Unit 2 · Water Relations

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 32

1 Key words [4]

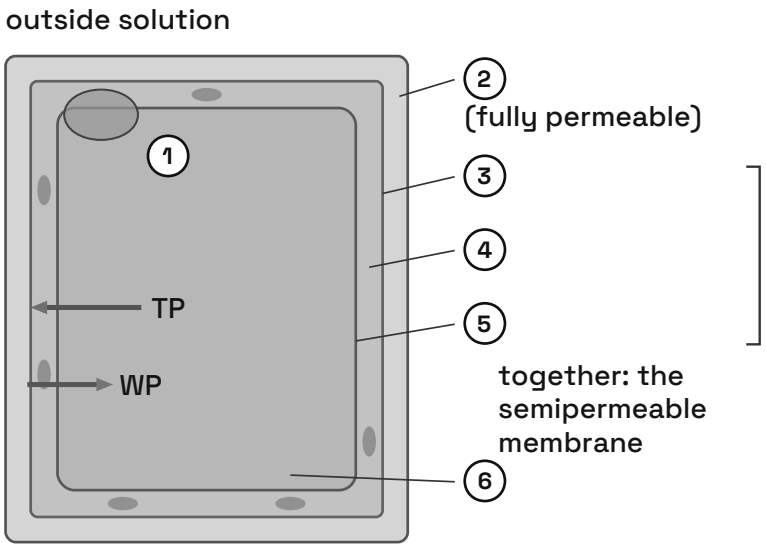
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

diffusant	**diffusate**	**epithem**	**hydathodes**	**hypotonic**	**imbibition**	**kinetic energy**
plasmolysis	**tracheids**	**turgor pressure**				

Particles spread by diffusion because of their own _____. The substance in which they spread is the diffusion medium, or _____. A solution with more water than the one it is compared with is _____. The pressure of a swollen protoplast pressing outwards on the cell wall is the _____. The swelling of dry wood and seeds as they take in water is _____. The shrinking of a protoplast away from its wall in a strong solution is _____. Water and minerals rise in the vessels and _____ of the xylem. Drops of liquid water come out of pores called _____ at the tips and edges of grass blades on humid mornings.

2 Label the diagram [3]

The diagram shows a plant cell as an osmotic system. Write the names of the parts 1 to 6. Each carries 0.5 mark.



TP: turgor pressure · WP: wall pressure

1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which part of the leaf is responsible for guttation? [1]

a. stomata
b. lamina
c. cuticle
d. hydathode

ii. What is true about imbibition? [1]

a. it is an endothermic process
b. it causes swelling (an increase in volume)
c. it is due to the presence of hydrophobic molecules
d. it occurs in living materials only

iii. In a fully plasmolyzed cell, [1]

a. TP = OP, so DPD = 0
b. TP = 0, so DPD = OP
c. OP = 0, so DPD = −TP
d. OP and TP are both zero

iv. A cell has OP 10 atm and TP 10 atm. What happens if it is placed in pure water? [1]

a. it takes in a lot of water and bursts
b. nothing: its DPD is zero, so it is already fully turgid
c. it loses water and becomes plasmolyzed
d. water enters because its OP is greater than that of water

v. On which day will a field of maize lose water fastest? [1]

a. a cool, humid, still day
b. a warm, dry, breezy, sunny day
c. a warm, humid, still night
d. a cold, foggy morning

4 Short answers [9]

Write short answers to the following questions.

a. Mention the two conditions necessary for osmosis. [2]

b. Why is transpiration called a necessary evil? [2]

c. A farmer puts a heap of chemical fertilizer right next to the roots of his young cauliflowers. By afternoon the plants have wilted. Explain why. [2]

d. Explain how a stoma of a dicot leaf opens and closes. **[3]**

5 Numerical problem **[4]**

Show your working.

Three cells lie in a row, P–Q–R. P: OP 16 atm, TP 9 atm. Q: OP 14 atm, TP 4 atm. R: OP 11 atm, TP 6 atm. Find the DPD of each cell, and the direction in which water moves between P and Q, and between Q and R.

Answer:

6 Long answer **[4]**

Write a long answer to the following question.

What is the ascent of sap? Explain how the cohesion–tension theory accounts for it.

7 Think **[3]**

Drops of water are seen at the tips of grass blades early on a cool, humid morning, but not on the leaves of a tall mango tree beside them. A student says they are dew. Is the student right? Explain.

8 Activity: Plasmolysis in a leaf peel

(not marked)

Peel a thin strip of the purple skin from a red onion's fleshy scale (or a *Rhoeo* leaf) and mount it in a drop of water. Draw a strong salt solution under the coverslip with filter paper and watch for ten minutes; then draw water under it and watch again.

What you did	What you saw in the cells
looked at the peel in water	
drew salt solution under the coverslip	
drew water under it again	

Why does a peel left in strong salt for an hour usually not recover?