2023 Bi H1 Q18

Section: Metabolism and Survival

Topic: Metabolic Pathways

Question Summary

The question tests understanding of RuBisCO, the enzyme responsible for carbon fixation in photosynthesis, and asks which statements about it are correct.

Worked Solution

Let’s examine each statement:

1) "RuBP changes shape to better fit RuBisCO."
■ Incorrect — RuBisCO is the enzyme, not RuBP (ribulose bisphosphate). It’s the enzyme that interacts with CO2, not the substrate changing shape.

2) "RuBisCO converts G3P to glucose."
■ Incorrect — RuBisCO is not involved in converting G3P to glucose. G3P is later used in the Calvin cycle to form glucose, but RuBisCO catalyses an earlier step.

3) "RuBisCO catalyses fixation of carbon dioxide."
■ Correct — This is the main function of RuBisCO: it catalyses the combination of CO2 with RuBP to form an unstable six-carbon compound that breaks down into 3-phosphoglycerate (3PG).

■ Answer: B — 3 only

Revision Tips

• RuBisCO = Ribulose Bisphosphate Carboxylase/Oxygenase.
• It catalyses the first major step in the Calvin cycle — carbon fixation.
• RuBP (5C) + CO2 (1C) -> 2 x 3PG (3C).
• G3P is formed later and used to make glucose and other carbohydrates.
• Remember: RuBisCO fixes carbon, not glucose synthesis directly.