CBSE TEST PAPER-02

CLASS - XI BIOLOGY (TRANSPORT IN PLANTS)

General Instruction:

- All questions are compulsory.
- Question No. 1 to 3 carry one marks each. Question No. 4 to 6 carry two marks each. Question No. 7 and 8 carry three marks each. Question No. 9 carry five marks.

1. Name two factors that affect water potential.

2. Define plasmodesmata.

3. Why is salt added in excess to pickles?

4. State the significance of plasmolysis.

5. Why is c_4 photosynthetic system more beneficial than c_3 photosynthetic system?

6. Distinguish between transpiration & evaporation.

7. Explain facilitated diffusion.

8. Describe water potential. What are the factors influencing it?

9. What forces are involved in absorption of water from soil by root hairs?

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[ANSWERS]

1. The amount of solute, and the external pressure.
2. Plasmodesmata are minute protoplasmic connections between adjacent cells.
3. Salt is added to the pickles to prevent the growth of any microorganisms.The salt makes the pickle solution hypertonic,thus any microorganism coming in contact would get plasmolysed and killed.

4. Significance of plasmolysis :-
i) Helps to understand the living nature of a cell.
ii) Helps to preserve meat, jellies and used in pickling as their salting kills bacteria by plasmolysis
iii) Used to prove the permeability of cell wall and selectively permeable nature of plasma membrane.
iv) To determine the osmotic pressure of the cell.

5. The following are the reasons for c_4 photosynthetic system more beneficial than c_3 photosynthetic system :

i) Primary co2 acceptor is a 3carbon compound called PEP...(while in c3 plants it is a 5carbon compound RUBP).

ii) c4 plants most efficiently use the atmospheric co2 .

iii) photorespiration (waste process) is not detectable in c4 plants.

iv)These regions show the phenomenon of “kranz anatomy” i.e the presence of prominent bundle sheath surrounding the vascular bundles .
6.

Transpiration	Evaporation
i) It is a physiological process where loss of water occurs through aerial parts of plants.	i) It is not physiological process but simply a physical process.

ii) It takes place during the daytime	ii) It takes place at all the times
iii) It is regulated by activity of guard cells around stomata	iii) No role of guard cell

7. Facilitated diffusion is also called carrier - mediated diffusion or transport by carrier protein. It occurs along concentration gradient assisted by carrier proteins e.g., diffusion of glucose in RBCs.

(a) The membrane proteins provide sites at which some molecules cross the membrane. They do not set up a concentration gradient for molecules to diffuse even if facilitated by proteins.

(b) Some special proteins aid to move substances across membranes without expenditure of ATP energy.

(c) It cannot cause net transport of molecules from a low to a high concentrations as it requires input of energy.

(d) Facilitated diffusion is stereospecific.

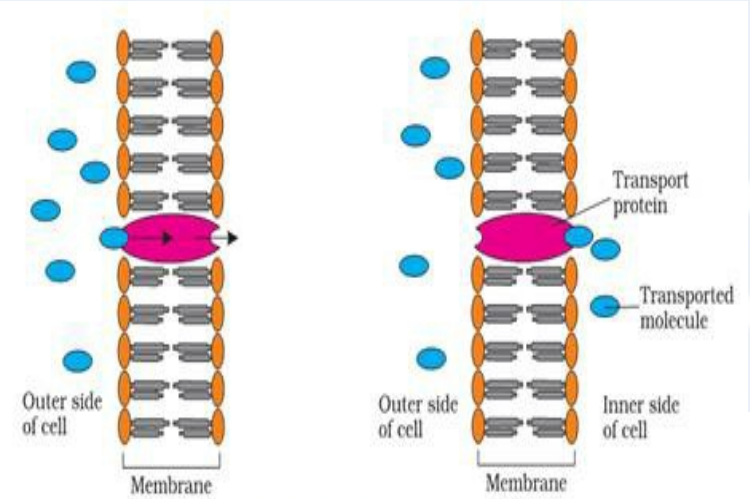

Figure 11.1 Facilitated diffusion

8. Water potential quantifies the tendency of water to move from one part to the other during various cellular processes such as diffusion, osmosis, etc. It is denoted by the Greek letter Psi or Ψ and is expressed in Pascals (Pa). The water potential of pure water is always taken as zero at standard temperature and pressure.

Water potential (Ψw) is expressed as the sum of solute potential (Ψs) and pressure potential (Ψp).

$\Psi w = \Psi s + \Psi p$

Solute potential (ys) and pressure potential (yp) are the two main components that affect water potential.
(a) Solute potential: All solutions have a lower water potential than pure water. The magnitude of this lowering due to dissolution of a solute is called solute potential devoted by p. The more the solute molecules, the lower is the ys.
For a solution at atmospheric pressure
\||/W = \||/S
(b) Pressure potential : If a pressure greater than atmospheric pressure, is applied to pure water or a solution, its water potential increases. Pressure potential is the pressure which develops in an osmotic system due to osmotic entry or exit of water i from it.
It is expressed by y . Its value is always in positive

9. a) A negative tension is exerted down the roots due to transpiration on pull by the aerial parts of the plants this causes a decrease in water potential of roots which favours the uptake of water from the soil.
b) The decrease of water potential in the root cells than the soil favours the absorption of water from the soil.
c) The cohesive forces among the water molecules & adhesive forces between the water & xylem vessels maintain an unbroken column of water in capillaries of xylem vessels. The gradient of water potential exists in the xylem vessel starting from leaf to roots which favour uptake of water from the soil.
d) The water from the soil enters into the root hairs & from there it reaches the xylem vessel with lower water potential. It results in formation of root pressure. This root pressure pushes water to aerial parts of plant body.