

## DPP

DAILY PRACTICE PROBLEMS

Class : XI<sup>th</sup>  
Date :

### Solutions

Subject : BIOLOGY  
DPP No. : 2

### Topic :- Transport in Plants

- 1 (a)  
The water potential and osmotic potential of pure water is zero
- 2 (b)  
Proteins have a very high imbibing capacity, starch less and cellulose least. This is why the proteinaceous seeds, e.g., pea seeds will show more imbibition than those of wheat seeds.
- 3 (b)  
Turgor pressure causes movements
- 4 (d)  
Diffusion process takes place between concentration of molecule solution and it is process, where the movement of molecules occur from a higher concentration to lower concentration, either it is internal or external. Higher the concentration gradient, higher will be the rate of diffusion
- 5 (a)  
In a ringing or Girdling experiment, the ring of bark, along with phloem is cut from the stem to represent the path of organic nutrients by phloem tissue. If phloem is not removed along with bark, supply of organic food will be continue and plant will survive. If xylem is girdled from main stem, supply of minerals and salts is stopped in the leaves and upper part of girdling site. So, wilting of leaves takes place after sometimes. In girdling experiment, root dies first as supply of food is stopped. In flowering plant, sieve tube transport food in the form of disaccharides (sucrose)
- 6 (c)  
Generally, stomata are provided for water loss but plants, which grow in xeric habitat have sunken type of stomata in their lower epidermis of leaves to minimize the loss of water, e.g., *Nerium*.
- 7 (c)  
Cohesion tension theory was proposed by Henry Dixon and Jolly in 1894. It is greatly supported and elaborated by Dixon (1914, 1924). It is also called as transpiration pull theory and is based on the following assumptions
  1. Cohesive and adhesive properties of water molecules
  2. Continuous water column from root hairs through stem to tip of leaves
  3. Strong transpiration pull exerted by all the transpiring leaves on the stem
- 8 (c)  
The given diagram represents the process of osmosis. *i.e.*, the movement of water from its higher concentration to lower concentration through a semipermeable membrane
- 9 (b)  
An account of 90% total transpiration occurs through leaves, *i.e.*, foliar. Remaining 10% takes place through stem, flower and fruits etc. Cauline transpiration is the loss of water from stem. Ascent of sap in conducting tissues of plant is affected by cohesion, adhesion and properties of water
- 10 (d)  
The food material synthesizes in leaves of green plants and from seed during germination is translocated to growing regions and storage organs of plant.
- 11 (c)  
Capillary water is the water present in narrow spaces or micropores of the soil. It is held in

the soil by capillary force and therefore, does not fall down to water level. Capillary water is absorbed by plant roots.

- 12 (a) ABA theory to explain the mechanism of stomatal closure was proposed by **Cowan *et al***, in 1982. According to it formation of abscisic acid (during drought or mid-day) promotes reversal of  $H^+ \rightleftharpoons K^+$  pump and increases availability of  $H^+$  inside the guard cell cytoplasm and stomata close. Active  $K^+$  transport theory for opening and closing of a stomata, was proposed by **Imamura (1943)** and **Fujino (1967)**. Proton ( $H^+ - K^+$ ) transport theory was proposed by **Levitt (1974)**.
- 13 (b)  $K^+$  ions regulate the opening and closing of stomata. Increased concentration  $K^+$  and malate ions in the guard cells increases the OP of guard cells, which results in decrease of water potential. Due to which water enters from adjoining subsidiary cells into guard cells by endosmosis. Turgor pressure of guard cells increases, which results in the opening of stomata.
- 14 (c) Mineral exists in soil as ions which are generally absorbed from the soil by both active and passive transport. Because sometimes concentration of ions in soil is 100 times more as compared to concentration in root system in its interior. So, all mineral cannot be absorbed passively
- 15 (c) Root hair zone (cell differentiation zone) in plants is a specialised structure for water absorption. It is the most efficient water absorption region in roots. In spite of water absorption, root hair zone or root cells are incapable for photosynthesis because of the absence of chlorophyll but use oxygen for respiration
- 17 (d) Adhesion is the attraction of unlike molecules to each other, such as that between water and the walls of xylem vessels in plants.
- 18 (c) A trichome is initiated as a protuberance from an epidermal cell. Generally, a dense covering of woody trichomes controls the rate of transpiration. They also reduce the heating effect of sunlight. They aid in the protection of plant body from outer injurious agencies.
- 19 (c) The guard cells of stomata in land plants are specialized epidermal cells which contain chloroplasts. In rest of epidermal cells, chloroplasts are absent. But chloroplasts of guard cells are capable of poor photosynthesis as there is absence of NADP reductase enzyme.
- 20 (b) The movement of water occurs from low DPD cell to high DPD cell. DPD is equal but opposite to water potential (algebraic sum of solute or osmotic potential and pressure potential).

Cell	Water potential (osmotic potential + pressure potential)	DPD
A	$-1+0.5=-0.5$	+0.5
B	$-0.6+0.3=-0.3$	+0.3
C	$-1.2+0.6=-0.6$	+0.6
D	$-0.8+0.4=-0.4$	+0.4

So, the correct sequence of the path of movement of water is  
 $B \rightarrow D \rightarrow A \rightarrow C$ .

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	B	B	D	A	C	C	C	B	D



Q.	11	12	13	14	15	16	17	18	19	20
A.	C	A	B	C	C	D	D	C	C	B



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