

SCHOOL: Your school name

SENIOR FIVE BIOLOGY · UNIT 7 QUIZ

Transport in plants · FREE SAMPLE

MARKING SCHEME (TEACHER'S COPY)

Academic year: 20..... – 20.....

Date:/...../20.....

Duration: 1 hour 30 minutes

Total marks: 18

INSTRUCTIONS

1. A full unit quiz has three sections and 50 marks.
2. This free sample is a short extract of each section.
3. Use correct biological terms.

SECTION A: OBJECTIVE QUESTIONS

Answer ALL questions. The marks are shown for each question.

1. Aphids are used to study phloem because their stylets: (1 mark)

- A. collect sap directly from sieve tubes
- B. fix nitrogen gas inside the leaves
- C. release digestive enzymes into xylem
- D. block the stomata on the leaf surface

Answer: A. collect sap directly from sieve tubes

Explanation: The sap can be analysed.

2. Sunken stomata help xerophytes by: (1 mark)

- A. increasing water loss from the leaf
- B. trapping humid air near the pores
- C. making more chlorophyll in guard cells
- D. absorbing water vapour from the air

Answer: B. trapping humid air near the pores

Explanation: The diffusion gradient is reduced.

3. Rolled leaves of marram grass reduce: (1 mark)

- A. root absorption
- B. water loss by transpiration
- C. salt uptake
- D. photosynthesis to zero

Answer: B. water loss by transpiration

Explanation: Stomata face a humid inner space.

4. Fill in the blanks. Use the words in the box to complete the sentences. One word in the box is not needed. (3 marks)

osmosis · **active H⁺-sucrose co-transport** · **simple diffusion through membranes** · **the cytoplasm of neighbouring cells**

- (i) Sucrose is loaded into sieve tubes by **active H⁺-sucrose co-transport**.
 (ii) Root hair cells absorb water by **osmosis**.
 (iii) Plasmodesmata connect **the cytoplasm of neighbouring cells**.

Answer: (i) active H⁺-sucrose co-transport; (ii) osmosis; (iii) the cytoplasm of neighbouring cells

Marking: 1 mark for each correct word (3 marks).

SECTION B: SHORT ANSWER QUESTIONS

Answer ALL questions. Write full answers.

5. A potometer bubble moved 45 mm in 5 minutes. The capillary has a cross-sectional area of 0.8 mm². Calculate the rate of water uptake. (4 marks)

Model answer: Volume = distance × area = 45 × 0.8 = **36 mm³** in 5 min. Rate = 36 ÷ 5 = **7.2 mm³ per minute**.

Marking: 1 mark for each correct key point or step in the model answer, up to 4 marks. Accept any correct method.

SECTION C: STRUCTURED QUESTIONS

Answer ALL questions. Marks for each part are shown.

6. **Transport in plants** (8 marks)

Explain three ways in which a cactus reduces water loss and still photosynthesises.

Model answer: Leaves are reduced to spines, greatly reducing the surface area for transpiration; the green stem photosynthesises. [2]

A thick waxy cuticle and few, sunken stomata reduce evaporation. [2]

CAM: stomata open at night (cool, humid), CO₂ is stored as malic acid, then released in the day for the Calvin cycle while stomata stay closed. [2]

Swollen stems store water in large parenchyma cells. [2]

Marking: Give the marks shown in brackets [] for each step. Accept any correct equivalent answer.

Watch out: Link each feature to reducing water loss or to carbon gain.

END