

# Markscheme

**May 2025**

**Biology**

**Standard level**

**Paper 1B**

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### Subject Details: Biology SL Paper 1B Markscheme

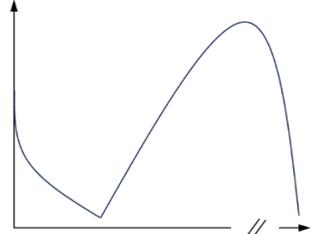
Candidates are required to answer **all** questions in Paper 1B. Maximum total = **25 marks**.

1. A markscheme often has more marking points than the total allows. This is intentional.
2. Each marking point has a separate line and the end is shown by means of a semicolon (;).
3. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.
4. An alternative answer is indicated by “**OR**”. Either answer can be accepted.
5. An alternative markscheme is indicated under heading **ALTERNATIVE 1** etc. Either alternative can be accepted.
6. Words in brackets ( ) in the markscheme are not necessary to gain the mark.
7. Words that are underlined are essential for the mark.
8. The order of marking points does not have to be as in the markscheme, unless stated otherwise.
9. If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).
10. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
11. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking indicate this by adding **ECF** (error carried forward) on the script.
12. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

Question		Answers	Notes	Total
1.	a	x400 / 400x / 400;	<i>Accept answers from x380 to x420</i>	1
1.	b	(eye piece) graticule;		1
1.	c	<p>a. nucleus drawn that clearly shows 2 membranes and pores passing through both membranes;</p> <p><i>Labels (Max 2 marks for labels):</i></p> <p>b. (inner/ outer) nuclear membrane / nuclear envelope / double/two membrane;</p> <p>c. (nuclear) pore;</p> <p>d. nucleolus;</p> <p>e. chromatin/nucleoplasm/DNA/chromosomes/genetic material;</p>	<p><i>Accept drawings inside cells.</i></p> <p><i>a. Award even if no internal structures are drawn.</i></p> <p><i>Award one mark for diagram, then up to 2 maximum for labels.</i></p>	3 max

Question			Answers	Notes	Total
2.	a		into the cell/cytoplasm / in / inwards;		1
2.	b	i	a. with aquaporin mRNA more water enters cells / has a larger relative volume / grow more / become bigger / water enters faster / more osmosis occurs <b>OR</b> with aquaporin mRNA, volume (continually) increases but the control does not / remains stable / reaches equilibrium; b. with aquaporin mRNA, egg cells burst but not with control;	Accept vice versa. a. Must use a comparative word such as larger, faster, more, bigger but do not accept numbers only.	2
2.	b	ii	a. aquaporins increases permeability of plasma/cell membranes to water <b>OR</b> (aquaporins) allows faster/easier movement/diffusion of water molecules <b>OR</b> (aquaporins) increase rate of osmosis / facilitated diffusion; b. water moves from hypotonic solution outside cell into (egg) cells due to differences in solute concentration <b>OR</b> allow water to move down or along a concentration gradient;	a. Answer should be qualified e.g. a reference to 'faster/more/increase/facilitate needed.	2
2.	c		eggs will be of different initial volumes/sizes/shape;	OWTTE Answers should include both the idea of different and initial/starting/beginning volume. Ignore fair test or fair comparison.	1
2.	d		the investigation is reliable as it was repeated 10 times / there were multiple trials/readings <b>OR</b> the investigation is not reliable as there were not enough trials / 10 trials may not be enough <b>OR</b> reliability cannot be assessed as no error bars / standard deviation;		1

Question		Answers	Notes	Total
3.	a	a. (random) sample is captured and marked; b. captured sample is released and left for a period of time <b>OR</b> captured sample is released and allowed to mix with general population; c. second sample is captured, and (both the total number and) the number of marked ticks counted; d. calculate population using the Lincoln (Peterson) index <b>OR</b> correct formula/description of formula;	<i>b. An indication of time is required or the idea of mixing with the general population. Not just 'released'</i>	3 max

Question			Answers	Notes	Total
3.	b	i	a. (person had been) previously infected / have immunity / have memory cells (to the bacterium); b. had been bitten by an (infected) tick before; c. their immunity is diminishing/reducing;		1 max
3.	b	ii	line rises (to reach a peak) <b>and</b> (then) line falls;	Example sketch:  Allow any gradient. Allow peak at any value. Allow any end point after a fall. Do not accept two peaks.	1
3.	c		<u>brain and spinal cord:</u>		1

Question		Answers	Notes	Total
4.	a	(storage) temperature;		1
4.	b	pH / enzyme/lipase concentration / substrate concentration / volume of oil/lipase / type of oil;		1
4.	c	a. negative correlation / as (storage) temperature increases, relative enzyme activity decreases; b. enzyme begins to denature / active site changed / enzyme changes shape (as temperature increases) <b>OR</b> enzyme activity is highest near the optimum temperature;	a. <i>accept inverse</i>  b. <i>accept inverse</i>	2
4.	d	the (size of the) error bars;		1
4.	e	a. measure pH using a probe/(chemical) indicator/meter/digital meter/pH strip/pH paper/any valid method of measuring pH; b. measure the time taken for pH/colour change;	a. <i>Needs how the pH was measured e.g probe</i> b. <i>Rate requires measurement over time so accept 'over a given time' or example with time units e,g intervals of 10 minutes or intervals of time</i>  <b>Allow</b> <i>correctly named indicators</i>	2