

APOLLO

Inheritance SL

Biology

First assessment 2025

10 questions | mark schemes

Mark-scheme answers

Biology SL | Paper 1A | May 2025 TZ1 | Q7 | 1 marks

7. B

Biology SL | Paper 1A | May 2025 TZ1 | Q13 | 1 marks

13. C

Biology SL | Paper 1A | May 2025 TZ1 | Q20 | 1 marks

20. C

Biology SL | Paper 1A | May 2025 TZ2 | Q20 | 1 marks

20. B

Biology SL | Paper 1A | May 2025 TZ3 | Q21 | 1 marks

21. C

8.	a	a. DNA is replicated before mitosis / during interphase; b. after replication chromosomes consist of 2 chromatids/DNA molecules held together; c. during anaphase the sister chromatids are separated; d. each new/daughter cell receives copies of the original chromosomes; e. two genetically identical daughter cells are produced OR mitosis maintains chromosome number in new/daughter cells;		3 max
8.	b	a. speciation is the splitting of a species into two or more species; b. organisms in the same species share most of their genome/DNA OR there is some variation in the genome/DNA/alleles within a species; c. variations arise through mutation/random orientation of bivalents/crossing over; d. these alleles/variations are passed on to offspring during sexual reproduction; e. selection pressures change the allele frequency / favourable alleles increase in frequency / unfavourable decrease; f. reproductive/geographical isolation/physical barrier may then lead to speciation;		4 max

Question		Answers	Notes	Total
8.	c	a. offspring inherit genetic traits from sexually reproducing parents via the gametes; b. genetic information contained in the DNA is copied/replicated and passed on to offspring; c. diploid organisms have two copies of each gene/allele; d. alleles may be dominant or recessive / valid example of simple dominance/recessive inheritance; e. dominant phenotype may be homozygous or heterozygous; f. recessive phenotype is expressed in homozygous individuals / with two copies of the recessive allele; g. heterozygous individuals do not display the recessive phenotype but may have offspring that do; h. alleles may display codominance / partial dominance / incomplete dominance / valid example; i. some traits result from multiple alleles / valid example; j. multiple allele inheritance results in continuous variation; k. genes carried on the sex chromosomes /X chromosome display sex linkage / valid example; l. genes may be linked on autosomes / display autosomal linkage; m. new alleles may arise by mutation;	<i>Accept annotated examples/ diagrams /punnett grid/crosses.</i>	8 max

4.	a		combination of <u>alleles</u> carried/inherited (by an organism);		1
4.	b	i	0.5 / 50% / $\frac{1}{2}$;		1
4.	b	ii	(If on the X chromosome) ALTERNATIVE 1 Father evidenced route: a. 1 has only one dominant allele on X (and not on the Y) / would be $X^D Y$ / OWTTE; b. 1 passed his X chromosome/dominant allele to 3/7 / OWTTE OR son/8 could not inherit the disease; c. (so) all daughters would be affected / not possible for 3/7 to be healthy / OWTTE; ALTERNATIVE 2 Mother evidenced route: d. 2 does not have the dominant allele / is homozygous recessive / would be $X^d X^d$ / OWTTE; e. 2 passed her X chromosome/ X^d/recessive allele(s) to 6/8; OR 6/8/sons would receive the Y chromosome with no (dominant) allele / OWTTE; f. (so) all sons/8 would be healthy / not possible for 8 to be affected / OWTTE;	Accept Punnett grids, providing they are clearly annotated and identify specific individuals.	2 max

Question	Answers	Notes	Total
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Mark-scheme answers

Biology SL | Paper 1A | Nov 2025 TZ1 | Q20 | 1 marks

20. C

4.	a	prophase;		1
4.	b	a. (plasma/cell) membrane pulled inwards OR membrane/cell pinched together (around the equator of the cell); b. (by) ring of proteins / contractile ring/proteins OR (by) actin and myosin; c. cytoplasm is split / cell divides; d. organelles are distributed between the two cells OR organelles are pulled by microtubules to opposite poles;	a. Accept OWTTE, including cleavage furrow or an invagination forming. b. Do not accept proteins unqualified. b. Both actin and myosin required for the mark in the second alternative. c. Accept OWTTE.	2 max
4.	c	168-169/169-170/168-170 (cm);	Units not required for the mark. Accept the first range given. Accept answers with decimals, e.g. 168-169.9. Accept answers joined by 'and' or 'to' rather than a dash, e.g. 168 and 170 or 168 to 170. Do not accept individual numbers.	1

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Question		Answers	Notes	Total
4.	d	a. <u>multiple alleles</u> OR (the alleles are) I^A , I^B , i ; b. I^A and I^B (alleles) are codominant to each other OR $I^A I^B$ (genotype) gives blood group/type AB; c. i (allele) is recessive to both I^A and I^B (alleles) OR I^A and I^B (alleles) are dominant to i (allele) OR $I^A i$ (genotype) gives blood group/type A and $I^B i$ (genotype) gives blood group/type B; d. 4 blood groups/types: A, B, AB, O; e. there are no intermediate blood groups/types;	a. Correct symbols required for the mark, but can be stated in different parts of the answer. Do not accept I for i for this mark. a., b. and c. Do not accept blood groups/types / genes for alleles. d. All four blood groups needed for the mark, but can be stated in different parts of the answer. e. Accept OWTTE.	3 max

6.	a		a. genetically determined/determined by (pair of) sex chromosomes/X and Y chromosomes; b. sperm carry either an X or a Y chromosome; c. egg is X and if fertilized by X sperm leads to a female child / XX female OR egg is X and if fertilized by Y sperm leads to a male child / XY male;		2
6.	b		a. recombination of parental alleles during fertilization; b. fertilized egg contains a mixture of paternal and maternal chromosomes; c. crossing over/meiosis gives rise to new combinations of alleles;		2