

APOLLO

Natural selection

HL

Biology

First assessment 2025

9 questions | mark schemes

Mark-scheme answers

Biology HL | Paper 1A | May 2025 TZ1 | Q38 | 1 marks

38. C

Biology HL | Paper 1A | May 2025 TZ2 | Q38 | 1 marks

38. A

Biology HL | Paper 1A | May 2025 TZ3 | Q37 | 1 marks

37. C

Biology HL | Paper 1A | Nov 2025 TZ1 | Q38 | 1 marks

38. C

Biology HL | Paper 1A | Nov 2025 TZ3 | Q38 | 1 marks

38. D

4.	a	i	a. scale markers of the ruler are too far apart / OWTTE; b. the mandible is too small to be precisely measured by a ruler / OWTTE;		1 max
4.	a	ii	a. Vernier/calliper/screw gauge (to measure directly on the beetle); b. (measured) using microscope with (eyepiece) graticule; c. beetle measured using app on mobile; d. photograph taken (enlarged) and mandible measured (with ruler) / OWTTE; e. digital software used to measure mandible;	b. Microscope alone is not sufficient.	1 max
4.	b		a. number/amount of flour beetles (at the start of each generation); b. number/amount of predators/assassin bugs (at the start of each generation); c. temperature; d. humidity; e. time; f. food/nutrients/diet; g. water; h. space; i. light; j. variable relating to the organism (e.g. age, origin); k. other reasonable variable;	Mark the first two answers only. Do not accept mandible size. "Environment/habitat" is too vague unless specified.	2 max

Question			Answers	Notes	Total
4.	c		a. general trend is decreasing size/negative correlation; b. from generation 1 to 3/4 mandible size is constant/fluctuates; c. after generation 3/4 predation (starts) decreasing mandible size OR lowest size in generation 6 OR steepest decrease between 5 and 6; d. towards the end of the experiment/generation 6 and 7, predation has (small/slight) increase / OWTTE;		2 max

Question			Answers	Notes	Total
4.	d		a. variation of mandible size within the population; b. predation causes selection pressure OR as mandible size increases so does the likelihood of predation OR beetles with smaller mandibles have higher escape/survival rates OR smaller mandible is a competitive advantage / OWTTE; c. beetles with smaller mandibles have more chances of reproducing; d. overproduction of offspring with small mandible; e. competition for resources leads to survival of the fittest / small mandible beetles; f. <u>allele</u> for small mandible is inherited/passed on to offspring; g. increasing the <u>frequency</u> of allele/phenotype/beetles with smaller mandibles (in the population);	c. <i>Must include idea of reproduction.</i> e. <i>Do not accept "survival of the fittest" out of context/as a sole answer.</i> f. <i>Do not accept "gene" or "genotype".</i>	4 max

10.	a	<i>Structure</i> a. RNA is single-stranded; b. polymer/chain of (RNA) nucleotides; c. (ribonucleotides) contain <u>ribose</u> and phosphate and base/named bases; d. sugar phosphate bonds / phosphodiester bonds (between sugar/ribose and phosphate) OR backbone made of alternating phosphate and ribose/sugar; <i>Evidence</i> e. (RNA) can be replicated; f. (RNA) has some catalytic activity (so it may have acted initially as both the genetic material and the enzymes of the earliest cells); g. ribozymes/rRNA in the ribosome (are still used to) catalyse peptide bond formation / involved in protein synthesis OR ribosomes contain rRNA/ribozymes with catalytic/enzymatic function h. some viruses contain RNA (supports the idea that RNA could have been used before genes made of DNA evolved);	<i>Allow a labelled drawing for the structure marking points (base must be attached to C1 and phosphate to C5).</i> <i>For c. do not allow "sugar" instead or ribose.</i>	5 max
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Question	Answers	Notes	Total
10. b	a. DNA can be amplified (for analysis) by PCR; b. to select endangered/evolutionary distinct species for conservation/EDGE of Existence programme; c. use of barcodes/environmental DNA allows to investigate/monitor biodiversity of habitats rapidly / to identify species; d. genetic profiling of species for identification; e. example of identification purpose / importance of identification: tracking populations / rewilding of native species / captive breeding / detecting invasive species / combating illegal wildlife trade/poaching / assess richness of a habitat / identify new species / track endangered species / cloning; f. seed / tissue banks for long term storage of living material / maintain viability of seeds for long periods / propagation in the future / reintroducing species / preserve genetic material of endangered species / study effects of climate change;		3 max

Mark-scheme answers

Biology HL | Paper 1A | Specimen 2025 | Q39 | 1 marks

39. A

Biology HL | Paper 1A | Specimen 2025 | Q40 | 1 marks

40. C