

APOLLO

Viruses

HL

Biology

First assessment 2025

8 questions | mark schemes

Mark-scheme answers

Biology HL | Paper 1A | May 2025 TZ2 | Q13 | 1 marks

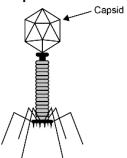
13. D

Biology HL | Paper 1A | May 2025 TZ3 | Q13 | 1 marks

13. D

Biology HL | Paper 1A | May 2025 TZ3 | Q28 | 1 marks

28. D

4.	a	capsid labelled;  [Source: ALI DAMOUH/SCIENCE PHOTO LIBRARY, 2024. <i>Bacteriophage, illustration.</i> [image online] Available at: https://www.gettyimages.co.uk/detail/illustration/bacteriophage-illustration-royalty-free-illustration/2080360644?ad_ppopup=true [Accessed 29 July 2024]. Source adapted.]		1
4.	b	a. (viruses) do not have a metabolism of their own (rely on a host cell for chemical processes) / cannot carry out transcription/protein synthesis / cannot perform ATP synthesis; b. they are not made of cells (but consist only of a nucleic acid core and protein coat/capsid); c. they do not carry out all reproduction but only multiply inside other living cells;		1 max
4.	c	a. the virus attaches to maltoporin/protein in the host/bacterium membrane; b. the viral DNA/genome is integrated into a host/bacterium; c. when the host DNA replicates/does mitosis, viral DNA is also replicated; d. all daughter cells contain viral DNA/genetic material; e. the inserted DNA is known as a prophage; f. bacteriophage/prophage remains in dormant state in host/bacterium OR later prophage may exit to initiate <u>lytic</u> cycle;		3 max

Question	Answers	Notes	Total
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Mark-scheme answers

Biology HL | Paper 1A | Nov 2025 TZ1 | Q12 | 1 marks

12. A

Biology HL | Paper 1A | Nov 2025 TZ3 | Q13 | 1 marks

13. A

7.	a	a. four bases in DNA / bases in DNA are adenine cytosine guanine and thymine OR four bases in RNA / bases in RNA are adenine cytosine guanine and uracil; b. purines and pyrimidines OR uracil instead of thymine in RNA; c. bases/nucleotides can be arranged in any sequence; d. many/4^n possible permutations/combinations/sequences (of the four bases) OR 64 possible triplets of bases/codons; e. nucleic acids/RNA/DNA can have any number of nucleotides / unlimited in length; f. mutations can change base sequence/increase diversity; g. many different proteins/proteins so many sequences needed to code for them; h. three/triplet of bases needed to code for each amino acid OR degeneracy of genetic code/more than one codon per amino acid;	<i>Award mark point a and mark point b if the answer includes the four bases in both DNA and RNA.</i> <i>Do not accept letters instead of base names in mark point a.</i> <i>Mark points d and g are different: mark point d is for the idea that the four bases in any sequence gives many possible base sequences; mark point g is for the idea that the many different proteins necessitate many different base sequences in the genome.</i>	4 max
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Question		Answers	Notes	Total
7.	b	a. variation in size/shape OR helical versus spherical / spikes versus no spikes / other contrasting shapes; b. head and tail in bacteriophage (lambda) and polyhedral/spherical in HIV/COVID-19; c. DNA or RNA as genetic material; d. retroviruses/HIV has reverse transcriptase (but other viruses do not); e. DNA in bacteriophage lambda and RNA in HIV/COVID-19; f. single-stranded or double stranded DNA/RNA/nucleic acid; g. bacteriophage lambda with double stranded and HIV/COVID-19 with single stranded; h. circular or linear DNA / linear DNA in bacteriophage lambda; i. variation in number of DNA/RNA/nucleic acid molecules OR HIV/other virus example with more than one molecule (of DNA/RNA); j. some viruses are enveloped (in plasma membrane from the host cell); k. bacteriophage lambda is a naked virus and HIV/COVID-19 is enveloped; l. rapid evolution due to short generation time/rapid mutation rate/no proofreading/intense natural selection; m. changes in influenza coat proteins/coronavirus spike proteins;	<i>Accept other verified and valid examples in marking points b, e, g, i, k and m.</i> <i>Accept coronavirus instead of COVID-19.</i> <i>Accept diagrams to show examples of structural differences for marking points b, e, g, i, k and m.</i> <i>Reject statements that some viruses have plasma membranes.</i>	7 max

Question		Answers	Notes	Total
7.	c	a. fusion of chromosomes (decreases chromosome number); b. chromosomes 12 and 13 in chimpanzees equivalent to human chromosome 2 OR fewer chromosomes in humans than chimpanzees / 46 in humans and 48 in chimpanzees; c. fission/breaks in/splitting of chromosomes increases chromosome number; d. doubling of chromosome number by polyploidy/in tetraploids; e. non-disjunction of all bivalents/chromosomes in meiosis OR DNA replication without cytokinesis; f. example of polyploidy in knotweeds/smartweeds/<i>Persicaria/Allium</i>/other verified example; g. changes in chromosome number/polyploidy can cause speciation OR chromosome number can change following speciation;	<i>d. do not allow types of polyploidy that result in infertility such as triploidy.</i> <i>e. Do not allow aneuploidy/trisomy.</i>	4 max

Question	Answers	Notes	Total
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Mark-scheme answers

Biology HL | Paper 1A | Specimen 2025 | Q14 | 1 marks

14. A