



## Transport in Plants Important Questions With Answers

NEET Biology 2023

1. A girdled plant (upto bast) may survive for some time but it will eventually die, because

- a) water will not move downwards    b) water will not move upwards  
**c) sugars and other organic materials will not move downwards**  
d) sugars and other organic materials will not move upwards.

**Solution : -**

In girdling or ringing experiments (Malpighi, 1675), a ring of bark is cut from the stem. It also removes phloem. Nutrients collect above the ring where the bark also swells up and may give rise to adventitious roots. Growth is also vigorous above the ring. The tissues below the ring not only show stoppage of growth but also begin to shrivel. Roots can be starved and killed if the ring is not healed after some time. Killing of roots shall kill the whole plant clearly showing that bark or phloem is involved in the movement of organic solutes towards root.

2. Basis of stomatal opening is \_\_\_\_\_

- a) exosmosis    **b) endosmosis**    c) decrease in cell sap concentration    d) plasmolysis of guard cells

**Solution : -**

The entry of water into a cell when placed in less concentrated solution is called endosmosis. Due to increase in osmotic pressure and diffusion pressure deficit of guard cells endosmosis of water from the surrounding epidermal and mesophyll cells takes place into the guard cells. The guard cells swell and the stomata open

3. A column of water within xylem vessels of tall trees does not break under its weight because of \_\_\_\_\_

- a) Tensile strength of water**    b) Lignification of xylem vessels    c) Positive root pressure  
d) Dissolved sugars in water

**Solution : -**

A column of water within xylem vessels of tall trees does not break under its weight because of high tensile strength of water which resist a pulling force. This occurs due to cohesion, adhesion and surface tension properly found in water.

4. Read the given statements that refer to different stages of plasmolysis. Select the correct option regarding them.

- (i) First stage of plasmolysis, when osmotic concentration of cell sap is just equivalent to that of external solution.  
(ii) Protoplast withdraws itself from corners of the cell wall.  
(iii) Protoplast gets detached from the cell wall and attains a spherical shape.

a)

(i)	(ii)	(iii)
Incipient plasmolysis	Limiting plasmolysis	Evident plasmolysis

b)

(i)	(ii)	(iii)
<b>Limiting plasmolysis</b>	<b>Incipient plasmolysis</b>	<b>Evident' plasmolysis</b>

c)

(i)	(ii)	(iii)
Limiting plasmolysis	Evident plasmolysis	Incipient plasmolysis

d)

(i)	(ii)	(iii)
Evident plasmolysis	Incipient plasmolysis	Limiting plasmolysis

**Solution : -**

Shrinkage of the protoplast of a cell from its cell wall under the influence of a hypertonic solution is called plasmolysis. Hypertonic solution causes exosmosis or withdrawal of water from cytoplasm and then the central vacuole of cell. The size of cytoplasm as well as central vacuole and hence protoplast becomes reduced. The pressure on the wall is simultaneously reduced and the elastic wall contracts causing a reduction in cell size. This is first stage of plasmolysis called limiting plasmolysis. At limiting plasmolysis, the pressure potential ( $\Psi_W$ ) is zero and the osmotic concentration of cell interior is just equivalent to that of external solution (isotonic). The cell is called flaccid.

The extra hypertonic external solution continues to withdraw water from the central vacuole by exosmosis. Initially the protoplast withdraws itself from the corners. This stage is known as incipient plasmolysis. Due to continued exosmosis, protoplast shrinks further and withdraws from the cell wall except one or a few points. It is known as evident plasmolysis.

5. In which of the following pathways, movement of water occurs from one cell to another cell through plasmodesmata?

- a) Apoplast pathway    **b) Symplast pathway**    c) Vacuolar pathway    d) Transmembrane pathway

**Solution : -**

In symplast pathway, water passes from cell to cell through their protoplasm. It does not enter cell vacuoles. The cytoplasm of the adjacent cells are connected through plasmodesmata. Symplastic movement is aided by cytoplasmic streaming of individual cells.

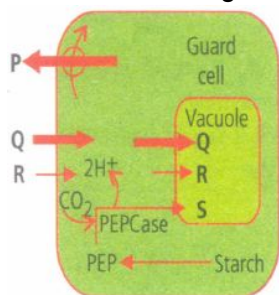
6. The movement of water from one cell of the cortex to the adjacent one in roots is due to \_\_\_\_\_ .

- a) accumulation of inorganic salts in the cells    b) accumulation of organic compounds in the cells  
c) chemical potential gradient    **d) water potential gradient**

**Solution : -**

Water potential is the difference in the chemical potential per unit molal volume of water in a system and that of pure water at the same temperature and pressure. Water always moves from the area of high water potential to the area of low water potential.

7. Stomatal opening and closing involves the role of various ions. In the given figure, arrows depict the movement of certain ions during stomatal opening in light. Identify the ions (P, Q, R and S) and select the correct option.



a)

P	Q	R	S
H <sup>+</sup>	K <sup>+</sup>	Cl <sup>-</sup>	Malate <sup>2-</sup>

b)

P	Q	R	S
K <sup>+</sup>	H <sup>+</sup>	Cl <sup>-</sup>	Malate <sup>2-</sup>

c)

P	Q	R	S
H <sup>+</sup>	K <sup>+</sup>	Cl <sup>-</sup>	Malate <sup>2-</sup>

d)

P	Q	R	S
K <sup>+</sup>	Malate <sup>2-</sup>	H <sup>+</sup>	Cl <sup>-</sup>

**Solution : -**

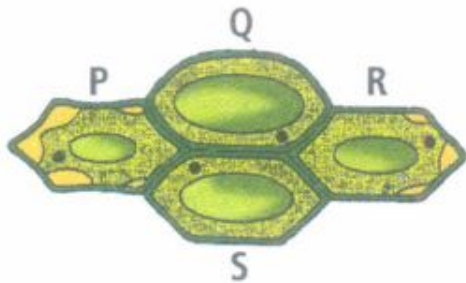
In light, starch is converted into phosphoenol pyruvic acid (PEP) in the presence of PEPcase enzyme. PEP combines with CO<sub>2</sub> to form OAA and then malic acid. Malic acid dissociates into malate ions (malate<sup>-</sup>) and H<sup>+</sup> ions in the guard cells. H<sup>+</sup> ions are transported to epidermal cells and K<sup>+</sup> ions are taken into the guard cells in exchange of H<sup>+</sup> (ion exchange). Some Cl<sup>-</sup> ions are also taken in to neutralize some of the K<sup>+</sup> ions. H<sup>+</sup> - K<sup>+</sup> exchange is an active process which involves involvement of ATP. Increased K<sup>+</sup> and malate ion concentration in the vacuole of guard cells causes sufficient osmotic pressure to absorb water from surrounding cells, resulting in increased turgor of guard cells and thus opening of stomata.

8. Use of excessive fertilisers causes wilting due to  
 a) endosmosis    **b) exosmosis**    c) imbibition    d) none of these.

**Solution : -**

Excessive use of fertilisers causes exosmosis. In such condition, osmotic withdrawal of water from all parts of plant takes place. This kind of loss of water causes wilting in plant.

9. Which out of the four plant cells (P, Q, R and S) would not exhibit any wall pressure?



- a) P and Q    b) Q and S    **c) P and R**    d) R and S

**Solution : -**

Wall pressure is equal and opposite pressure of the cell wall against the cell content to the turgor pressure. In the given figure, cell walls of cells Q and S, generate resistance against the expanding protoplasm as they are shown to be fully turgid cells. But cells P and R are shown to be in the stage of plasmolysis, hence these cells would not exhibit any wall pressure.

10. Multi-directional flow of a variety of organic and inorganic solutes occurs through  
 a) xylem    b) vascular tissue    **c) phloem**    d) root
11. If a soft stemmed plant is cut horizontally near the base of its stem with a sharp blade on early morning of a humid day, drops of solution ooze through cut stem. This is due to:  
 a) guttation    b) bleeding    c) transpiration pull    **d) root pressure**

**Solution : -**

If we cut a small soft-stemmed plant on a day, when there is plenty of atmospheric moisture, early in the morning we will soon see drops of solution ooze out of the cut stem; this comes out due to the positive root pressure. If we fix a rubber tube to the cut stem as a sleeve we can actually collect and measure the rate of exudation, and also determine the composition of the exudates. Root pressure is a positive pressure that develops in the xylem sap of the root of some plants. It is a manifestation of active water absorption. Root pressure is observed in certain seasons which favour optimum metabolic activity and reduce transpiration. It is more during rainy season in the tropical countries and during spring in temperate habitats.

12. 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

**Solution : -**

Reverse osmosis is also known as hyperfiltration. It is a technique that allows the removal of water molecules from various contaminants through a semi-permeable membrane. The process requires a driving force, viz, pressure from a pump, to push the fluid through the membrane. Reverse osmosis is used in removing salts from saline water and extra purification of water.

13. The spraying of phenyl mercuric acetate in leaves \_\_\_\_\_  
a) increases transpiration    **b) reduces transpiration**    c) increases rate of photosynthesis  
d) causes guttation

**Solution : -**

Phenyl mercuric acetate is an antitranspirant. It covers the stomata as a film and resist the diffusion of water therefore, reduces the rate of transpiration. Other antitranspirants include Abscisic Acid (ABA) and aspirin

14. When a fresh-water protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will \_\_\_\_\_  
a) increase in number    b) disappear    c) increase in size    **d) decrease in size**

**Solution : -**

when fresh water protozoan placed in marine water medium, loss of water takes place. i.e. exosmosis. Thus the contractile vacuole will decrease in size.

15. The concentration of solute in four cells is 0.4 M. They are placed in four separate containers I, II, III and IV, filled with saline water of concentrations 0.1 M, 0.4 M, 2 M and 3M respectively. In which container will the cell swell?  
**a) I**    b) II    c) III    d) IV

**Solution : -**

Concentration of container-I with respect to the cell is hypotonic, therefore, endosmosis occurs and water will move from its higher concentration towards its lower concentration (i.e., from container to cell), as a result of which cell in container-I will swell.

16. The most important factor affecting transpiration is  
a) Light    b) Temperature    c) Wind    **d) Atmospheric humidity**

17. In succulent plants the stomata opens at night and closes by day. Which of following would be best hypothesis to explain the mechanism of stomata opening at night only?

- a) CO<sub>2</sub> used up, increased pH results in accumulation of sugars  
b) CO<sub>2</sub> accumulates, reduces pH stimulates enzymes resulting in accumulation of carbohydrate  
c)

Increase in CO<sub>2</sub> concentration, conversion of organic acids in to starch resulting in the increased uptake of potassium ions and water

**d)**

**High CO<sub>2</sub> concentration causes accumulation of organic acids in guard cells resulting in to the increased concentration of cell sap**

18. A few drops of sap were collected by cutting across a plant stem by a suitable method. The sap was tested chemically. Which one of the following test results indicates that it is phloem sap?  
a) Absence of sugar    b) Acidic    **c) Alkaline**    d) Low refractive index

**Solution : -**

The phloem sap is alkaline in nature. It continuously pumps protons from its companion cells to the other neighbouring cells during transport of sugars

19. Stomatal movement is not affected by :  
**a) O<sub>2</sub> concentration**    b) light    c) Temperature    d) CO<sub>2</sub> concentration

**Solution : -**

Stomatal movement is not affected by O<sub>2</sub> concentration whereas light, temperature and CO<sub>2</sub> concentration affect the stomatal movement.

20. Osmotic pressure depends upon  
 a) Conc. of solutes    b) Temperature    c) Ionization of solutes    **d) All of these**
21. The most important factor for absorption of water in plants is  
**a) living cell**    b) force of capillarity    c) imbibition    d) cohesive force of water
22. If  $\Psi_W$  = water potential;  $\Psi_S$  = solute potential;  $\Psi_P$  = pressure potential, then select the correct equation showing their inter-relation.  
 a)  $\Psi_W = \Psi_S - \Psi_P$     **b)  $\Psi_W = \Psi_S + \Psi_P$**     c)  $\Psi_S = \Psi_W + \Psi_P$     d)  $\Psi_W = \Psi_S = \Psi_P$

**Solution :** -

$$\Psi_W = \Psi_S + \Psi_P$$

where  $\Psi_W$  = water potential,  $\Psi_S$  = solute potential; and  $\Psi_P$  = pressure potential.

23. In the following question, a statement of assertion is followed by a statement of reason.

Mark the correct choice as :

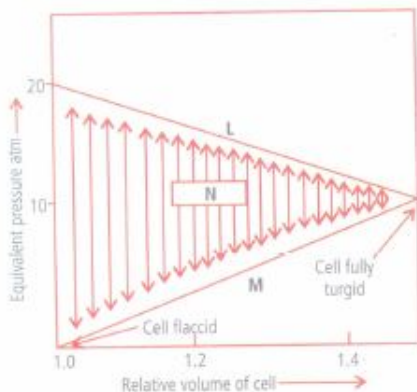
**Assertion:** Mass or bulk flow is the movement of substances in bulk from source to sink as a result of pressure differences.

**Reason:** Water, minerals and food are generally moved by mass flow.

- a) If assertion is true but reason is false.    b) If both assertion and reason are false.  
 c) If both assertion and reason are true and reason is the correct explanation of assertion

**d) If both assertion and reason are true but reason is not the correct explanation of assertion.**

24. Given diagram illustrates the changes that occur when a plant cell takes up water. Identify L, M, N and select the incorrect statement regarding the given diagram.



- a) N is the diffusion pressure deficit which becomes zero when L and M are equal in magnitude.  
 b) In a flaccid cell, value of N becomes equal to that of L.  
**c) M represents osmotic pressure, which increases when a flaccid cell takes up water.**  
 d) L represents solute potential, which decreases with the increase in turgidity of the cell.

**Solution :** -

Given diagram illustrates the changes that occur when a flaccid plant cell takes up water. L represents osmotic pressure (OP) or solute potential (If.), M represents turgor pressure (TP) or pressure potential. If J and N represents diffusion pressure deficit (DPD) or water potential (If J. In a flaccid cell, TP is zero, therefore, DPD = OP - 0 = OP. When a flaccid cell is placed in water, it takes up water due to endosmosis, OP of the cell starts decreasing while TP starts increasing. In fully turgid condition, OP and TP become equal so that DPD becomes zero.

25. Transpiration and root pressure cause water to rise in plants by\_\_\_\_\_

- a) **Pulling and pushing it, respectively**    b) Pushing it upward    c) Pushing and pulling it, respectively  
d) Pushing it upward

**Solution :** -

Transpiration and root pressure cause water to rise in plants by pulling and pushing it, respectively. So, the rise of water in plants is the result of transpiration pull and pushing force by root pressure

26. Which of the following criterion does not pertain to facilitated transport?

- a) High selectivity    b) Transport saturation    **c) Uphill transport**    d) requirement of special membrane

**Solution :** -

The facilitated transport pertains to downhill movement as net transport of molecules is from higher concentration to lower concentration.

27. Osmotic concentration of a cell kept in water is chiefly regulated by:

- a) Vacuoles**    b) Plastids    c) Ribosomes    d) Mitochondria

**Solution :** -

Fact.

28. Following are the differences between apoplast pathway and symplast pathway.

	<b>Apoplast pathway</b>	<b>Symplast pathway</b>
(i)	It consists of nonliving parts of plant body, i.e., cell walls and intercellular spaces.	It consists of living parts of plant body, i.e., protoplasts connected by plasmodesmata.
(ii)	There is little resistance in the movement of water.	Some resistance occurs in the movement of water through symplast.
(iii)	It is slightly slower.	It is faster.
(iv)	Metabolic state of root directly affects apoplast pathway.	Metabolic state of root does not affect symplast pathway.

Which of the given differences is/are incorrect?

- a) (iii) only**    b) (i) and (iii) only    c) (iii) and (iv) only    d) (ii) and (iii) only

**Solution :** -

Apoplast pathway is faster while symplast pathway is slightly slower. Metabolic state of root does not affect apoplast pathway while metabolic state of root directly affects symplast pathway.

29. Xylem translocates \_\_\_\_\_

- a) Water and mineral salts only    b) Water, mineral salts and some organic nitrogen only  
**c) Water, mineral salts, some organic nitrogen and hormones**    d) Water only

**Solution :** -

Xylem is associated with translocation of mainly water, mineral salts, some organic nitrogen and hormones.

30. The most important function of transpiration in plants is to cause

- a) Loss of surplus water    **b) Cooling of the plant**    c) Rapid ascent of sap    d) Rapid rise of minerals

31. Which of the following facilitates opening of stomatal aperture?

- a) Contraction of outer wall of guard cells    b) Decrease in turgidity of guard cells  
**c) Radial orientation of cellulose microfibrils in the cell wall of guard cells**  
d) Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells

**Solution :** -

Cellulose microfibrils are oriented radially which makes easy for the stoma to open.

32. An innovative professor who wanted to give a live demonstration of a physiological process, filled a glass bottle with previously moistened mustard seeds and water. He screwcapped the bottle and kept it away in a corner and resumed his lecture. Towards the end of his lecture there was a sudden explosion with glass pieces of bottle



thrown around.

Which of the following phenomena did the professor want to demonstrate?

- a) Diffusion   b) Osmosis   c) Anaerobic respiration   **d) Imbibition**

**Solution : -**

If certain substances for example seeds are dropped in water, within a few hour they absorbs the water and swell up considerably. These substances are called imbibants and the phenomenon is known as imbibition. The blast occurred due to increasing imbibitional pressure whose magnitude is extremely high.

33. Which of the following substance serve as an anti-transpirant in plant?

- a) Phenyl mercuric acetate   b) Aspirin   c) Silicon oil   **d) All of these**

34. Select the incorrect statement regarding facilitated diffusion.

- a) It is a very specific process   b) It is a passive process  
c) It helps the hydrophilic substances to be transported across the membrane  
**d) It is faster than active process.**

35. The water potential of pure water is:

- a) Zero**   b) Less than zero   c) More than zero but less than one   d) More than one

**Solution : -**

By convention, the water potential of pure water at standard temperature, which is not under any pressure is taken to be zero.

36. The process responsible for facilitating loss of water in liquid form from the tip of grass blades at night and in early morning is \_\_\_\_\_ .

- a) Imbitiion   b) Plasmolysis   c) Transpiration   **d) Root Pressure**

**Solution : -**

Root pressure (positive pressure) can be responsible for pushing up water to small heights in the stem. It also observable at night and early morning when evaporation is low, and excess water collects in the form of droplets around special openings of veins near the tip of grass blades, and leaves of many herbaceous parts. Such water loss in its liquid phase is known as guttation. Imbibition is the adsorption leading to absorption of water by hydrophilic substances. Plasmolysis is the shrinking of the cell membrane and cytoplasm when a cell is undergoing exosmosis. The loss of water in the form of water vapor from the aerial parts of the plant is called transpiration.

37. Mainly conduction of water in an angiospenn occurs through\_\_\_\_\_

- a) tracheid   **b) xylem vessels**   c) sieve tubes   d) All of these

**Solution : -**

The water absorbed by roots has to be conducted upward so as to meet the needs of tissues there. Water moves up through the lumen of xylem vessels

38. Guttation is caused by\_\_\_\_\_

- a) transpiration   b) osmosis/DPD   **c) root pressure**   d) osmotic pressure

**Solution : -**

Guttation refers to the exudation of droplets of liquid water from the margins and tip of leaves through a group of cells called hydathodes. Guttation depends on root pressure.

39. The type of diffusion in which substances move across the membrane along their concentration gradient in the presence of certain carriers or transport proteins is called as

- a) simple diffusion**   b) facilitated diffusion   c) osmosis   d) active transport.

**Solution : -**

The diffusion of hydrophilic substances along the concentration gradient through fixed membrane transport proteins without involving energy expenditure, is called facilitated diffusion. Facilitated diffusion is very specific as it allows cell to select substances for uptake. It is sensitive to inhibitors as well as show saturation effect. Two major types of transport proteins are known viz, carrier proteins (also called carriers, transporters) and channel proteins. Carrier proteins bind the particular solute to be transported and deliver the same to the other side of the membrane.

40. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A. Hypotonic	(i) No net flow of water
B. Hypertonic	(ii) Water moves into the cell
C. Isotonic	(iii) Water moves out of the cell

a) **A-(ii), B-(iii), C-(i)**    b) A-(iii), B-(ii), (-i)    c) A-(i), B-(ii), C-(iii)    d) A-(ii), B-(i), C-(iii)

41. In the following question, a statement of assertion is followed by a statement of reason.

Mark the correct choice as :

**Assertion:** The isobilateral leaf has equal number of stomata on both surfaces.

**Reason:** The dorsiventral leaf has greater number of stomata on upper surface.

- a) If both assertion and reason are true and reason is the correct explanation of assertion  
 b) If both assertion and reason are true but reason is not the correct explanation of assertion  
 c) **If assertion is true but reason is false.**    d) If both assertion and reason are false.

**Solution :** -

Stomata are tiny pore complexes found in epidermis of leaves and other soft aerial parts. The lower surface of a dorsiventral (often dicotyledonous) leaf has a greater number of stomata than the outer surface, while in an isobilateral (often monocotyledonous) leaf, stomata are about equal in number on both surfaces.

42. Which of the following elements are most readily mobilised?

- a) **Phosphorus, sulphur, nitrogen and potassium**    b) Calcium, sulphur, nitrogen and phosphorus  
 c) Phosphorus, sulphur, nitrogen and calcium    d) Potassium, sulphur, nitrogen and calcium

**Solution :** -

Phosphorus, sulphur, nitrogen and potassium most readily mobilise while calcium is structural component which is not remobilised.

43. Which of the following biological membranes is semipermeable?

- a) Fish and animal bladders    b) Egg membrane    c) Plasma membrane of cell    **d) All of these**

**Solution :** -

There are certain membranes, which allow penetration of only solvent molecules but not the solute particles. Such membranes are known as semi-permeable. Examples of such membranes are cellophane, fish and animal bladders, egg membrane, plasma membrane, etc. The biological membranes are not perfectly semi-permeable. They allow to pass solute molecules only up to a certain extent and are, therefore, selective in nature. They are known as selectively or differentially permeable membranes. All living biological membranes are differentially permeable membranes, which allow some substances to pass through it more readily than others.

44. If some solute is dissolved in pure water, its water potential

- a) remains same    b) increases    **c) decreases**    d) first decreases then increases

**Solution :** -

The water potential of a solution can be determined using pure water as the standard of reference. The pure water, at atmospheric pressure, has a water potential of zero (0). The presence of solute particles reduces the free energy of water and thus decreases the water potential (negative value). Because of this, the water potential



of a solution is always less than zero.

45. In the following question, a statement of assertion is followed by a statement of reason.

Mark the correct choice as :

**Assertion:** Cohesion, adhesion and surface tension give high tensile strength to water.

**Reason:** Capillarity is aided by small diameter of the tracheary elements.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

**b) If both assertion and reason are true but reason is not the correct explanation of assertion**

c) If assertion is true but reason is false    d) If both assertion and reason are false.

**Solution : -**

(i) Transpiration pull or cohesion - tension theory is based upon the cohesive and adhesive properties of water molecules, which forms the unbroken continuous water column in the xylem.

(ii) Water molecules are held together by strong cohesion force which is due to hydrogen bonds amongst them. There is another force of adhesion which holds water to the walls of xylem vessels. Water molecules are attracted to one another more than the water molecules in the gaseous state. (iii) It produces surface tension that accounts for high capillarity through tracheids and vessels. Water column is present in tracheary elements. There is a continuous column of water from roots through the stem and into the leaves. These tracheary elements form this continuous system through their unthickened areas. Since, a large number of tracheary elements are present together, no breakage in the continuity of water occurs even if there is a blockage of one or few of them.

46. Refer to the given table and select the option that correctly fills the blanks in it.

Property	Simple diffusion	Facilitated transport	Active transport
Highly selective	A	Yes	B
Uphill transport	No	C	Yes
Requires ATP	No	D	Yes

a)

A	B	C	D
No	Yes	No	No

b)

A	B	C	D
Yes	Yes	Yes	No

c)

A	B	C	D
No	No	No	Yes

d)

A	B	C	D
No	Yes	Yes	Yes

47. Select the incorrect statement regarding imbibition.

a) Imbibition is the phenomenon of adsorption of water or any other liquid without forming solution.

b) The liquid which is imbibed is called as imbibate.

**c) There occurs a decrease in volume of imbibant during imbibition**

d) Water is absorbed by germinating seeds through imbibition.

**Solution : -**

The adsorption of water by the solid particles of an adsorbent causing it to enormously increase in volume without forming a solution is called imbibition. Solid substances or adsorbents which take part in imbibition are called imbibants, e.g., seeds, dry wood. The liquid (usually water) which is imbibed is known as imbibate. The imbibate is held in between and over the surface of particles of the solid substance through the processes of capillarity and adsorption. The swelling imbibant also develops a pressure called imbibition pressure (matric potential).

48. Select the option which correctly satisfies the same relationship.

Stomata: Transpiration: : Hydathode : \_\_\_\_\_

**a) Guttation**    b) Root pressure    c) Bleeding    d) Oozing

**Solution : -**

The process of exudation of liquid drops from the edges of leaves is called guttation. Usually it occurs through stomata-like pores called hydathodes. It is this process by which fully turgid plants remove extra water. The cause of guttation is mainly root pressure (when the root pressure is high and rate of transpiration is low, guttation takes

place). Hydathodes are stomata-like pores generally present at the tips or margins of leaves of those plants that grow in moist shady places (e.g., Tropaeolum).

49. The 96% of water absorption in plants is due to

- a) **Passive absorption**   b) Active absorption   c) Symplastic pathway   d) Mostly active sometimes passive

50. Read the given statements and select the correct option.

**Statement 1:** Xylem transport is unidirectional.

**Statement 2:** Phloem transport is bi-directional.

- a) **Both statements 1 and 2 are correct.**   b) Statement 1 is correct but statement 2 is incorrect.  
c) Statement 1 is incorrect but statement 2 is correct.   d) Both statements 1 and 2 are incorrect.

**Solution :** -

Water passage from root hair to xylem and then to other parts is unidirectional (unidirectional upwards in xylem).

The direction of movement of organic solutes in phloem can be upwards or downwards i.e., bi-directional.

