2025 Bi H1 Q18

Section: Metabolism and Survival

Topic: Metabolic Pathways

Question Summary:

Three reactions from the carbon fixation stage of photosynthesis are listed, and you are asked to identify which reaction is catalysed by **RuBisCO** and which one requires **hydrogen ions**.

Worked Solution:

Reaction 1: RuBP → 3-phosphoglycerate (3PG)
- This reaction is catalysed by **RuBisCO** during carbon fixation.

Reaction 2: 3PG → G3P
- This step is part of the reduction phase and requires **ATP** and **NADPH**.
- NADPH provides **hydrogen ions** (H) for the conversion to G3P.

Reaction 3: G3P → glucose
- This is part of the regeneration/synthesis pathway and does not require hydrogen ions.

Therefore:
- Catalysed by RuBisCO → Reaction **1**
- Requires hydrogen ions → Reaction **2**

This corresponds to row **B**.

Final Answer: B

Revision Tips:

- RuBisCO fixes CO2 by catalysing the reaction RuBP → 3PG.
- Hydrogen (from NADPH) is required to convert 3PG → G3P in the reduction stage.
- Carbon fixation → reduction → regeneration: learn the sequence

of reactions.