



B O A R D O F S T U D I E S
NEW SOUTH WALES

2009 HSC Biology Marking Guidelines

Section I, Part A

Question	Correct Response
1	C
2	B
3	B
4	A
5	C
6	C
7	A
8	B
9	C
10	A
11	D
12	C
13	B
14	D
15	D

Section I, Part B**Question 16***Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
• Provides at least FOUR correct pieces of information	3
• Provides THREE correct pieces of information	2
• Provides TWO correct pieces of information	1

Question 17 (a)*Outcomes assessed: H9, H13***MARKING GUIDELINES**

Criteria	Marks
• Draws a pedigree that shows correct relationships • Identifies affected individuals	3
• Draws a pedigree with most relationships shown • Identifies only males as affected	2
• Draws diagram or pedigree that shows ONE correct relationship	1

Question 17 (b)*Outcomes assessed: H2, H9, H14***MARKING GUIDELINES**

Criteria	Marks
• Provides a reason in general terms	1

Question 17 (c)*Outcomes assessed: H9, H14***MARKING GUIDELINES**

Criteria	Marks
• Makes correct assessment and provides specific supporting information	2
• Makes an assessment with general supporting information	1

Question 18*Outcomes assessed: H8***MARKING GUIDELINES**

Criteria	Marks
• Shows clearly how measures that improve cleanliness in food practices AND water AND personal hygiene would help to minimize the number of people infected	4–5
• Describes measures that improve cleanliness in food practices AND water AND personal hygiene OR • Shows clearly how TWO measures would help to minimise the number of people infected	2–3
• Describes ONE method OR • Provides an outline of more than ONE method	1

Question 19*Outcomes assessed: H6, H13***MARKING GUIDELINES**

Criteria	Marks
• Provides appropriate drawing with THREE regions and THREE correct processes clearly identified	6
• Provides appropriate drawing with FIVE correct and clearly identified regions and/or processes	5
• Provides appropriate drawing with FOUR correct and clearly identified regions and/or processes	4
• Provides appropriate drawing with THREE correct and clearly identified regions and/or processes	3
• Provides appropriate drawing with ONE or TWO correct and clearly identified regions and/or processes	2
• Provides appropriate drawing	1

Question 20 (a)*Outcomes assessed: H11, H12***MARKING GUIDELINES**

Criteria	Marks
• Outlines appropriate steps including: <ul style="list-style-type: none">– selecting suitable specimens– identifying pathogens and pests– recording observations	3
• Outlines TWO of the above	2
• Outlines ONE of the above	1

Question 20 (b)*Outcomes assessed: H11, H12***MARKING GUIDELINES**

Criteria	Marks
• Provides features of a possible risk and an appropriate safety measure	2
• Provides features of ONE possible risk OR • Provides features of ONE appropriate safety measure	1

Question 21 (a)*Outcomes assessed: H13***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Draws a graph that has:<ul style="list-style-type: none">– X and Y axes set up correctly– axes labelled correctly– axes scaled correctly– line graph plotted correctly	4
<ul style="list-style-type: none">• Any THREE of the above	3
<ul style="list-style-type: none">• Any TWO of the above	2
<ul style="list-style-type: none">• Any ONE of the above	1

Question 21 (b)*Outcomes assessed: H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Indicates optimal temperature for growth from the graph• Indicates temperature range for growth/no growth	2
<ul style="list-style-type: none">• ONE of the above	1

Question 22

Outcomes assessed: H6, H13

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Draws a table • Identifies correctly THREE T-lymphocytes • Sketches in general terms the role of each identified T-lymphocyte 	3
<ul style="list-style-type: none"> • Draws a table • Identifies correctly at least TWO T-lymphocytes • Sketches the role of at least ONE identified T-lymphocyte OR <ul style="list-style-type: none"> • Identifies correctly THREE T-lymphocytes AND their roles not in a table 	2
OR <ul style="list-style-type: none"> • Identifies correctly at least TWO T-lymphocytes OR <ul style="list-style-type: none"> • Identifies correctly ONE T-lymphocyte AND sketches in general terms its role 	1

Question 23 (a)

Outcomes assessed: H3, H4, H7

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Correctly relates widespread use of the reproductive technology to changes in the genetic composition of the population 	2
<ul style="list-style-type: none"> • States ONE possible impact of the reproductive technology on the genetic composition of the population 	1

Question 23 (b)

Outcomes assessed: H4, H7

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Provides features and characteristics of the potential impact of the use of the technology on the path of evolution of a correctly named genetically modified plant or animal 	3
<ul style="list-style-type: none"> • Outlines an impact of the use of the technology 	2
<ul style="list-style-type: none"> • States ONE possible impact of the use of the technology 	1

Question 24 (a)*Outcomes assessed: H11***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Names correctly ONE dependent variable and ONE independent variable	2
<ul style="list-style-type: none">Correctly names ONE dependent variable OR <ul style="list-style-type: none">Correctly names ONE independent variable	1

Question 24 (b)*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Names the body system that monitors and responds to changes in external temperature	1

Question 24 (c)*Outcomes assessed: H13***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Draws an appropriate feedback model with labelsOutlines response due to increased temperatureOutlines response due to decreased temperature	3
<ul style="list-style-type: none">Provides an appropriate drawing with labelsOutlines a response due to increased or decreased temperature	2
<ul style="list-style-type: none">Provides a simple drawing that outlines one step in the feedback mechanism	1

Question 25 (a)*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
• Names correctly TWO possible defense adaptations	2
• Names correctly ONE possible defense adaptation	1

Question 25 (b)*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
• Identifies that there could be a bacterial infection AND that antibiotics will prevent the growth of the bacteria	2
• Relates antibiotics to treating infection without identifying bacteria as the possible cause OR • Identifies bacteria as the source of the infection but does not link this to the use of antibiotics	1

Question 26*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
• Identifies main features of enantiostasis and homeostasis • Shows how the processes maintain metabolic functions	3
• Correctly defines or describes enantiostasis AND homeostasis OR • Describes enantiostasis OR homeostasis using a specific example • Shows how the process maintains metabolic functions	2
• Provides a correct statement that describes the role of homeostasis OR enantiostasis in maintaining metabolic functions OR • Provides a specific example that describes the process of maintaining metabolic functions	1

Question 27*Outcomes assessed: H7, H9, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates thorough knowledge and understanding of how genetics and the environment affect phenotype of individuals• Provides appropriate examples of each factor• Clearly shows cause and effect for both factors• Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas	7–8
<ul style="list-style-type: none">• Demonstrates sound knowledge and understanding of how genetics and the environment affect phenotype of individuals• Provides appropriate examples for each of the factors• Shows cause and effect in one factor only• Communicates some scientific principles and ideas in a clear manner	5–6
<ul style="list-style-type: none">• Demonstrates a basic knowledge of factor(s) affecting phenotype of individuals• Provides appropriate example(s)• Communicates ideas in a basic form using general scientific terms	3–4
<ul style="list-style-type: none">• Demonstrates a limited knowledge of factor(s) affecting phenotype of individuals• Provides an appropriate example• Communicates simple ideas	1–2

Section II

Question 28 (a)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Labels diagram of the human eye showing THREE sites of refraction	3
• Labels diagram of the human eye with TWO correct labels and TWO sites OR • Identifies THREE sites of refraction	2
• Draws diagram of the eye OR • Identifies TWO sites of refraction	1

Question 28 (b) (i)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Provides the main features of ONE suitable technology	1

Question 28 (b) (ii)

Outcomes assessed: H4, H13

MARKING GUIDELINES

Criteria	Marks
• Identifies possible implications for society of the use of technology identified in (b) (i)	2–3
• Identifies a possible implication for society of the use of technology	1

Question 28 (c)
Outcomes assessed: H6, H14
MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Relates the intensity of the stimulus to the threshold level of intensity needed for the neuron to fire Shows understanding of the ‘all or nothing’ nature of the action potential 	4–5
<ul style="list-style-type: none"> Describes TWO of: <ul style="list-style-type: none"> action potential threshold stimuli 	2–3
<ul style="list-style-type: none"> Describes action potential OR threshold OR stimuli 	1

Question 28 (d) (i)
Outcomes assessed: H6
MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Provides correct reasons for the importance of accommodation 	2
<ul style="list-style-type: none"> Provides some correct information related to the importance of accommodation 	1

Question 28 (d) (ii)
Outcomes assessed: H6, H14
MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Provides features and characteristics of a model that demonstrates accommodation and shows that it is achieved by a change in curvature of the lens 	4
<ul style="list-style-type: none"> Outlines a model that identifies the lens type associated with near focus and distant focus OR <ul style="list-style-type: none"> Describes the process of accommodation without reference to a model 	2–3
<ul style="list-style-type: none"> Identifies the use of a lens in focusing light OR <ul style="list-style-type: none"> Identifies an aspect of a model used to demonstrate accommodation 	1

Question 28 (e)*Outcomes assessed: H4, H6, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a thorough understanding of hearing mechanisms• Shows clearly how hearing difficulties are overcome by the use of technologies• Links the use of technologies to our understanding of hearing mechanisms• Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas	6–7
<ul style="list-style-type: none">• Demonstrates a sound understanding of hearing mechanisms• Identifies hearing difficulties• Describes use of technologies to overcome hearing difficulties• Includes the use of some correct scientific principles and ideas	4–5
<ul style="list-style-type: none">• Demonstrates a limited understanding of hearing mechanisms• Outlines the technology and/or the hearing difficulty• Communicates ideas in a simple way	2–3
<ul style="list-style-type: none">• Provides some relevant information	1

Question 29 (a) (i)*Outcomes assessed: H9***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Names ONE correct chemical	1

Question 29 (a) (ii)*Outcomes assessed: H9***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Provides main features of the role of ligases	2
<ul style="list-style-type: none">• Identifies role of ligases	1

Question 29 (b) (i)*Outcomes assessed: H1***MARKING GUIDELINES**

Criteria	Marks
• Names ONE fermentation product made prior to the 18 th century	1

Question 29 (b) (ii)*Outcomes assessed: H1, H6, H13***MARKING GUIDELINES**

Criteria	Marks
• Provides features/characteristics of ONE scientific discovery that led to the expansion of fermentation since the 18 th century	3
• Outlines ONE scientific discovery that led to the expansion of fermentation since the 18 th century	2
• Names ONE scientific discovery that led to the expansion of fermentation since the 18 th century	1

Question 29 (c) (i)
Outcomes assessed: H9
MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Names TWO types of RNA 	1

Question 29 (c) (ii)
Outcomes assessed: H9, H14
MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Names mRNA as the RNA active at location 1 AND tRNA as an RNA active at location 2 • Describes mRNA as assisting in transcription AND tRNA as assisting in translation 	4
<ul style="list-style-type: none"> • Names mRNA as the RNA active at location 1 AND tRNA as an RNA active at location 2 AND EITHER <ul style="list-style-type: none"> • Describes mRNA as assisting in transcription OR <ul style="list-style-type: none"> • Describes tRNA as assisting in translation 	3
<ul style="list-style-type: none"> • Describes mRNA as assisting in transcription OR <ul style="list-style-type: none"> • Describes tRNA as assisting in translation 	2
<ul style="list-style-type: none"> • Names mRNA as the RNA active at location 1 OR <ul style="list-style-type: none"> • Names tRNA as an RNA active at location 2 	1

Question 29 (d) (i)

Outcomes assessed: H9, H11

MARKING GUIDELINES

Criteria	Marks
• Provides features of the steps of DNA extraction	5
• Provides features of at least TWO steps of DNA extraction	3–4
• Provides an outline of some of the steps of extraction	1–2

Question 29 (d) (ii)

Outcomes assessed: H9, H14

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms a correct procedure to identify the DNA	1

Question 29 (e)

Outcomes assessed: H4, H9, H14

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates thorough knowledge and understanding of the applications of modern biotechnology in producing useful products to humans • Describes modern biotechnology applications and their associated products • Links usefulness of products to humans and their being produced biotechnologically • Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas 	6–7
<ul style="list-style-type: none"> • Demonstrates sound knowledge and understanding of the application of modern biotechnology in producing useful products to humans • Describes a modern biotechnology application and a product • Links the usefulness of the product to humans and it being produced biotechnologically 	4–5
<ul style="list-style-type: none"> • Demonstrates a basic knowledge of biotechnology product(s) and application • Describes a modern biotechnological application • Identifies a product of the application 	2–3
<ul style="list-style-type: none"> • Demonstrates a limited knowledge of biotechnology product(s) or application 	1

Question 30 (a) (i)*Outcomes assessed: H9***MARKING GUIDELINES**

Criteria	Marks
• Names the THREE alleles	1

Question 30 (a) (ii)*Outcomes assessed: H9, H13***MARKING GUIDELINES**

Criteria	Marks
• Provides an appropriate diagram showing heterozygous parents and homozygous recessive offspring	2
• Provides appropriate diagram, but alleles not identified clearly	1

Question 30 (b) (i)*Outcomes assessed: H9***MARKING GUIDELINES**

Criteria	Marks
• Names ONE example of cloning an animal OR plant	1

Question 30 (b) (ii)*Outcomes assessed: H4, H9, H13***MARKING GUIDELINES**

Criteria	Marks
• Provides features and characteristics of ONE benefit to society of this example	3
• Outlines ONE benefit of the example	2
• Identifies ONE benefit of cloning	1

Question 30 (c)*Outcomes assessed: H9***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Provides features and characteristics of the correct processes at locations 1, 2 and 3	5
<ul style="list-style-type: none">Provides a description of processes at two locations	3–4
<ul style="list-style-type: none">Provides detailed description of ONE of the processes OR <ul style="list-style-type: none">Outlines TWO of the processes	1–2

Question 30 (d)*Outcomes assessed: H9, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Provides characteristics and features of a model of linkage that explains this patternOutlines the features of an inheritance pattern of linked genes	5–6
<ul style="list-style-type: none">Outlines a correct model of linkageProvides a correct inheritance pattern of linked genes	3–4
<ul style="list-style-type: none">Outlines a correct model of linkage OR <ul style="list-style-type: none">Provides a correct inheritance pattern of linked genes	1–2

Question 30 (e)*Outcomes assessed: H4, H9, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates thorough knowledge and understanding of genetic mutation and management of disease using gene therapy• Provides examples of genetic mutation, disease and gene therapy• Shows clearly how understanding of mutation and diseases could lead to gene therapy for the disease• Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas	6–7
<ul style="list-style-type: none">• Demonstrates sound knowledge and understanding of genetic mutation and management of disease using gene therapy• Provides examples of genetic mutation, disease and gene therapy• Identifies the link between knowledge of mutation, disease and gene therapy as a management tool• Communicates some scientific principles and ideas in a clear manner	4–5
<ul style="list-style-type: none">• Demonstrates a basic knowledge of genetic mutation, disease and gene therapy• Indicates that there is a link between genetic mutation, disease and gene therapy• Communicates ideas in a basic form using general scientific terms	2–3
<ul style="list-style-type: none">• Demonstrates a limited knowledge of genetic mutation or disease or gene therapy	1

Question 31 (a)*Outcomes assessed: H10***MARKING GUIDELINES**

Criteria	Marks
• Provides an appropriate feature for EACH classification level	3
• Provides an appropriate feature for TWO of the classification levels	2
• Provides an appropriate feature for ONE of the classification levels OR • Provides identifying features for the human classification listed	1

Question 31 (b) (i)*Outcomes assessed: H10***MARKING GUIDELINES**

Criteria	Marks
• Provides ONE correct fossil dating method	1

Question 31 (b) (ii)*Outcomes assessed: H2, H10, H13***MARKING GUIDELINES**

Criteria	Marks
• Sketches in general terms TWO problems	3
• Sketches in general terms ONE possible problem	2
• Identifies ONE problem	1

Question 31 (c)*Outcomes assessed: H10, H14***MARKING GUIDELINES**

Criteria	Marks
• Provides features and characteristics of at least TWO pieces of evidence to support EACH theory	5
• Provides features and characteristics of at least TWO pieces of evidence to support ONE theory AND ONE piece of evidence to support the other theory	4
• Provides features and characteristics of at least ONE piece of evidence to support EACH theory	3
• Provides features and characteristics of at least ONE piece of evidence to support ONE theory	2
• Identifies at least ONE piece of evidence to support ONE theory	1

Question 31 (d) (i)*Outcomes assessed: H10***MARKING GUIDELINES**

Criteria	Marks
• Correctly names TWO species other than <i>Homo erectus</i> or <i>Homo sapiens</i>	1

Question 31 (d) (ii)*Outcomes assessed: H10, H12***MARKING GUIDELINES**

Criteria	Marks
• Sketches in general terms comparisons including at least ONE similarity AND ONE difference	4–5
• Sketches in general terms similarities OR differences OR • Sketches in general terms a similarity OR a difference	2–3
• Identifies ONE similarity OR ONE difference	1

Question 31 (e)*Outcomes assessed: H2, H10, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates thorough knowledge and understanding of biological evidence used to improve an understanding of human evolution• Describes detailed examples of relevant biological evidence• Shows clearly how the evidence has contributed to improvement in understanding the evolution of humans• Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas	6–7
<ul style="list-style-type: none">• Demonstrates sound knowledge and understanding of biological evidence used to improve an understanding of human evolution• Outlines examples of relevant biological evidence• Shows links between evidence and understanding of human evolution• Communicates some scientific principles and ideas in a clear manner	4–5
<ul style="list-style-type: none">• Demonstrates a basic knowledge of evidence and human evolution• Identifies some relevant evidence• Identifies area of understanding of human evolution that is based on biological evidence• Communicates ideas in a basic form using general scientific terms	2–3
<ul style="list-style-type: none">• Demonstrates a limited knowledge of evidence or human evolution• Identifies relevant biological evidence	1

Question 32 (a)*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Correctly identifies the process• Identifies the greenhouse gas involved• Identifies the product of the process	3
<ul style="list-style-type: none">• Identifies TWO of the above	2
<ul style="list-style-type: none">• Identifies ONE of the above	1

Question 32 (b) (i)*Outcomes assessed: H1, H6***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Identifies ONE person who made a significant contribution to the discovery	1

Question 32 (b) (ii)*Outcomes assessed: H1, H6, H13***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Provides correct features of the evidence found by the scientist named	3
<ul style="list-style-type: none">• Provides general examples of relevant evidence <p>OR</p> <ul style="list-style-type: none">• Provides ONE feature of relevant evidence linked to the scientist	2
<ul style="list-style-type: none">• Provides ONE example of evidence related to oxygen production	1

Question 32 (c) (i)*Outcomes assessed: H6***MARKING GUIDELINES**

Criteria	Marks
• Identifies correctly the location and names the feature	1

Question 32 (c) (ii)*Outcomes assessed: H6, H14***MARKING GUIDELINES**

Criteria	Marks
• Provides characteristics and features of the processes occurring at each location	4
• Provides characteristics and features of the process at ONE location • Sketches in general terms the process at another location	3
• Sketches in general terms the processes at each location	2
• Provides some correct information about process at ONE location	1

Question 32 (d)*Outcomes assessed: H6, H11***MARKING GUIDELINES**

Criteria	Marks
• Provides features of correct techniques that are used to isolate and separate pigments and determine their location in the cells	5–6
• Sketches in general terms at least TWO relevant techniques	3–4
• Provides some correct information about ONE relevant technique	1–2

Question 32 (e)*Outcomes assessed: H1, H6, H14***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates thorough knowledge and understanding of how the use of isotopes enhanced earlier discoveries about photosynthesis• Provides detailed examples of the use of isotopes to identify the products of photosynthesis and their starting compounds• Relates the aspects of photosynthesis associated with the earlier researchers and the confirmation of their findings using isotopes• Demonstrates coherence and logical progression and includes correct use of scientific principles and ideas	6–7
<ul style="list-style-type: none">• Demonstrates sound knowledge and understanding of how the use of isotopes enhanced earlier discoveries about photosynthesis• Provides examples of the use of isotopes to identify products of photosynthesis and the starting compounds• Identifies some connections between early research and recent isotope studies• Communicates some scientific principles and ideas in a clear manner	4–5
<ul style="list-style-type: none">• Demonstrates a basic knowledge of isotopes/discoveries about photosynthesis• Provides examples of isotope studies• States some details of earlier discoveries• Communicates ideas in a basic form using general scientific terms	2–3
<ul style="list-style-type: none">• Demonstrates a limited knowledge of isotopes or discoveries about photosynthesis• Provides a simple example of isotope studies• Communicates simple ideas	1

Biology

2009 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I Part A			
1	1	9.3.4.2.4	H9
2	1	9.4.3.2.1	H1, H6
3	1	9.4.4.2.1	H6
4	1	9.4.7.2.1, 9.4.5.2.3	H6, H8
5	1	9.3.2.2.7	H2, H9
6	1	9.2.3.2.3, 9.2.3.2.6	H6
7	1	9.3.3.2.3	H9
8	1	9.3.2.2.3, 9.3.2.2.6	H6, H9
9	1	9.2.2.1.4, 9.2.2.1.2	H6
10	1	9.2.1.3.1, H14.3c	H6, H14
11	1	9.2.3.2.9, H14.3c	H6, H8, H14
12	1	9.2.2.3.1	H6, H14
13	1	9.4.4.2.3, 9.4.5.2.4	H6
14	1	9.3.4.2.7	H10
15	1	9.4.4.3.1	H6, H8
Section I Part B			
16	3	9.4.3.2.2.	H6
17 (a)	3	9.3.2.3.1, 13.1d	H9, H13
17 (b)	1	9.3.2.3.1, 14.1f	H2, H9, H14
17 (c)	2	9.3.2.3.1, 9.3.3.2.6, 14.1b-c	H9, H14
18	5	9.4.2.2.2	H8
19	6	9.2.3.3.1, 13.1e	H6, H13
20 (a)	3	9.4.7.3.1, 11.2c, 12.2b	H11, H12
20 (b)	2	9.4.7.3.1, 11.3b, 12.1d	H11, H12
21 (a)	4	9.1, 9.2.1.2.9, 13.1f	H13
21 (b)	2	9.1, 9.2.1.2.9, 14.1a	H14
22	3	9.4.5.2.2, 13.1	H6, H13
23 (a)	2	9.3.5.1	H3, H4, H7
23 (b)	3	9.3.5, 9.3.5.2.3.	H4, H7
24 (a)	2	9.1, 9.2.1, 11.2a	H11
24 (b)	1	9.2.1.2.6	H6
24 (c)	3.	9.2.1.3.2, 13.1d-e	H13
25 (a)	2	9.4.4.2.4	H6
25 (b)	2	9.4.3.2.3	H6
26	3	9.2.3.2.8, 9.2.1.2.4, 9.2.3.3.6	H6

Question	Marks	Content	Syllabus outcomes
27	8	9.3.3.1, 9.3.4.1, 14.3b, 14.1h	H7, H9, H14
Section II			
Question 28 — Communication			
28 (a)	3	9.5.2.2.1, 9.5.3.2.2	H6
28 (b) (i)	1	9.5.3.3.2	H6
28 (b) (ii)	3	9.5.3.3.3	H4, H13
28 (c)	5	9.5.7.2.3, 9.5.7.3.3, 14.1a, 14.1c	H6, H14
28 (d) (i)	2	9.5.3.2.3	H6
28 (d) (ii)	4	9.5.3.3.1.2, 9.5.3.3.2, 14.1f	H6, H14
28 (e)	7	9.5.6, 14.3b	H4, H6, H14
Section II			
Question 29 — Biotechnology			
29 (a) (i)	1	9.6.5.2.1	H9
29 (a) (ii)	2	9.6.5.2.2, 9.6.5.2.1	H9
29 (b) (i)	1	9.6.2.2.1	H1
29 (b) (ii)	3	9.6.3.1	H1, H6, H13
29 (c) (i)	1	9.6.4.2.1	H9
29 (c) (ii)	4	9.6.4.2.1	H9, H14
29 (d) (i)	5	9.6.5.3.2, 11.2c	H9, H11
29 (d) (ii)	1	9.6.5.3.1, 14.2c	H9, H14
29 (e)	7	9.6.6.2.3, 9.6.6.2.4, 14.3b	H4, H9, H14
Section II			
Question 30 — Genetics: The Code Broken?			
30 (a) (i)	1	9.7.2.2.2	H9
30 (a) (ii)	2	9.7.2.3.1, 13.1e	H9, H13
30 (b) (i)	1	9.7.7.2.3	H9
30 (b) (ii)	3	9.7.7.2.4	H4, H9, H13
30 (c)	5	9.7.1	H9
30 (d)	6	9.7.3.2.3, 9.7.3.3.2, 14.1f	H9, H14
30 (e)	7	9.7.5, 9.7.6, 14.3b	H4, H9, H14
Section II			
Question 31 — The Human Story			
31 (a)	3	9.8.1.2.1, 9.8.1.2.3, 9.8.1.3.1	H10
31 (b) (i)	1	9.8.2.2.3, 9.8.2.2.4	H10
31 (b) (ii)	3	9.8.2.2.5	H2, H10, H13
31 (c)	5	9.8.3.2.3, 14.1b	H10, H14
31 (d) (i)	1	9.8.3.2.1	H10
31 (d) (ii)	5	9.8.3.2.2, 9.8.3.3.1	H10, H12
31 (e)	7	9.8.2.2.6, 9.8.2.3.3, 14.3b	H2, H10, H14

Section II			
Question 32 — Biochemistry			
32 (a)	3	9.9.1.2	H6
32 (b) (i)	1	9.9.2.2.1	H1, H6
32 (b) (ii)	3	9.9.2.2.1	H1, H6, H13
32 (c) (i)	1	9.9.8.1, 9.9.8.2.4	H6
32 (c) (ii)	4	9.9.8.2.3, 9.9.4.2.3, 14.3c	H6, H14
32 (d)	6	9.9.3, 11.3c	H6, H11
32 (e)	7	9.9.5, 9.9.6, 14.3b	H1, H6, H14