



QUESTION WORKBOOK

Xylem and the transpiration stream: the pull comes from the top

Plant transport and mineral nutrition · Unit B08

AQA 3.3.4.2 · OCR A 3.1.3 · Edexcel A Topic 4.1–4.4 · CAIE 7.1, 7.2

7 questions · 21 marks

PRINT EDITION

SECTION A · Short, 1 to 2 marks

- A1** A potted plant shows yellowing between the veins of its oldest leaves, while the youngest leaves stay green. Identify the mineral ion most likely to be in short supply, and account for the older leaves being affected first. [2]

- A2** Name the band of waterproof material in the walls of the endodermal cells that blocks the apoplast route into the xylem. [1]

SECTION B · Standard, 3 to 5 marks

- B1** Water reaches the leaves of a fifty-metre tree even though atmospheric pressure could support a column of water only about ten metres high. Explain how, using the cohesion-tension theory. [5]

- B2** The capillary tube of a potometer has an internal diameter of 0.80 mm. The air bubble travels 62 mm in 4.0 minutes. Calculate the rate of water uptake by the shoot in $\text{mm}^3 \text{min}^{-1}$. [4]

- B3** Describe the apoplast and symplast routes taken by water across the root cortex, including the point on each route at which water has to cross a plasma membrane. [3]

- B4** A student records a potometer reading and writes it down as the rate of transpiration. Explain why this will not score, and explain whether the true rate of transpiration was above or below the figure she recorded. [3]

- B5** Air enters one xylem vessel of a transpiring tree and the water column in that vessel breaks, yet the leaves above it go on receiving water. Suggest how. [3]