DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : BIOLOGY
DPP No. : 3

Topic :- Transport in Plants

1 **(b)**
The experimental set up shown in the diagram is simple potometer used for measuring the rate of transpiration. In simple potometer, when water is lost by the plant, it is taken from the glass tube and as a
result, the mercury column rises

2 **(c)**
According to active K^+ theory of Levitt, the stomatal opening and closing is regulated by ATP driven K^+ exchange pump. According to this theory, there is a accumulation of K^+ in the guard cells during day time 200. When guard cells have more K^+, endosmosis takes place, resulting in the lowering of osmotic potential of guard cells. They starts to absorb water from neighbouring cells and becomes turgid to make a pore or opening in the stoma.
Thus, stomatal opening takes place. Due to the loss of K^+ the osmotic concentration of guard cells in comparison to adjoining epidermal cells decreases. Therefore, exosmosis takes place and guard cells becomes flaccid due to the loss of turgidity. Thus, stomatal closure takes place

3 **(c)**
During the transport of water from the soil to xylem, water moves through mainly two channels, *i.e.*, symplast and apoplast. Symplast when water moves between adjacent cell through cytoplasmic connection and when water moves through cell wall, it is called apoplatic movement

4 **(d)**
Water potential is the difference in free energy or chemical potential per unit molal volume of water in a system in reference to pure water at normal temperature and pressure and by increasing the pressure its value also increases

5 **(c)**
The imbibants have negative water potential. As a result when they come in contact with water, a steep water potential is established between the imbibant and imbibate

6 **(c)**
Phloem sap is composed of organic substances in soluble forms. Sugar, hormone and water are the constituent of phloem sap. If one analyse the phloem sap chemically, presence of nitrogen and mineral is expected in least amount. While in xylem sap, its presence will be more

7 **(a)**
Mineral ions are frequently remobilised, particularly from older, senescing parts. Older dying leaves export much of their mineral content to younger leaves. Similarly, before leaf fall in decidous plants, minerals are removed to other parts. Elements most readily mobilised are phosphorus, sulphur, nitrogen and potassium. Some elements that are structural components, like calcium are not remobilised

8 **(c)**
Diffusion is process, which occurs in three forms of matter, *i.e.,* solid, liquid and gas. The process occurs along the concentration gradient, *i.e.,* movement of molecule takes place from higher concentration area to lower concentration area

10 **(a)**
In plants, water and minerals both are absorbed by the root hairs. Root hair zone is also known as zone of maturation or differentiation as the cells of this zone undergo maturation

and differentiation into different types of primary tissues of the root.

11 **(a)**

DPD or Diffusion Pressure Deficit is an older term, which was used for water potential. Due to the pressure of DPD in a solution, it tends to make up the reducion in diffusion pressure by absorbing water. Therefore, DPD is also called as suction pressure

12 **(c)**

Transport of water soluble substances (glucose, sodium ions and chloride ions) is facilitated by transport proteins. The transport proteins are embedded in the lipid bilayer of cellular membranes and provide sites at which such molecules cross the membrane

The transport proteins themselves do not create a concentration gradient. A concentration gradient must already be present in order to facilitate diffusion. A transport protein simply provides a binding site that binds the specific molecule (*e*. *g*., glucose) or ion to be transported

After binding the specific molecule, the transport protein changes its shape and carries the molecule across the membrane where it releases the molecule. The transport protein returns to its original shape and waits to catch another molecule to be transported

13 **(d)**

Process of diffusion is actively involved in various processes of life like transpiration by plants, respiration in livings and photosynthesis. It is a part of all the three processes

14 **(a)**

Munch (1930) proposed the pressure flow hypothesis which best explain the transport of organic nutrients from the source (supply) to sink (utilisation site). According to this theory, source shows a high osmotic concentration than the sink.

When the organic substances from mesophyll cells are (act as source) passed to the sieve tube of phloem through their companion cell by active transport, a high osmotic concentration is developed in sieve tube and acts as a source. Water is absorbed by sieve tubes from the adjacent xylem and develop a high turgor pressure. Thus, the transpiration of organic nutrient takes place from a region of higher turgor region to the area of lower turgor pressure

15 **(a)**

Each stoma (pl. stomata) remains surrounded by two small, specialized, green, kidney-shaped epidermal cells called guard cells, which are rapidly influenced by turgor changes. Adjacent to each of the guard cells are usually one to several other modified epidermal cells called **accessory** or **subsidiary cells**.

Sclerenchymatous cells are thick-walled lignified, dead cells supportive in function. These are not related with the structure of stomata.

16 **(d)**

A-Stomal aperture, B-Guard cell, C-Cellulosic microfibrils

17 **(b)**

Guttation is the loss or exertion of water in the form of liquid droplets from the leaves and other parts of an uninjured or intact plant. Guttation takes place through special structures called **hydathodes**. Water lost during guttation contains inorganic and organic components so, it is not pure.

18 **(c)**

Zone of cell differentiation or root hair zone is the most efficient region of water absorption in plants, which is made up of thousands of root hairs. This zone is 1-6 cm in length. Root hairs are specialised to absorb water and are 0.05-1.5 mm in length and 10 um in breadth

19 **(d)**

The upper epidermises of monocots have large, thin walled and empty bulliform cells or motor cells containing water. These cells are mainly concerned with rolling and unrolling of leaf. The epidermis is cuticularized.

20 **(a)**

The movement of H_2O occurs from high value of Ψ_w to low value of Ψ_w, *i.e.,* from less negative value to

more negative value of Ψ_w

ANSWER-KEY										
Q.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A.	**B**	**C**	**C**	**D**	**C**	**C**	**A**	**C**	**A**	**A**
Q.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
A.	**A**	**C**	**D**	**A**	**A**	**D**	**B**	**C**	**D**	**A**

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