2001 HSC Notes from the Examination Centre Biology

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2001 HSC NOTES FROM THE EXAMINATION CENTRE BIOLOGY

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Biology. It provides comments with regard to responses to the 2001 Higher School Certificate Examination, indicating the quality of candidate responses and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2001 Higher School Certificate Examination, the Marking Guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Biology.

General Comments

In 2001, approximately 12 450 candidates attempted the Biology examination. This was the first year of the new syllabus and the examination has a different format to previous years.

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections, should accumulate to a more comprehensive understanding than may be described in each section separately.

Section I – Core

Part A – Multiple choice

Question	Correct Response
1	A
2	A
3	C
4	B
5	B
6	A
7	C
8	C

Question	Correct Response
9	B
10	A
11	A
12	D
13	B
14	D
15	C

Part B

General Comments

Overall, the candidates' responses indicated that the majority had a good grasp of biological concepts, appropriate for HSC candidates. Candidates need to be aware that the answer space allocated is a guide to the length of the required response.

Specific Comments

Question 16

(a) Most candidates answered this part successfully by stating an opinion. There were some candidates who paraphrased the opinion and then made inferences, which was not what the question asked.

(b) Some candidates had difficulty distinguishing between 'reliability' and 'validity'. In general, many candidates were able to 'justify' one piece of information.

Question 17

(a) Most candidates were able to 'label' a structural feature. The feature needed to be named as part of the labelling.

(b) Candidates needed to use the labelled structure and to describe an essential property. Some candidates incorrectly stated that the arteries pump blood.

Question 18

(a) Most candidates were able to name two products extracted from donated blood. The better candidates were able to correctly state two uses of these products.

(b) The majority of candidates were able to propose a valid reason, for example a shortage of donated blood.

Question 19

(a) This part provided a variety of responses. The better candidates used good scientific method and wrote a procedure in point form, mentioned appropriate equipment and investigated more than one structure and more than one type of plant. Candidates needed to follow a logical sequence in their response.

(b) Most candidates could identify two safe work practices.

Question 20

Most candidates were able to correctly identify an Australian endotherm and ectotherm. The candidates' responses to the changes suggested in the questions were appropriate. Most candidates responded in table form as required. Some candidates demonstrated a poor understanding of appropriate table design. Some candidates had difficulty distinguishing between a 'response' and an 'adaptation'.

Question 21

Some candidates struggled to answer this question appropriately. Some candidates described the experiments of the scientists without stating their conclusions: it is these conclusions that form the contributions required. Some candidates did not attribute the contributions of Sutton and Boveri correctly. Morgan's contribution was described well.

Question 22

(a) The majority of candidates were able to correctly state the effect of cloning as reducing the genetic diversity of the species. Some candidates simply defined cloning.

(b) Many candidates struggled to answer this part completely. Many candidates were able to identify an evolutionary cause or effect but could not explain how this would affect the population. There was a lack of clarity when discussing the number of cloned individuals and the implications greater or lesser numbers would have. There were a number of correct approaches to respond to this part, but candidates needed to make clear their approach in formulating their responses.

Question 23

Some candidates described general responses whereas some specific aspects of the immune response were required. Better answers included specific immune responses like the production of B and/or T cells, the production of antibodies in response to the antigen, and the development of cell-mediated immunity.

Question 24

The majority of candidates were able to correctly name a non-infectious disease. However, some candidates made a poor choice of disease, which limited their potential answers to explain the relationship between the cause and one symptom. A wide variety of diseases was given.

Question 25

Most candidates could correctly identify and explain two possible effects of the widespread use of antibiotics. This included the possibility of controlling the spread of the disease, but also the possibility of multi-resistant bacteria being developed which would enable them to spread.

Question 26

(a) In this part most candidates correctly stated the reason as preventing the rejection of the organ.
(b) Most candidates could identify a possible consequence, but many had difficulty giving an appropriate reason for this consequence.

Question 27

This question provided a range of responses. Some candidates did not realise that the 1997 results were included. Many candidates did not identify limitations in the data. Most candidates were able to identify a trend in the data. However, many candidates did not produce an appropriate response to the instruction to 'analyse' or 'assess'.

Question 28

Many candidates experienced difficulty in answering the question appropriately. It was important for candidates to state the link between the advances and the developments. Many candidates knew a great deal about advances in genetics or developments in reproductive technologies but did not score well because they failed to identify the link. Candidates need to read the question carefully and structure their answers accordingly.

Section II – Options

Question 29

(a) Most candidates answered this part well.

(b) A variety of answers was possible, with most candidates answering the first part well. In the second part, many candidates failed to distinguish between 'relevant' and 'reliable'.

(c) Most candidates were able to describe one technology but were unable to expand their answer to include an additional way in which technology could be applied.

(d) Overall this was poorly answered, with many non-attempts or a poor understanding of the word 'accommodation'. Answers involving eye dissections or measurement of pupil sizes were common but were not accepted.

(e) Many candidates could state two devices but very few were able to evaluate the appropriateness of the two devices.

Question 30

(a) Most candidates answered this part very well.

(b) A variety of answers was possible; most candidates answered the first part well. In the second part, many candidates were able to address 'relevance' but not 'reliability'.

(c) Changes in technology were stated in response to this question but these were often poorly explained. Few candidates addressed changes in scientific knowledge.

(d) Most candidates had difficulty in 'justifying' rather than 'stating' a procedure. This also applied to the conclusions drawn.

(e) Many candidates could state one modern application of biotechnology, but had difficulty in assessing the efficiency of that application.

Question 31

(a) Most candidates answered this part well. A significant number reversed the order of the sugar and the phosphate.

(b) A variety of answers was possible, with most candidates answering the first part well. In the second part, many candidates were able to address 'relevance' but not 'reliability'.

(c) Responses to this part were generally very long, with few attempts to structure the response.

(d) Many candidates saw the key words 'meiosis' and 'processes' and gave detailed answers describing all the stages of meiosis, without relating this information to linkage.

(e) Many candidates found this question difficult. To adequately explain the link, an explanation of mapping techniques was required along with the results obtained and an explanation of why these could not be applied to the Human Genome Project's aims.

Question 32

(a) A significant number of candidates had problems with the first part of this question, giving incorrect distinguishing features of mammals. In the second part a comparison was necessary to gain full marks.

(b) Many candidates gave information about radiometric dating rather than the process used to obtain information. In the second part many candidates were able to address 'relevance' but not 'reliability'.

(c) There were many non-attempts for this part. Those who chose skin colour or body shape as their example of polymorphism were generally able to explain the evolutionary significance of opposing phenotypes, eg light v dark skin. Some types of polymorphism, eg sickle-celled anaemia or ABO blood groups, were poorly understood by candidates.

(d) Most candidates were able to outline the information gathered, but many did not adequately justify the conclusions drawn from that information.

(e) Better responses selected and described factors affecting human evolution such as population mobility, modern medicine or genetic engineering. These candidates were able to justify their predictions. A significant number of candidates gave Lamarckian explanations of human evolution. Very few candidates used an appropriate text type.

Question 33

(a) A number of candidates simply stated 'solar energy' without giving the transformation. The second part was poorly answered with most candidates having little detailed knowledge of Photosystem II.

(b) Many candidates gave actual examples of information they had gathered rather than an explanation of how to gather the information. Most candidates could explain how to check for reliability, but relevance was usually omitted.

(c) This part was generally well answered.

(d) Most candidates did not include a test for oxygen, simply assuming that any gas produced was oxygen. The better answers were those that included clear diagrams.

(e) Most candidates could mention C^{14} and/or O^{18} but few indicated which compounds contained these tracers, the intermediate steps or the final products obtained.

Biology

2001 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I Part A			
1	1	9.2.3	H7
2	1	9.2.3	H6
3	1	9.2.1	H6
4	1	9.2.1	H11
5	1	9.2.1	H3, H14
6	1	9.3.1	H10
7	1	9.3.2, 9.3.4	H10, H9
8	1	9.3.4	H2
9	1	9.3.3, 9.3.2	H9
10	1	9.3.3	H9, H14
11	1	9.4.2	H4
12	1	9.4.4	H8
13	1	9.4.6	H6
14	1	9.4.5, 9.4.6	H4, H8
15	1	9.4.3	H2, H11
Section I Part B			
16 (a)	1	9.1	H11, H12
16 (b)	3	9.1	H11, H12
17 (a)	1	9.2.2	H6
17 (b)	2	9.2.2	H6
18 (a)	4	9.2.2	H3, H6
18 (b)	1	9.2.2	H5, H6
19 (a)	4	9.2.3	H6, H12
19 (b)	2	9.2.3	H6, H12
20	7	9.2.1	H6, H13
21	4	9.3.3	H1, H9
22 (a)	2	9.3.1, 9.3.5	H5, H7
22 (b)	4	9.3.1, 9.3.5	H5, H7, H10
23	3	9.4.3	H1, H6
24	4	9.4.7	H4, H6
25	3	9.3.4, 9.4.8	H4, H8
26 (a)	1	9.4.5, 9.4.6	H6
26 (b)	2	9.4.5, 9.4.6	H6
27	4	9.4.7	H14
28	8	9.3	H1,H5, H6, H9, H10, H13

Question	Marks	Content	Syllabus outcomes
Section II **Question 29 — Communication**			
(a) (i)	1	9.5.2, 9.5.4	H6
(a) (ii)	2	9.5.2, 9.5.4	H6
(b) (i)	2	9.5.5	H4, H12
(b) (ii)	2	9.5.5	H6, H12
(c)	5	9.5.3	H4, H6
(d)	6	9.5.3	H6, H11, H12, H14
(e)	7	9.5.1, 9.5.6	H5, H6, H13
Question 30 — Biotechnology			
(a) (i)	1	9.6.5	H9
(a) (ii)	2	9.6.5	H9
(b) (i)	2	9.6.1	H3, H12
(b) (ii)	2	9.6.1	H6, H12
(c)	5	9.6.3, 9.6.4	H3
(d)	6	9.6.2	H6, H11, H12, H14
(e)	7	9.6.6	H3, H6, H13
Question 31 — Genetics – The Code Broken?			
(a) (i)	2	9.7.1	H9
(a) (ii)	1	9.7.1	H9
(b) (i)	2	9.7.7, 9.7.8	H3, H12
(b) (ii)	2	9.7.7, 9.7.8	H3, H12
(c)	5	9.7.6	H4, H5, H6, H12
(d)	6	9.7.3	H9, H11, H12, H14
(e)	7	9.7.4	H5, H9, H13
Question 32 — The Human Story			
(a) (i)	1	9.8.1	H1, H5, H7
(a) (ii)	2	9.8.1	H1, H5, H7
(b) (i)	2	9.8.2	H1, H12
(b) (ii)	2	9.8.2	H1, H12
(c)	5	9.8.4	H2, H7, H9
(d)	6	9.8.1	H7, H11, H14
(e)	7	9.8.6	H5, H7, H13
Question 33 — Biochemistry			
(a) (i)	1	9.9.4	H6
(a) (ii)	2	9.9.4	H6
(b) (i)	2	9.9.1	H6, H12
(b) (ii)	2	9.9.1	H6, H12
(c)	5	9.9.8	H1, H6
(d)	6	9.9.3	H6, H11, H14
(e)	7	9.9.5, 9.9.6	H1, H6, H13

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2001 HSC Biology
Marking Guidelines

Question 16 (a) (1 mark)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• A correct opinion stated	1

Question 16 (b) (3 marks)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• Names ONE valid piece of information, describes it and supports the use of information	3
• Names ONE valid piece of information and describes it	2
• Names ONE valid piece of information	1

Question 17 (a) (1 mark)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• ONE structural feature labelled	1

Question 17 (b) (2 marks)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Describes an essential property of the labelled feature • Links this property with its function	2
• Describes essential property of the labelled feature	1

Question 18 (a) (4 marks)

Outcomes assessed: H3, H6

MARKING GUIDELINES

Criteria	Marks
• TWO products and TWO uses correctly stated	4
• TWO products and ONE correct use for one product stated	3
• ONE product and its use named OR • TWO products named (without uses) OR • TWO uses stated (without names)	2
• ONE product or ONE use named	1

Question 18 (b) (1 mark)

Outcomes assessed: H5, H6

MARKING GUIDELINES

Criteria	Marks
• States ONE valid reason	1

Question 19 (a) (4 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• Features of correct procedure provided • Logical sequence of steps • Appropriate equipment included • More than one structure and more than one type of plant investigated	4
• Correct procedure outlined • Logical sequence of steps • Appropriate equipment included OR • Any three of the four above	3
• A correct procedure outlined	2
• Procedure identified	1

Question 19 (b) (2 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• TWO relevant safe practices identified	2
• ONE relevant safe practice identified	1

Question 20 (7 marks)

Outcomes assessed: H6, H13

MARKING GUIDELINES

Criteria	Marks
• Correctly names an Australian endothermic animal and correctly names an Australian ectothermic animal. • Correctly constructs the columns in a table, with headings • Correctly constructs the rows in a table, with headings • Correctly states a 'change 1' response by an endothermic animal • Correctly states a 'change 1' response by ectothermic animal • Correctly states a 'change 2' response by an endothermic animal • Correctly states a 'change 2' response by ectothermic animal NB: All responses must be correct for the animal stated	7
• Six of the above	6
• Five of the above	5
• Four of the above	4
• Three of the above	3
• Two of the above	2
• One of the above	1

Question 21 (4 marks)

Outcomes assessed: H1, H9

MARKING GUIDELINES

Criteria	Marks
• Correctly indicates the features of a contribution of any TWO of the scientists	4
• TWO relevant contributions described but one incorrectly attributed to one of the other scientists	3
• TWO relevant contributions described and not attributed OR ONE contribution described and correctly attributed	2
• Contribution named and described or attributed	1

Question 22 (a) (2 marks)

Outcomes assessed: H5, H7

MARKING GUIDELINES

Criteria	Marks
• Link between cloning and reduced or unchanged diversity stated	2
• States that diversity will be reduced or unaffected OR • Defines cloning [in either (a) or (b) but not both]	1

Question 22 (b) (4 marks)

Outcomes assessed: H5, H7, H10

MARKING GUIDELINES

Criteria	Marks
• TWO possible evolutionary effects identified and their TWO causes explained	4
• TWO possible evolutionary effects identified and ONE cause explained OR • ONE possible evolutionary effect identified and TWO causes explained	3
• ONE possible evolutionary effect identified and its cause explained OR • TWO possible causes explained OR • TWO effects identified	2
• ONE possible evolutionary cause or effect identified	1

Question 23 (3 marks)

Outcomes assessed: H1, H6

MARKING GUIDELINES

Criteria	Marks
Description of the relationship between: • source of material that activates immune system • immune response • immune system memory activated when re exposed	3
• TWO of these THREE aspects provided	2
• Makes simple statement about immunity or antibodies	1

Question 24 (4 marks)

Outcomes assessed: H4, H6

MARKING GUIDELINES

Criteria	Marks
• Correctly names a non-infectious disease and identifies a symptom • Describes the relationship between the cause and ONE symptom	4
• Correctly names a non-infectious disease • Identifies a cause and a symptom, without explaining the relationship OR • Incorrectly names a non-infectious disease • Describes the relationship between the cause and one symptom	3
• Correctly names a non-infectious disease • States a cause OR symptom OR • Incorrectly names a non-infectious disease • States a cause and symptom	2
• Correctly names a non-infectious disease OR • States a cause or symptom	1

Question 25 (3 marks)

Outcomes assessed: H4, H8

MARKING GUIDELINES

Criteria	Marks
• Describes TWO implications and relates at least ONE of these to the likely spread of disease	3
• Describes ONE implication and relates this to the likely spread of disease OR • Describes TWO implications without any resultant relationships	2
• Identifies a possible implication	1

Question 26 (a) (1 mark)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Outlines a correct reason	1

Question 26 (b) (2 marks)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Identifies a possible consequence and gives an appropriate reason for the consequence	2
• Possible consequence stated, without a cause or effect	1

Question 27 (4 marks)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Identifies trends in data in graph • Discusses the limitations of the data • Makes a judgement about the validity of the prediction in light of the data limitations	4
• Identifies trend in data in graph • Discusses the limitations of the data	3
• Identifies trend in data in graph AND • States that data has limitations or states a prediction	2
• Identifies trend in data in graph OR • States a prediction	1

Question 28 (8 marks)

Outcomes assessed: H1, H5, H6, H9, H10, H13

MARKING GUIDELINES

Criteria	Marks
• Identifies, explains and makes a judgement about the impact of at least TWO advances in genetics, related to developments in reproductive technologies	7–8
• Identifies and explains at least TWO advances in genetics, related to developments in reproductive technologies	5–6
• TWO advances stated and the relevant development stated for each OR • ONE advance related to reproductive technologies, identified, explained and evaluated	3–4
• ONE or TWO advances identified OR • ONE or TWO developments identified OR • One advance and its development identified	1–2

Question 29 (a) (i) (1 mark)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• States location of photoreceptors	1

Question 29 (a) (ii) (2 marks)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• States function of iris and function of cornea or conjunctiva correctly	2
• States function of iris OR function of cornea or function of conjunctiva correctly	1

Question 29 (b) (i) (2 marks)

Outcomes assessed: H4, H12

MARKING GUIDELINES

Criteria	Marks
• Identification of at least ONE possible source of information AND • Statement or outline of a process to extract information from a correct source	2
• Identification of at least ONE possible source of information OR • Statement or outline of a process to extract information from a correct source	1

Question 29 (b) (ii) (2 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• Statement of process that will allow a judgement to be made about relevance AND • Statement of process that will allow a judgement to be made about reliability	2
• Statement of process that will allow a judgement to be made about relevance OR • Statement of process that will allow a judgement to be made about reliability	1

Question 29 (c) (5 marks)

Outcomes assessed: H4, H6

MARKING GUIDELINES

Criteria	Marks
• Identifies and gives features of at least TWO technologies that can be used to overcome the effects of cataracts	4–5
• Identifies and gives features of ONE way in which technology can be used to overcome the effects of cataracts	2–3
• Identifies ONE technology used to overcome the effects of cataracts	1

Question 29 (d) (6 marks)

Outcomes assessed: H6, H11, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Describes the procedure used • Draws links between the procedures and the real life situation • States the conclusion(s) drawn from the investigation • Judges the validity of the conclusion(s) by linking it (them) with the extent to which the investigation resembled real life	5–6
• Description of procedure with simple explanation of procedure AND • Statement of conclusion(s) with simple explanation of why conclusion(s) was reached	3–4
• Describes method in simple terms and states conclusion(s) reached OR • A detailed description of method OR • Statement and explanation of conclusion	1–2

Question 29 (e) (7 marks)

Outcomes assessed: H5, H6, H13

MARKING GUIDELINES

Criteria	Marks
• Identifies and describes TWO named devices AND • Describes and makes a judgement about the advantage and disadvantage of each device AND • Makes a judgement about the appropriateness of each of the named devices	6–7
• Identifies and describes the devices AND • Explains advantage or appropriateness and disadvantage of TWO devices	4–5
• Identifies TWO devices and explains advantages AND disadvantages of ONE of these	2–3
• Identifies an advantage and a disadvantage of ONE device	1

Question 30 (a) (i) (1 mark)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Names the process	1

Question 30 (a) (ii) (2 marks)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Process correctly outlined including a statement dealing with the ability of human and plasmid DNA to join	2
• Process incompletely outlined; statement of sticky ends ‘matching up’ OR • Joining with DNA ligase	1

Question 30 (b) (i) (2 marks)

Outcomes assessed: H3, H12

MARKING GUIDELINES

Criteria	Marks
• Identification of at least ONE possible source of information AND • Statement or outline of a process to extract information from a correct source	2
• Identification of at least ONE possible source of information OR • Statement or outline of a process to extract information from a correct source	1

Question 30 (b) (ii) (2 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• Statement of process that will allow a judgement to be made about relevance AND • Statement of process that will allow a judgement to be made about reliability	2
• Statement of process that will allow a judgement to be made about relevance OR • Statement of process that will allow a judgement to be made about reliability	1

Question 30 (c) (5 marks)

Outcomes assessed: H3

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO changes (1 knowledge and 1 technology) • Explains how these have impacted on traditional biotechnology by linking the changes in understanding with resultant changes in the way biotechnological processes are carried out	4–5
• Identifies at least TWO changes that may have implications for traditional biotechnology but not explained OR • Identifies ONE change and explains how this impacted by linking a change in understanding with a resultant change in the way biotechnological process is carried out	2–3
• Identifies ONE traditional use of biotechnology OR • Identifies one change in technology or scientific knowledge and biotechnology	1

Question 30 (d) (6 marks)

Outcomes assessed: H6, H11, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Justifies procedure using supporting information and descriptions AND • Supports conclusion(s) reached from data obtained • Links an aim of the investigation with the procedure used and the conclusion drawn	5–6
• Description of procedure with simple explanation of procedure AND • Statement of conclusion with simple explanation of why conclusion(s) was reached AND • Links an aim of the investigation with the conclusion	3–4
• Describes method in simple terms and states conclusion(s) reached OR • A detailed description of method OR • Statement and explanation of conclusion	1–2

Question 30 (e) (7 marks)

Outcomes assessed: H3, H6, H13

MARKING GUIDELINES

Criteria	Marks
• Names a modern application of biotechnology less than 25 years old • Describes the process and identifies its outcomes • Makes a judgement about the efficiency of the process with supporting evidence provided	6–7
• Names a modern application of biotechnology less than 25 years old • Describes the process and identifies its outcomes • Makes a statement related to efficiency, but no judgement or assessment is given	4–5
• Names a modern application of biotechnology less than 25 years old • Describes the process • Makes a judgement about the efficiency of the process with supporting evidence provided for a biotechnology more than 25 years old OR • Makes a judgement relating to the efficiency of a modern biotechnology	2–3
• Names a modern application of biotechnology less than 25 years old	1

NB: In each answer, the biotechnology must relate to medicine, animal biotechnology or aquaculture.

Question 31 (a) (i) (2 marks)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Both X and Y identified	2
• Either X OR Y correctly named	1

Question 31 (a) (ii) (1 mark)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Names correct sequence for non-coding strand	1

Question 31 (b) (i) (2 marks)

Outcomes assessed: H3, H12

MARKING GUIDELINES

Criteria	Marks
• Identification of at least ONE possible source of information AND • Statement or outline of a process to extract information from a correct source	2
• Identification of at least ONE possible source of information OR • Statement or outline of a process to extract information from a correct source	1

Question 31 (b) (ii) (2 marks)

Outcomes assessed: H3, H12

MARKING GUIDELINES

Criteria	Marks
• Statement of process that will allow a judgement to be made about relevance AND • Statement of process that will allow a judgement to be made about reliability	2
• Statement of process that will allow a judgement to be made about relevance OR • Statement of process that will allow a judgement to be made about reliability	1

Question 31 (c) (5 marks)

Outcomes assessed: H4, H5, H6, H12

MARKING GUIDELINES

Criteria	Marks
• Provides detailed information about the advantages and/or disadvantages of public education's role in preventing cancer	4–5
• Describes the role of public education in preventing cancer. Lists at least one advantage and/or one disadvantage of such programs	2–3
• Identifies a role of public education in preventing cancer	1

Question 31 (d) (6 marks)

Outcomes assessed: H9, H11, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Describes the procedure used • Draws links between the procedures and the real life situation • States the conclusion(s) drawn from the investigation • Judges the validity of the conclusion(s) by linking it (them) with the extent to which the investigation resembled real life	5–6
• Describes procedure with simple explanation of procedure • Statement of conclusion(s) with simple explanation of why conclusion(s) was reached	3–4
• Describes method in simple terms and states conclusion reached OR • A detailed description of method only OR • Statement explaining conclusion	1–2

Question 31 (e) (7 marks)

Outcomes assessed: H5, H9, H13

MARKING GUIDELINES

Criteria	Marks
• Outlines/describes the aims of the Human Genome Project • Explains, using supporting information why mapping could not be used to generate genome base sequence	6–7
• Outlines chromosome mapping techniques OR HGP base sequencing techniques • Gives a simple explanation of why mapping could not be used, without reference to these techniques	4–5
• Outlines at least two relevant aspects of the Human Genome Project	2–3
• Identifies an aspect of the Human Genome Project	1

Question 32 (a) (i) (1 mark)

Outcomes assessed: H1, H5, H7

MARKING GUIDELINES

Criteria	Marks
• ONE human feature named that is mammalian characteristic	1

Question 32 (a) (ii) (2 marks)

Outcomes assessed: H1, H5, H7

MARKING GUIDELINES

Criteria	Marks
• TWO structures identified and the differences between *Homo sapiens* and *Australopithecus afarensis* stated	2
• ONE structure identified and difference between *Homo sapiens* and *Australopithecus afarensis* stated	1

Question 32 (b) (i) (2 marks)

Outcomes assessed: H1, H12

MARKING GUIDELINES

Criteria	Marks
• Identification of at least ONE possible source of information AND • Statement or outline of a process to extract information from a correct source	2
• Identification of at least ONE possible source of information OR • Statement or outline of a process to extract information from a correct source	1

Question 32 (b) (ii) (2 marks)

Outcomes assessed: H1, H12

MARKING GUIDELINES

Criteria	Marks
• Statement of process that will allow a judgement to be made about relevance AND • Statement of process that will allow a judgement to be made about reliability	2
• Statement of process that will allow a judgement to be made about relevance OR • Statement of process that will allow a judgement to be made about reliability	1

Question 32 (c) (5 marks)

Outcomes assessed: H2, H7, H9

MARKING GUIDELINES

Criteria	Marks
• Describes the possible phenotypes of one named example of polymorphism in humans AND • Describes possible adaptive advantages of identified phenotypes in terms of evolutionary significance	4–5
• Identifies the possible phenotypes of one named example of polymorphism in humans • Identifies possible adaptive advantages of an identified phenotype	2–3
• Names one form of polymorphism in humans	1

Question 32 (d) (6 marks)

Outcomes assessed: H7, H11, H14

MARKING GUIDELINES

Criteria	Marks
• Outlines information gathered about the similarities and differences in two features using supporting information and detailed descriptions and/or diagrams AND • Indicates how conclusion(s) reached are supported by the information gathered	5–6
• Description of information gathered about similarities and differences in two features using supporting information AND • Statement of conclusion with simple explanation of why conclusion(s) was reached	3–4
• Describes information in simple terms and states conclusion reached OR • A detailed description of information	1–2

Question 32 (e) (7 marks)

Outcomes assessed: H5, H7, H13

MARKING GUIDELINES

Criteria	Marks
• Identifies and describes OR discusses two or more factors that could affect human evolution • Gives supporting arguments to justify the predictions made	6–7
• Discusses two or more factors that could affect human evolution OR • Identifies and describes one factor that could affect human evolution AND • Justifies the prediction made	4–5
• Identifies and describes two or more factors that could affect human evolution OR • Discusses one factor that could affect human evolution	2–3
• Identifies and describes a factor that could reasonably affect human evolution OR • Predicts two or more factors that could reasonably affect human evolution	1

Question 33 (a) (i) (1 mark)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Energy transformation correctly identified	1

Question 33 (a) (ii) (2 marks)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Describes the two part function, including exciting the electron from P680 and removal of electron from water to produce oxygen	2
• Describes or states one of the above	1

Question 33 (b) (i) (2 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• Identification of at least ONE possible source of information AND • Statement or outline of a process to extract information from a correct source	2
• Identification of at least ONE possible source of information OR • Statement or outline of a process to extract information from a correct source	1

Question 33 (b) (ii) (2 marks)

Outcomes assessed: H6, H12

MARKING GUIDELINES

Criteria	Marks
• Statement of process that will allow a judgement to be made about relevance AND • Statement of process that will allow a judgement to be made about reliability	2
• Statement of process that will allow a judgement to be made about relevance OR • Statement of process that will allow a judgement to be made about reliability	1

Question 33 (c) (5 marks)

Outcomes assessed: H1, H6

MARKING GUIDELINES

Criteria	Marks
• Identifies the structures shown in electronmicrographs that were identified or better understood with EM • Discusses how the identification of these structures has led to a greater understanding of the structure and function of chloroplasts	4–5
• Identifies at least ONE structure shown in the electronmicrographs that were identified or better understood with EM • States some aspects of the better understanding	2–3
• Identifies ONE structure visible in electronmicrographs	1

Question 33 (d) (6 marks)

Outcomes assessed: H6, H11, H14

MARKING GUIDELINES

Criteria	Marks
• Describes the procedure used • Draws links between the procedures and the real life situation • States the conclusion(s) drawn from the investigation • Judges the validity of the conclusion by linking it (them) with the extent to which the investigation resembled real life	5–6
• Description of procedure with simple explanation of procedure AND • Statement of conclusion with simple explanation of why conclusion(s) was reached	3–4
• Describes method in simple terms and states a conclusion reached OR • A detailed description of method OR • Statement and explanation of conclusion	1–2

Question 33 (e) (7 marks)

Outcomes assessed: H1, H6, H13

MARKING GUIDELINES

Criteria	Marks
• States the key steps in the biochemical pathway to be examined • Lists the key compounds involved in the pathway • Identifies at least two radioactive tracers used • Indicates the main features of the method used to let radioactive tracers enter the plant	6–7
• At least TWO radioactive tracers given as examples AND • States how tracers are used, without a sense of cause and effect AND • Includes most of the compounds involved and pathways	4–5
• ONE radioactive tracer given as an example AND • States ONE pathway or compound involved	2–3
• ONE radioactive tracer given as an example	1