

Leaves, water uptake and extreme environments: practice questions

7 questions · 21 marks · mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 21

1 **Triple only** [1 mark]

What is the function of the air spaces in the spongy mesophyll?

- A. ☐ They absorb light
- B. ☐ They let carbon dioxide diffuse to the cells
- C. ☐ They carry sucrose away
- D. ☐ They stop water loss

2 **Triple only** [3 marks]

Explain how the palisade mesophyll layer is adapted for photosynthesis. (3)

3 Explain why a plant loses water faster on a windy day than on a still day. (2) [2 marks]

4 A student used a potometer to measure water uptake. In three repeats, the air bubble moved 45 mm, 41 mm and 49 mm in 5 minutes. Calculate the mean rate of water uptake in mm per minute. (3) [3 marks]

Answer =

- 5** A leafy shoot has a mass of 40.0 g. After one day, its mass is 37.0 g. Calculate the percentage loss of mass. (2) **[2 marks]**

Answer =

[illegible]

- 6** Triple only [4 marks]
Cacti grow in very dry places. Explain how two features of a cactus reduce water loss. (4)

[illegible]

- 7** Explain how light intensity, air movement and temperature affect the rate of water uptake by a plant. (6) **[6 marks]**

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1] Triple only

B B

2. [3] Triple only

- near the top / upper surface of the leaf so it receives the most light (1)
- cells contain many chloroplasts (1)
- containing chlorophyll to absorb light for photosynthesis (1)
- cells are tall and tightly packed, so many cells can absorb light (1)
- Max 3

3. [2]

- moving air carries away water vapour from around the stomata / leaf (1)
- so the concentration gradient is steeper / water vapour diffuses out faster (1)

4. [3]

- $(45 + 41 + 49) \div 3 = 45$ mm (1)
- $45 \div 5$ (1)
- 9 mm per minute (1) allow 9.0; allow correct answer with unit for 3 marks; allow ecf from an incorrect mean

5. [2]

- $(40.0 - 37.0) \div 40.0 \times 100$ (1)
- 7.5% (1) allow correct answer with no working for 2 marks

6. [4] Triple only

- leaves are reduced to spines / small leaves (1)
- small surface area so less evaporation (1) allow less water vapour lost
- thick waxy cuticle (1)
- waterproof so less water evaporates (1) allow reduces water loss through the surface
- few stomata / stomata in pits / closed in the day (1) allow stomata open at night
- less water vapour diffuses out (1)
- Max 4

7. [6]

Level 3 5-6	All three factors are covered with the correct effect on water uptake and a clear explanation linked to stomata, evaporation or the concentration gradient. Scientific terms are used accurately.
Level 2 3-4	The effect of two or three factors is stated, with some correct explanation.
Level 1 1-2	The effect of one or two factors is stated with little or no explanation.

Indicative content

- increasing light intensity increases the rate of water uptake because stomata open in the light
- more water vapour diffuses out of the leaf, so more water is pulled up the xylem
- increasing air movement increases the rate because water vapour is carried away from the leaf
- this keeps a steeper concentration gradient so water vapour diffuses out faster
- increasing temperature increases the rate because water evaporates faster from the cells
- water vapour particles also move faster, so diffusion out through the stomata is faster