

Important Questions on Solute Transport & Photoassimilate Translocation



Q1. Match the following-

COLUMN A	COLUMN B
a. Hypertonic	i. water moves out and cell shrinks
b. Isotonic	ii. water moves in and cell become turgid
c. Hypotonic	iii. no net water movement
d. Diffusion	iv. movement along the concentration gradient

A. a-ii, b-iv, c-i, d-iii

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

Q2. Given below are some statements about symplast pathway of water flow. Which one of the following is correct regarding this type of water flow from the epidermis to endodermis?

A. Water travels via extracellular spaces and cell walls without crossing any membrane

B. Water moves across the root cortex via the plasmodesmata

C. the plasma membrane of each is crossed cell in its path twice

D. Transport across the tonoplast

Q3. Given below are some ecological rules. Match each rule with their corresponding meanings-

a. osmotic potential i. Depend on adsorptive forces that bind water to a dry matrix

b. Pressure potential ii. Effect of dissolved solutes on water potential

c. Matric potential iii. Effect of hydrostatic pressure on potential energy of a solution

d. Gravitational potential iv. Depends on position of water in gravitational field

A. a-ii, b-iii, c-i, d-iv

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

Q4. Match the following-

COLUMN A	COLUMN B
a. Apoplastic movement	i. water movement through cells
b. Symplastic movement	ii. diffusion through intercellular cells
	iii. major pathway for water transport
	iv. relatively slower and aided by cytoplasmic streaming

A. a-ii, iii b- i, iv

B. a-i, ii, c- iii, iv

C. a- ii, iii, b- i, iv

D. a-i, iv, b-ii, iii

Q5. The movement of ions across the membrane can take place through active and passive transport. Given below are some statements regarding active transport of ions across root hair cell. Which statement (s) is correct regarding this?

P. more glutathione is produced by cell

Q. root cell has high number of mitochondria

R. cyanide inhibits the uptake of ions

S. uptake of ions is against the gradient

A. P and R

B. R and S

C. Q and R

D. Q and S

Q6. Given below are some enzymes which are involved in nitrate assimilation. Match each enzyme with their corresponding option-

a. Nitrate reductase i. contains 3 prosthetic groups

b. Nitrite reductase ii. Also known as GOGAT

c. Glutamate synthase iii. contains 2 prosthetic groups

d. Dinitrogenase iv. Tetramer having Fe and Mo

A. a-ii, b-iii, c-i, d-iv

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

Q7. The osmotic potential of the sap of plant cell is -10 bars and value of wall pressure is 2 bars. When the cell is put in a solution having osmotic potential -3bar, then what will be the value of force which will cause water to enter cell?

A. -6 bar

B. -4 bar

C. -5 bar

D. -3 bar

Q8. Match the following-

COLUMN A	COLUMN B
a. Tonicity	i. causes the protoplast to shrink away from the cell wall
b. Turgor pressure	ii. pressure exerted outwardly against cell walls by expanding protoplast
c. Plasmolysis	iii. measure of osmotic pressure gradient of 2 solutions separated by semipermeable membrane
d. Mass flow	iv. movement of matters in bulk between two points

A. a-ii, b-iv, c-i, d-iii

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

Q9. Given below are some physical properties of water which helps in formation of water column in xylem vessel and upward movement. Match each property with their corresponding definition-

a. Cohesion i. attraction of water molecules more in liquid phase than gas phase

b. Adhesion ii. Mutual attraction between water molecules

c. Surface tension iii. Molecules attracted to hydrophilic walls of tracheary elements

A. a-ii, b-iii, c-i

B. a-i, b-iii, c- ii

C. a-iii, b-ii, c-i

D. a-ii, b-i, c- iii

Q10. Given below are some types of conducting cells in the xylem. Match each cell type with their corresponding meanings-

a. Vessel element i. Storage function

b. Tracheids ii. only present in angiosperms

c. Parenchyma iii. Elongated and spindle shaped

d. Fibers iv. Mechanical function

A. a-ii, b-iii, c-i, d-iv

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

ANSWERS

1. B

2. B

3. A

4. A

5. B

6. B

7. C

8. C

9. A

10. A

SOLUTION

Solution-1

COLUMN A	COLUMN B
a. Hypertonic	i. water moves out and cell shrinks
b. Isotonic	ii. water moves in and cell become turgid
c. Hypotonic	iii. no net water movement
d. Diffusion	iv. movement along the concentration gradient

Solution- 2

In symplast pathway of water flow, water travels through cortex via the route of plasmodesmata after entering root hair and crossing epidermis. **A** is wrong because role of extracellular spaces is generally seen in apoplastic pathway. **C** is also wrong as water crosses plasma membrane once. **D** is also wrong tonoplast is outer membrane of vacuole having no role in water transport. Hence, B is the correct option.

Solution-3

- a. osmotic potential ii. Effect of dissolved solutes on water potential
b. Pressure potential iii. Effect of hydrostatic pressure on potential energy of a solution
c. Matric potential i. Depend on adsorptive forces which bind water to a dry matrix
d. Gravitational potential iv. Depends on position of water in gravitational field

Solution 4:

COLUMN A	COLUMN B
a. Apoplastic movement	ii. diffusion through intercellular cells iii. major pathway for water transport
b. Symplastic movement	i. water movement through cells iv. relatively slower and aided by cytoplasmic streaming

Solution-5 All the statements are incorrect except R and S regarding active transport. In active transport, the ions are moved against the concentration gradient across the cell membrane. The cyanide acts as inhibitor of transport and addition of cyanide inhibits the uptake of ions in active transport. Hence, B is correct option.

Solution-6

- a. Nitrate reductase i. contains 3 prosthetic groups
b. Nitrite reductase iii. contains 2 prosthetic groups
c. Glutamate synthase ii. Also known as GOGAT
d. Dinitrogenase iv. Tetramer having Fe and Mo

Solution- 7

The net osmotic pressure on cell = osmotic potential of cell- wall pressure

$$= -10 + 2$$

$$= -8 \text{ bar}$$

When the cell is put in a solution having osmotic potential -3bar, the value of force which will cause water to enter cell = osmotic pressure on cell – osmotic pressure of solution

$$= -8 - (-3)$$

$$= -5 \text{ bar}$$

Hence, C is correct option.

Solution 8:

COLUMN A	COLUMN B
a. Tonicity	iii. measure of osmotic pressure gradient of 2 solutions separated by semipermeable membrane
b. Turgor pressure	ii. pressure exerted outwardly against cell walls by expanding protoplast
c. Plasmolysis	i. causes the protoplast to shrink away from the cell wall
d. Mass flow	iv. movement of matters in bulk between two points

Solution 9:

- a. Cohesion ii. Mutual attraction between water molecules
- b. Adhesion iii. Molecules attracted to hydrophilic walls of tracheary elements
- c. Surface tension i. attraction of water molecules more in liquid phase than gas phase

Solution 10:

- a. Vessel element ii. only present in angiosperms
- b. Tracheid's iii. Elongated and spindle shaped
- c. Parenchyma i. Storage function
- d. Fibers iv. Mechanical function

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