IQM3011 A2 Teacher marking exercise

IQM3011 A2 Synthetic Biology Paper 1 Responses

The selected synthetic extracts below form an unmarked exercise. Apply the supplied assessment criteria, record evidence and propose marks or bands before consulting the separate teacher reference.

Controlling sources: IQM3011_2026_Sample_Assessment_2_Paper_1_Candidate_Question_Paper; Candidate_Answer_Booklet; Staff_Mark_Scheme_and_Marking_Map_v3. Sample 2026–27; all questions compulsory; 2 hours; 20 Section A marks and 50 Section B marks.

Unmarked short synthetic excerpts for staff discussion; each prompt context is reproduced and the response excerpt is copied from an internal script. Extracts do not establish full-question or overall performance.

Teacher standardisation exercise instructions

Staff-only practice using four exact excerpts from generated internal scripts. For each complete selected subpart, record a proposed mark out of the printed maximum, the source point evidence, and one focused feedback point before consulting the separate reference. The displayed maximum is for that subpart only; it does not establish a whole-question or whole-paper result.

These extracts cannot establish an entire response or candidate result. All material is synthetic; the live assessment prohibits AI assistance.

Extract A S1 B1 b unit conversion

The paper gives an image length of 36 mm and an actual mitochondrial length of 3.0 µm.

Question B1b: (b) Calculate the magnification of the mitochondrial image. Show your working.

Maximum 2 marks. Source criteria: 1 for converting 36 mm to 36,000 µm (or converting 3.0 µm to 0.0030 mm) and using image size ÷ actual size; 1 for ×12,000. Apply the source rule that method credit needs visible relevant working and magnification has no length unit.

The image length is converted to micrometres before dividing by actual length. The magnification is dimensionless.

$$\text{Magnification} = \frac{36\ \text{mm} \times 1000\ \mu\text{m/mm}}{3.0\ \mu\text{m}} = \frac{36\,000\ \mu\text{m}}{3.0\ \mu\text{m}} = \times 12\,000$$

Extract B S2 B2 c signed percentage change

The paper gives an initial potato mass of 2.50 g and a final mass of 2.20 g, and asks for signed percentage change with working.

Question B2c: (c) Calculate the percentage change in mass of the potato piece. Show the sign and your working.

Maximum 2 marks. Source criteria: 1 for 100 × (2.20 − 2.50) ÷ 2.50; 1 for −12.0% or an explicit 12% loss. The source permits one accuracy mark for a correct magnitude without sign/direction, but no method mark without working.

The mass fell by 0.30 g, and I divided by the starting mass to find the percentage magnitude.

$$\frac{2.50 - 2.20}{2.50} \times 100 = 12\,\%$$

Extract C S3 B4 b sodium glucose cotransport

The paper states that oxygen availability is greatly reduced, limiting ATP production, and asks how this can reduce sodium–glucose cotransport.

Question B4b: (b) Explain how limiting ATP production can reduce sodium–glucose cotransport from the intestinal lumen into epithelial cells.

Maximum 4 marks. Source criteria: ATP powers the basolateral sodium–potassium pump; reduced pumping changes intracellular sodium/reduces the gradient; the sodium gradient drives sodium entry through the cotransporter; reduced sodium-driven cotransport reduces glucose uptake. Do not treat the cotransporter as directly ATP-powered.

ATP directly powers the sodium–glucose cotransporter. With less oxygen, the transporter has less ATP and less glucose enters the cells.

Extract D S3 B5 d association and causation

The paper reports that volunteers with higher measured oxygen delivery also perform better in an exercise task, then asks why this alone does not establish causation.

Question B5d: (d) The volunteers with higher measured oxygen delivery also perform better in an exercise task. State one reason why this association alone does not establish that higher oxygen delivery caused better performance.

Maximum 1 mark. Source criterion: identify a confounder such as training status that could influence both measures, or explain that observational association does not control alternative causes. Small sample size alone is insufficient.

There were only a few people, so the result may not apply to everybody.