CBSE TEST PAPER-03

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 7 carry two marks each. Question No. 8 and 10 carry three marks each.

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1. What determines the direction of flow of water from one cell to another cell?

2. Define guttation.

3. What is the water potential of pure water?

4. Mention two conditions necessary for imbibitions to occur?

5. What are the factors affecting the rate of diffusion.

6. What is the role of osmotic potential in regulating water potential of plant cells.

7. Distinguishes between imbibitions & diffusion?

8. Describe the plant cell as an osmotic system?

9. What are the factors affecting stomata opening & closing of stomata?

10. Define transpiration? Why is it useful? Mention any three environmental factors that affect the transpiration?

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[ANSWERS]

1. Water potential of cell (Ψ).

2. The loss of extra water in liquid drops from margins of leaves of herbaceous plants when root pressure is high and transpiration is low is called guttation.

3. The water potential of pure water in an open container is zero because there is no solute and the pressure in the container is zero.

4. i) Water potential gradient between the absorbing surface & the liquid imbibed
ii) The affinity between the absorbent & the imbibed liquid.

5. The rate of diffusion is affected by the following:-

i) Gradient of concentration

ii) Permeability of cell membrane separating them.

iii) Temperature

iv) Pressure

6. The osmotic potential is responsible for movement of water in plants.The water moves from high water potential to low water potential.As the solute concentration is high in roots as compared to soil,water will move from soil (high water potential) to roots (low water potential) that is osmotic potential drive s the movement of water.

7.

Imbibition	Diffusion
i) it occurs in living & dead both	i) it occurs in solids, liquids & gases.
ii) It refers “to the absorption of water by general surface”	ii) It refers “to the movement of molecules, ions of gases, solids, liquids from the region of higher concentration to lower concentration.

iii) An absorbent is involved but no membrane in it.	iii) No need of semi- permeable membrane
iv) It is a reversible process.	iv) It is not a reversible process.

8. The plasma membrane in plant cell with the vacuolar membrane & cytoplasmic film or alone is more or less semi permeable in mature. This membrane allows the water molecules to get through it freely whereas it allows certain molecules to enter & prevent others. The cytoplasm is surrounded by the cell wall. It possesses very much higher concentration than the solutions entering the plant cells via osmosis. So the plant cell functions as an osmotic system if it fulfills the following two conditions:-

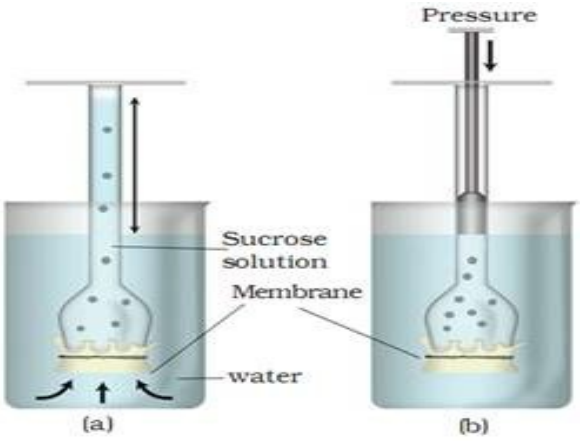

Figure 11.4 A demonstration of osmosis.

i) It has a semi-permeable membrane.

ii) It possesses a liquid substance having much higher concentration therefore, plant cell acts as osmotic system.

9. The factors affecting stomata opening & closing of stomata are:-

a) Light:- Light intensity needed for stomatal opening is low the stomata open in light but close in dark. In CAM plants, stomata open in dark & closed during daytime.

b) Temperature:- If temperature is increased, then the stomata open but when there is decrease in temperature the stomata close.

c) Availability of water:- The stomata are closed due to water stress or moisture deficit.

d) Concentration of CO_2 :- If there is an increase in CO_2 concentration inside the leaf the stomatal openings are closed even in light. When CO_2 is used up by plant in photosynthesis the stomata open.

10. Transpiration is the evaporation of water into the atmosphere from the leaves and stems of plants. It is useful to plants because

i) Transpiration results in transpiration pull which thereby increase the rate of absorption of water along with minerals from the soil through roots.

ii) Transpiration helps in cooling the structures of the plant when exposed to hot sunlight. Transpiration is affected by three environmental factors:-

a) humidity:- water is lost slowly in the atmosphere, if the humidity is high or increased.

b) temperature:-A high temperature increases the rate of evaporation of water from the mesophyll cells. So when the temperature is high the rate of transpiration will be high.

c) wind speed:- high wind speed or a dry breeze greatly increases the transpiration.