?



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17. What is the role of root pressure in ascent of sap?



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18. Write explanatory note on translocation of organic solutes

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19. Differentiate between stomata and hydathode

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20. Explain the following terms

(i) Guttation (ii) wilting (iii) imbibition (iv) chelator

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21. Differentiate between transpiration and guttation. Name the morphological parts related with two processes

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22. Why do some herbaceous plants have hydathodes? Under what conditions do they help the plants?

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23. What is meant by apoplast pathway? Why does it occur in cortex and not in endodermis?

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24. Explain the mass flow hypothesis of transport in phloem

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25. Fill in the blanks

A kneading of wheat flour is accompanied by release of heat which is due

to of water by \_\_\_\_\_ and cellulose

B opening and closing of stomata depend on changes in the.....of guard cells

C The wall of guard cells towards stomatal pore is .....while the other wall is.....

D guttation sometimes causes injury to the .....margins by salt deposition which is left by .....of exudate

E potometer is an apparatus used for measuring in the rate of .....

F In land plants the water potential is never .....because osmotic potential is always negative



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**26.** Make corrections wherever you find mistake in spelling s/words in the following paragraph / sentences

A According to Levitt (1974) active  $K^+$  ion transport and pH of mesophyll cells together control the opening and closing of stomata

B water potential can be zero negative or positive in pure water at atmospheric pressure has minimum potential it is positive in a solution

in pure water under some external pressure above atmospheric the water potential is negative

C Red light is more effective than light in opening of stomatal pores



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**27.** Give scientific reasons to the following:

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

B animal cells reupture when placed in distilled water

C plant cells get plasmolysed when placed in hypertonic solution



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**28.** Match the items in column A with column B each point in column A has minimum one match in column B and maximum three matches

**Column A**

1. Stomatal movement
2. Apoplast-symplast concept
3. Cohesion-tension theory
4. Pressure potential ( $\psi_p$ )
5. Osmotic pressure.

**Column B**

- (a) E. Munch (1930)
- (b) Starch Sugar hypothesis
- (c) Hydrostatic pressure theory.
- (d) Dixon and Joly (1894).
- (e)  $K^+$  transport
- (f) Turgor pressure (TP)
- (g) Suction pressure
- (h) Osmotic potential
- (i) Turgor changes
- (j) Solute potential

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1. Describe the theories related to translocation of water

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2. In what ways does the concept of water potential help in explaining water movement?

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3. Describe the apoplast and symplast pathways



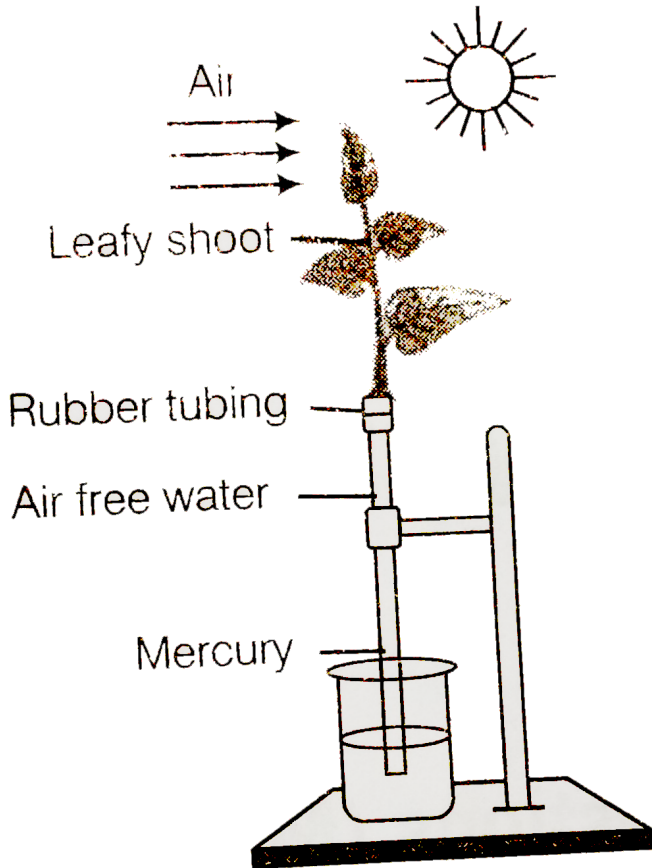
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4. HOW DO PLANTS ABSORB WATER?



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5. Comment on the experimental setup.



(a) What does the setup demonstrate ?

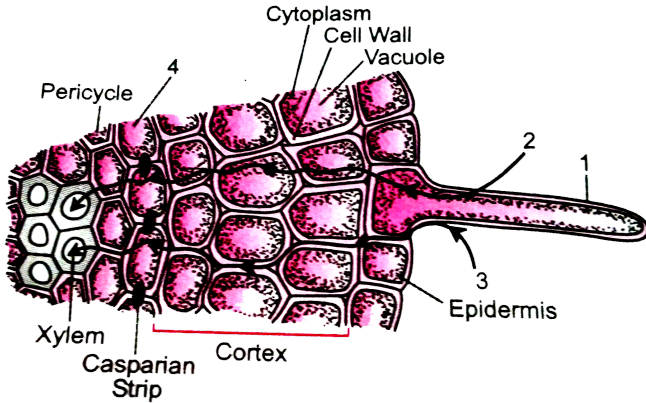
(b) What will happen to the level of water if a blower is placed close to setup ?

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





6. A portion of transverse section of root is shown in the diagram label 1 to 5 and also write the function of parts 1, 4 and 5 briefly explain the pathways 2 and 3



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### Analytical Question With Answer

- (a) What is guttation? What is the cause of guttation?
- (b) What are hydathodes?

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2. (a) What is imbibition? How is it different from osmosis?

(b) What is the importance of imbibition to the plants

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3. Why is root pressure not an important factor for upward movement of water in tall trees? Explain

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4. Water can reach up to endodermis through apoplast but it moves through endodermis by symplast why? Explain

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5. Why is primary xylem in root exarch and in stem endarch? Explain

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6. What forces are involved in the absorption of water form the soil by root hairs?

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7. What causes the leaves of the grasses to rool in dry weather?

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8. What is facillitated diffuseion? How do large molecules or ions pass through outer membrnes of plastids and mitochondria?

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9. Differentiate between the terms symport antiport and uniport





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10. Is it possible to perform girdling experiments in monocots? Give reasons in support of your answer



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11. If a plant is girdled which part of the plant dies first the root or the shoot ? Answer giving reason?



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12. Plants do not have a circulatory system how do they transport substances ?



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13. Pickles are well suited to protect them from bacterial contamination why?

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14. Facilitated diffusion involving membrane proteins is categorised under passive transport. Why?

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15. Give three important features of active transport

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16. Give the properties common between facilitated diffusion and active transport

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17. How osmotic potential is related with osmotic pressure? What is the unit of osmotic quantities?

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18. Give reason why the xylme sap flows out form the cut end if a well hydrated plant is cut below the first leaf or near the base of stem

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19. How do the guard cells differ from subsidiary cells ?

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20. A plant cell with 0.5% concetration of salt in its cell sap is palced in a solution with 5% concentration of salt answer the following :

(i) What will happen to the cell?

(ii) How will you describe the concentration of the outside solution?

(iii) What changes are required to bring back the normalcy of the cell ?



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## Practice Question Multiple Choice Question

1. A plant cell attains turgidity due to

A. electrolysis

B. endosmosis

C. plasmolysis

D. hydrolysis

**Answer: B**



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2. Which one of the following theories for ascent of sap was proposed by an eminent Indian scientist J.C. Bose?

- A. pulsation theory
- B. relay pump theory
- C. transpiration pull theory
- D. root pressure theory

**Answer: a**



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3. When a fresh-water protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will

- A. disappear
- B. increase in size
- C. decrease in size



D. increase in number

**Answer: a**



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4. water reaches the top of a plant due to

A. root pressure

B. capillarity

C. transpiration pull theory

D. diffusion

**Answer: a**



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5. Potameter 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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6. A cell when dipped in 0.5 M sucrose solution has no effect but when the same cell will be dipped in 0.5 M NaCl solution the cell will

A. increase in size

B. decrease in size

C. will be turgid

D. will get plasmolysed

**Answer: c**



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

- A. aquactic submerged plants
- B. plants living in deserts
- C. aquatic plants with floating leaves
- D. plants growing in hilly regions

**Answer: a**



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8. The translocation of organic solutes in sieve tube members is supported by

- A. cytoplasmic streaming
- B. root pressure and transpiration pull
- C. p protein
- D. mass flow involving a carrier and atp

**Answer: c**

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9. Water is lost in a liquid state in some plants through hydathodes.

These hydathodes

- A. remain closed at night
- B. remain closed day
- C. remain always open
- D. do not show any specification opening and closing

**Answer: c**

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10. The rate of transpiration will be very less in a situation where

- A. ground water is sufficient available
- B. wind is blowing
- C. environment is very hot and dry
- D. relative humidity is very high

**Answer: d**

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11. Identify the correct relationship with reference to water potential of a plant cell

- A.  $\Psi_w = \Psi_m + \Psi_s + \Psi_p$
- B.  $\Psi_w = \Psi_m + (\Psi_s - \Psi_p)$

$$C. \Psi_w = \Psi_m - (\Psi_s + \Psi_p)$$

$$D. \Psi_w = \Psi_m - \Psi_s - \Psi_p$$

**Answer: a**



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**12.** Passive absorption of water by the root system of the result of

- A. Force created in the cells of the root
- B. increases respiratory activity in root cells
- C. tension on the cell sap due ot transpiration
- D. osomotic force in the shoot system

**Answer: c**



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13. Which of the following statements are true/false ?

A. a and b are true and c, d and e are false

B. a and c are true and b, d and e are false

C. a and d are true and b, c and e are false

D. c, d and e true and a and b are false

**Answer: a**



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14. Two cells A and B are contiguous. Cell A has osmotic pressure 10 atm, turgor pressure-7 atm and diffusion pressure deficit 3 atm. Cell B has osmotic pressure 8 atm, turgor pressure 3 atm and diffusion pressure deficit 5 atm. The result will be

A. no movement of water

B. equilibrium between the two

C. movement of water form cell a to b

D. movement of water from cell b to a

**Answer: d**



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15. Which of the following statement is/are true ?

A. a and b only

B. b and d only

C. a,c and d only

D. a,b and d only

**Answer: c**



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16. The pathway of the movement of water through cell wall only is called

- A. symplast pathway
- B. plasmodesmata pathway
- C. apoplast pathway
- D. vacuolar pathway

**Answer: c**



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17. 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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**18.** If flowers are cut and dipped in dilute NaCl solution then

- A. transpiration is low
- B. endosmosis occurs
- C. no bacterial growth takes place
- D. absorption of solute inside flower cell takes place

**Answer: b**



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**19.** Munch hypothesis is based on

- A. translocation of food due to t.p. gradient and imbibition force

B. translocation of food due to turgor pressure tp gradient

C. translocation of food due to imbibition force

D. none of the above

**Answer: b**



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20. Which of the following chemical serves as an antitirnaspirants in plants?

A. cobalt chloride

B. dimethyl mercury

C. potassium iodide

D. phenyl mercuric acetate

**Answer: d**



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21. Path of water movement from soil to xylem is

A.

$soil \rightarrow \sqrt[3]{air} \rightarrow c \text{ or } tex \rightarrow pericyc \leq \rightarrow endodermis \rightarrow m\eta xylm$

B.

$soil \rightarrow \sqrt[3]{ari} \rightarrow c \text{ or } tex \rightarrow endodermis \rightarrow pericyc \leq \rightarrow pro \rightarrow x$

C.  $soil \rightarrow \sqrt[3]{ari} \rightarrow e\pi dermis \rightarrow phloem \rightarrow xylme$

D.

$soil \rightarrow \sqrt[3]{air} \rightarrow e\pi dermis \rightarrow c \text{ or } tex \rightarrow pho \leq m \rightarrow rxy \leq m$

Answer: b



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22. Which of the following statement is/are not true?

A. b,c and e only

B. b,c and d only

C. a ,b and c only

D. a and e only

**Answer: b**



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**23.** The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of

A. weak gravitational pull

B. transpiration pull

C. lignified thick wall

D. lignified thick wall

**Answer: d**



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24. Instrument used for measuring rate of transpiration is

- A. photometer
- B. potometer
- C. porometer
- D. lactometer

**Answer: b**



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25. A cell, when kept in sugar solution, gets dehydrated. Then, the solution is

- A. hypotonic
- B. hypertonic
- C. isotonic

D. none of these

**Answer: b**



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**26.** Guard cells help in

A. transpiration

B. guttation

C. fighting against infection

D. protection against grazing

**Answer: a**



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**27.** Which of 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: c**



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**28.** 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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29. 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 the above

**Answer: a**



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30. The form of sugar transported through phloem is

- A. glucose
- B. fructose
- C. sucrose

D. ribose

**Answer: c**



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**31.** The process of guttation takes place

- 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 a rate of transpiration are high

**Answer: a**



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**32.** 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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**33.** When a plant undergoes senescence, the nutrients may be

- A. exported
- B. withdrawn
- C. translocated
- D. none of above

**Answer: b**

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

A. 10

B. 20

C. zero

D. none of the above

**Answer: c**



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35. 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

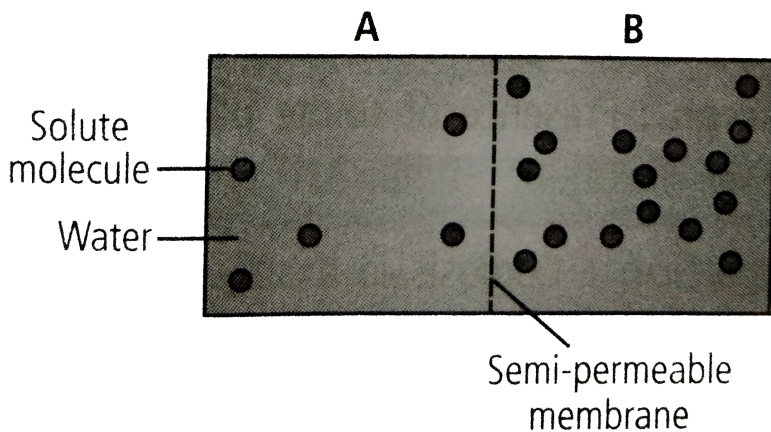
C. both a and b

D. both b and c

**Answer: c**

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**36.** Based on the figure given below which of the following statements is not correct



A. movement of solvent molecules will take place from chamber a to b

B. movement of solute will take place from a to b

C. presence of a semipermeable is a pre requisite for this process to occur

D. the direction and rate of osmosis depends on both the pressure gradient and concentration gradient

**Answer: b**



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**37. Match the followings and choose the correct option**

A. A-(iii),(B)-(iv),(C)-(i),(D)-(ii)

B. A-(i),(B)-(ii),(C)-(iii),(D)-(iv)

C. A-(iii),(B)-(ii),(C)-(iv),(D)-(i)

D. A-(iii),(B)-(ii),(C)-(i),(D)-(iv)

**Answer: b**



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38. Mark the mismatched pair.

- A. Amyloplast (i) store protein granule
- B. Elaiplast (ii) store oils of fats
- C. chloroplasts (iii) contain chlorophyll pigments
- D. chromoplasts (iv) contain coloured pigments other than chlorophyll

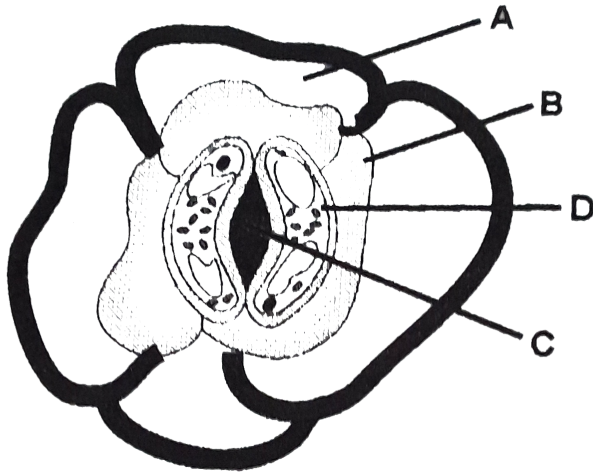
**Answer: a**



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39. Given below is the diagram of a stomatal apparatus in which of the following all the four parts labelled as A,B,C and D are correctly

identified?



A. epidermal subsidiary stomatal guard

B. guard stomatal subsidiariy

C. epidermal

D. epidermal guard stomatla subsidiary

**Answer: a**



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40. According to the Steward's starch hydrolysis theory, which one of the following is the principle reason for the opening of stomata during daytime

- A. efflux of  $k^+$  ions from guard cells under the influence of abscisic acid hormone
- B. photosynthetic utilization of  $CO_2$  in guard cells
- C. influx of  $k^+$  ions into guard cells under the influence of abscisic acid hormone
- D. conversion of sugar into starch in guard cells

**Answer: b**



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41. Compare the statements a and b

Statement a. To counteract the increase in turgor pressure in plant cells the cell wall produces an equal and opposite pressure, i.e., wall pressure

Statement b. When plant cells undergo endosmosis, they swell but do not burst .

- A. statement a is wrong and b is correct
- B. both the statements a and b are correct and a is not the reason for b
- C. both th statement a and b are correct and a is the reason for b
- D. statement a is correct and b is wrong

**Answer: c**



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**42.** Cell A and cell B are adjacent plant cells. In cell A  $\Psi_s = -20$  bars and  $\Psi_p = 8$  bars. In cell B,  $\Psi_s = -12$  bars and  $\Psi_p = 2$  bars . Then,

- A. water moves from cell b to cell a

- B. equal amount of water is simultaneous exchanged between cell a and cell b
- C. water moves form cell a to cell b
- D. there is no movement of water between cell cand cell b

**Answer: a**

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**43.** Which one is the driving force for the process of passive absorption of water in roots

- A. acitivity of aquaporins
- B. transpiration in leavs
- C. the increase in imbitional pressure in root cells
- D. root pressure

**Answer: b**

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44. Which option is true for a fully turgid cell ?

- A.  $d_{pd} = o_{p}$
- B.  $d_{epd} = \text{zero}$
- C.  $w_{p} = t_{p}$
- D.  $o_{p} = \text{zero}$

**Answer: b**

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45. Hydathode helps in

- A. transpiration
- B. guttation
- C. photosynthesis

D. respiration

**Answer: b**



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**46.** Stomatal opening or closing is due to

- A. change in the turgidity of guard cells
- B. the inner walls of each guard cell is thick and elastic
- C. cellulose microfibrils of guard cell are oriented radially
- D. all of the above

**Answer: d**



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**47.** Apoplastic movement of water in plants occurs through

- A. casparian strips
- B. plasma membrane
- C. intracellular spacesf
- D. plasmodesmata

**Answer: none is correct**

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**48.** CAM helps the plants in

- A. conserving water
- B. secondary growth
- C. disease resistance
- D. reproduction

**Answer: a**

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49. Guttation is the result of

- A. diffusion
- B. transpiration
- C. osmosis
- D. root pressure

**Answer: d**



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50. Radial conduction of water takes place by

- A. vessel
- B. vessels and trachieds
- C. phloem

D. ray parenchyma cells

**Answer: d**



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**51.** Force generated by transpiration can create pressure sufficient to lift water even upto the height of

A. 130 feet

B. 130 metre

C. 230 feet

D. 230 metre

**Answer: b**



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52. phloem sap is mainly made of

- A. water and sucrose
- B. water and minerals
- C. oligosaccharides and hormones
- D. none of these

**Answer: a**



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53. Which of the following statement is correct?

- A.  $d_p = o_p - w_p$
- B.  $d_p = o_p + w_p$
- C.  $d_p = w_p - o_p$
- D.  $d_p = t_p + o_p$

**Answer: a**



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**54.** Root pressure is usually acidic because

- A. increase in transpiration
- B. active absorption
- C. low osmotic potential in soil
- D. passive absorption

**Answer: b**



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**55.** A column of water within xylem vessels of tall trees does not break under its weight because of

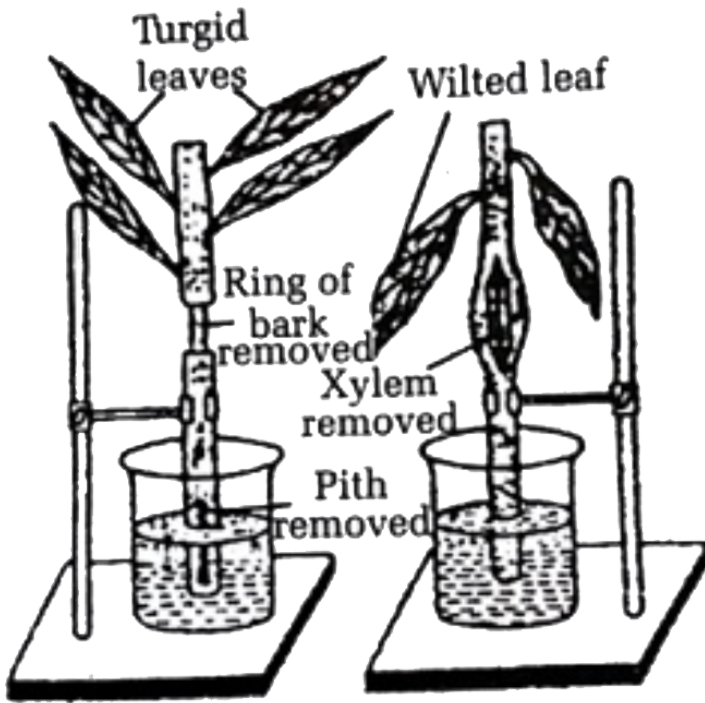
- A. positive root pressure
- B. dissolved sugars in water
- C. tensile strength of water
- D. lignification of xylem vessel

**Answer: c**



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56. Identify the process taking place in this experiment.



- A. ringing experiment for translocation of sap
- B. demonstration of root pressure
- C. eosin test to demonstrate ascent of sap
- D. demonstration of transpiration

Answer: a



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57. Specialised epidermal cells surrounding the guards cells are called

- A. subsidiary cells
- B. bulliform cells
- C. lenticels
- D. complementary cells

**Answer: a**



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58. Water soluble pigments found in plant cell vacuoles are

- A. chlorophylls
- B. carotenoids
- C. anthocyanine

D. xanthophylls

**Answer: c**



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**59.** The water potential of pure water is

- A. less than zero
- B. more than zero but less than one
- C. more than one
- D. zero

**Answer: d**



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**60.** Which of the following facilitates opening of stomatal aperture ?

- A. decrease in turgidity of guard cells
- B. radial orientation of cellulose microfibrils in the cell wall of guard cells
- C. longitudinal orientation of cellulose microfibrils in the cell wall of guard cells
- D. contraction of outer wall of guard cells

**Answer: b**



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**61. Stomatal movement is not affected by**

- A. tempertura
- B. light
- C.  $O_2$  concentration
- D.  $CO_2$  concetration

**Answer: c**



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**62.** Stomata in grass leaf are

- A. dumb bell shaped
- B. kidney shaped
- C. rectangular
- D. barrel shaped

**Answer: a**



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**Practise Question Assertion Reason**



1. Assertion: Light is very important factor in transpiration.

Reason: It induces stomatal opening and darkness closing. Therefore, transpiration increases in light decreases in dark .

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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2. Assertion The water molecules are held together from substomatal cavities in leaves to the roots because of cohesive force

Reason Water does not ascend in stem due to transpiration pull

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: c**



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**3. Assertion** Rate of transpiration is measured by Ganong's photometer

**Reason** Rate of transpiration decreases in light and increases in dark

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion

C. If Assertion is true but the Reason is false

D. If both Assertion and Reason are false

**Answer: d**

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4. Statement 1: It becomes difficult to open and shut the wooden doors and windows during rainy season.

Statement 2: Wooden doors and windows imbibe water in rainy season and thus their volume is increased.

A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion

C. If Assertion is true but the Reason is false

D. If both Assertion and Reason are false

**Answer: a**



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5. Assertion The biological membranes are differentially or selectively permeable

Reason Semipermeable membrane allow penetration of only solvent molecules but not the solute particles

A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion

C. If Assertion is true but the Reason is false

D. If both Assertion and Reason are false

**Answer: b**



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**6. Assertion :** If a bottle filled with volatile substance (such as perfume ) is opened at a corner of the room the odour of substance can be smelled from another corner

**Reason:** Volatile substance diffuses from the region of higher concentration to the region of lower concentration

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true and the Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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7. [A]: Root cells have lower OP than leaf cells.

[R]: Root cells have higher solute concentration.

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: d**



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8. Assertion Plasmolysis occurs when the plant cells are placed in highly concentrated sugar or salt solution

Reason Highly concentrated sugar or salt solution acts as hypotonic solution which results in exosmosis

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: c**



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9. Assertion: root pressure is largely responsible for ascent of sap in herbaceous plants

Reason: root pressure is caused due to diffusion pressure gradient and is maintained by the activity of living cells

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true and the Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: b**



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10. Assertion plants show wilting under water logging conditions

Reason Root fail to respire because they do not get oxygen under water logging conditins

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason re true but Reason is not a correct eplanatin of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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11. Asserition The roots oif transpiration is directly proportional to relative humidity

Reason humid air increases the rate of diffusion so that the rate of transpiration increases

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: d**

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**12.** Assertion most of the water absorbed by the plants is lost by transpiration

Reason water is not needed for the vital activities of plants

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: c**



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**13.** Assertion In dorsiventral leaf the loss of water from lower surface is comparatively much higher than the upper surface

Reason The number of stomata (per unit area) are more in the lower surface than in the upper surface

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion

- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**

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**14.** Assertion: Waxy and cutin coating on plant parts reduce the transpiration.

Reason: These adaptations are found in xerophytes.

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false

D. If both Assertion and Reason are false

**Answer: b**



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**15.** Assertion Primary cell wall is permeable whereas secondary cell wall is impermeable

Reason Primary cell wall is made up of cellulose whereas secondary cell wall is made up of lignin

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: b**



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**16.** Assertion Xylem tracheids are dead and lignified even then they allow movement of water from cell to cell

Reason Xylem tracheids possess pits and cell to cell movement of water occurs through them

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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17. Assertion : Water and mineral uptake by root hairs from the soil occurs through apoplast until it reaches endodermis

Reason : Casparian strips in endodermis are suberized.

- A. If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: b**



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**18. Assertion** In angiosperms, the conduction of water is more efficient because their xylem has vessels.

**Reason** Conduction of water by vessel elements is an active process in which energy is supplied by xylem parenchyma rich in mitochondria.

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: c**



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19. [A]: Due to excessive use of fertilizers, the available water to the plants becomes hypo- tonic in relation to cell sap.

[R]: The water molecules, as a result, diffuse out of the cells due to endosmosis.

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: d**



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**20.** Assertion: Light is very important factor in transpiration.

Reason: It induces stomatal opening and darkness closing. Therefore, transpiration increases in light decreases in dark .

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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**21.** Assertion (A) Most mineral must enter the root by the active absorption into the cytoplasm of epidermal cells.

Reason (R ) This transportation needs energy in the form of ATP . Some ions also move into the epidermal cells passively.

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: a**



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**22.** Assertion: The chemical potential of pure water at normal temperature and pressure is zero.

Reason: In solution, value of water potential is always positive.

- A. If both Assertion and Reason are true and the Reason is a correct expansion of the Assertion
- B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
- C. If Assertion is true but the Reason is false
- D. If both Assertion and Reason are false

**Answer: c**

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### Curiosity Question

1. Why is osmosis called diffusion of solvent through a semi-permeable membrane?

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2. Why a molar solution of sodium chloride has almost twice the osmotic pressure of a molar solution of sucrose?

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3. Why animal cells do not show plasmolysis?

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4. Why do our hands feel warmth during the kneading of wheat flour?

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5. Why the gravitational water is not readily available to the plants?

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1. Why the blood is stored in isotonic saline water?



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