2025 Bi H1 Q8

Section: Metabolism and Survival

Topic: Cellular Respiration

Question Summary:

You are asked which pair of molecules **must** be present in a living cell for **glycolysis** to occur.

Worked Solution:

- Glycolysis is the first stage of respiration and occurs in the cytoplasm.
- It does **not** require oxygen, mitochondria or pyruvate to begin.

Essential requirements:
- **Glucose** (the substrate for glycolysis).
- **NAD** (to accept hydrogen during oxidation steps).
- **ATP** is required at the start of glycolysis to phosphorylate glucose.

Check each option:
- A: **NAD and ATP** — both are required ✔
- B: Dehydrogenase and oxygen — oxygen not required ✘
- C: Glucose and NADH — NADH is a **product** of glycolysis, not a requirement ✘
- D: Pyruvate and ATP — pyruvate is a product of glycolysis ✘

Therefore, the only correct pair of molecules needed for glycolysis to occur is NAD and ATP.

Final Answer: A

Revision Tips:

- Glycolysis does **not** require oxygen — it is anaerobic.
- NAD accepts hydrogen → forms NADH during glycolysis.
- ATP is both required (investment) and produced (payoff) in

glycolysis.
- Glucose is the starting point, pyruvate is the end product.