Carbon Uptake in Sun and Shade Leaves

Scoring guide · one credit per question · review written work against each rubric

Carbon Uptake in Sun and Shade Leaves

Question 1

Choice (2)

The shade leaf has a positive net uptake of 3.0 μmol/m²/s compared with 2.0 for the sun leaf.

Question 2

Without light the leaf cannot carry out light-driven photosynthesis, but cellular respiration continues and releases CO_2 as it breaks down organic molecules.

Question 3

In darkness the sun leaf releases CO_2 at a rate of 2.0 μmol/m²/s. Adding that release rate to the high-light net uptake gives 16.0 + 2.0 = 18.0 μmol/m²/s.

Question 4

The shade leaf has greater net uptake in low light (3.0 versus 2.0), but the sun leaf has greater net uptake in high light (16.0 versus 9.0). The high-light result contradicts the claim.

Question 5

Vary air temperature, measure net CO_2 uptake per area, and hold the measurement light level constant. Accept a sound comparison that controls another relevant condition, such as leaf age or starting CO_2 concentration, while keeping the high-light setting fixed.