2002 HSC Notes from
the Marking Centre
Earth and Environmental Science

Contents

2002 HSC NOTES FROM THE MARKING CENTRE
EARTH AND ENVIRONMENTAL SCIENCE

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Earth and Environmental Science. It provides comments with regard to responses to the 2002 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 2002 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 Earth and Environmental Science.

General Comments

In 2002, approximately 1350 candidates attempted the Earth and Environmental Science examination.

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	D
3	B
4	B
5	C
6	C
7	A
8	C

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

Part B

General Comments

Overall, the candidates' responses indicated that the majority had a good grasp of Earth and Environmental Science concepts, appropriate for HSC candidates. Candidates need to be reminded that the answer space allocated is a guide to the maximum length of response required.

Specific Comments

Question 16

(a)   Generally well done with the most common mistake being 'Pangea'.

(b)   Generally well done, however, candidates needed to show an understanding of the development of the continent from west to east.

(c)   Many candidates interpreted the question as a description of the plate tectonic super cycle. It was important for them to offer an explanation of this cycle with reference to the break-up of the continents thereby indicating a cause and an effect. Some candidates confused the stages of separation such as rifting, with the hypotheses for the mechanism, such as slab pull.

Question 17

(a)   Many candidates had difficulty associating Fault A with a divergent boundary and some thought that the block diagrams represented mountain areas with the fault plane acting as the boundary between plates.

(b)   Candidates had difficulty producing a sequence of diagrams. Diagrams should be fully labelled.

Question 18

(a)   Generally well answered.

(b)   Generally well answered, however, many used incorrect names for seismometers.

(c)   There was frequently a lack of detail in answers to this question. If candidates were discussing prevention of building collapse, it was essential that they provided detail such as the reinforcement of buildings with flexible materials rather than just mentioning 'earthquake proof' buildings.

Question 19

(a)   Most candidates were able to draw a line graph of the data with a labelled and appropriate vertical scale.

(b)   Most candidates were able to identify one trend but many had difficulty identifying a second trend. Many candidates focused on small variations rather than the overall pattern.

(c)   Most candidates addressed the first part of the question well but did not explore the origins of the oxygen and the changes in oxygen levels over geological time.

Question 20

This question provided ample opportunity for the candidates to display their knowledge. A sound understanding of the principles of relative dating was evident. Many did not relate absolute dating to the basalt, with a large number incorrectly using Carbon-14 or incorrectly using absolute dating to date the sedimentary rocks.

Question 21

Most candidates set out their table well. Many students demonstrated a lack of detailed knowledge of early land plants. Many incorrectly compared early algae to modern plants. Many candidates incorrectly gave general features of the problems to be overcome when plants evolved onto the land.

Question 22

This question required a comprehensive understanding of geological time and the breaks in the time scale. The early Phanerozoic refers to the early Palaeozoic with particular emphasis on the 'Cambrian explosion'. Some candidates confused abiotic with biotic and many neglected to address the issue of the 'apparent' increase in abundance due to the development of hard parts and the resultant increased preservation. Many candidates discussed the earliest life forms (cyanobacteria) rather than focusing on the late Proterozoic as required. There was evidence of a lack of knowledge of the significance of the Ediacara fauna.

Question 23

This question was generally well done with candidates able to show their skills in constructing a flow chart. Some did not detail the products on the flow chart.

Question 24

Considerable knowledge about landfill sites was evident in candidate responses, however, many failed to evaluate the features. Good answers included a judgment about the probability of leakage from a landfill site. A significant proportion of responses did not make clear whether the response referred to 'stability' or 'suitability'. As a result of this, the answers failed to focus on the geological aspects of stability, instead looking at the broader issues of the suitability of a site. Frequently, features were listed but lacked description.

Question 25

The quality of responses to this question was inconsistent. Many candidates only answered part of the question. Most candidates described Australia as having a very flat topography but were unable to explain this feature. Most were able to describe the characteristics of Australian soils but had difficulty relating these features to the theory of plate tectonics. Leaching of soils was poorly explained, as was the formation of the duricrust.

Question 26

Some candidates showed excellent insight into the processes involved in the treatment of water released from a tailings dam. There was evidence of confusion between the stages A, B, C and D and the points T, U, V, W and X. Many neglected to discuss stage D. It was apparent that many candidates had not studied water treatment in mines but were able to successfully apply the principles of sewage treatment instead. Many candidates appeared unfamiliar with the term 'silt' and therefore incorrectly chose a grate to remove silt. The important process of filtration was frequently omitted.

Section II – Options

Question 27

(a)　(i)　Well answered.

　　　(ii)　Good answers clearly indicated the reasons for and against.

(b)　(i)　This question required candidates to describe an actual first-hand investigation that they had performed. Many incorrectly described methods of treating areas which had been affected by introduced species.

　　　(ii)　Candidates needed to base the conclusion on their own results. This was frequently not done, with candidates generalising about broad methods of dealing with introduced species.

(c)　Many candidates did not 'analyse' but gave a series of descriptions or statements instead.

(d)　(i)　Well answered.

　　　(ii)　Candidates found it difficult to contrast the effect of the introduced species, using the data from the graphs.

　　　(iii)　Candidates listed several reasons, but failed to give a discussion of reasons as was required.

(e)　Generally well done, however a large number of candidates interpreted the question as one about control rather than quarantine.

Question 28

(a) (ii) This was well answered. Most candidates were able to give the architectural feature and associate this with a reduction in energy consumption.

(b) (i)   Many candidates lacked the ability to show that they had carried out a first hand investigation. Many examples given were from secondary sources. Experimental methods were often poorly presented.

     (ii) Candidates needed to base the conclusion on their own results.

(c) Excellent responses consisted of either written comparisons of both the similarities and differences of the two environments or a tabulation showing the similarities and differences under appropriate headings.

(d) Most candidates gave good interpretations of the graph, although some candidates appeared to struggle with the map interpretation. Many neglected to develop their answers by providing an explanation.

(e) This was generally well done, however, too many candidates wrote lengthy descriptions of the impacts on society without expressing cause and effect relationships and assessing the issues.

Question 29

(a) (i)   This was well answered.

     (ii) The most commonly studied mines were Cadia and North Parkes. Both of these are on agricultural land with limited endangered species.

(b) (i)   Candidates frequently described methods of rehabilitation rather than the method used to investigate rehabilitation methods.

     (ii) Candidates had difficulty justifying the success of rehabilitation methods.

(c) Candidates had difficulty linking the geological characteristics of the deposit with the exploration method.

(d) Candidates needed to refer to the graphs in their explanations. Many had difficulty working with three graphs.

(e) Generally well done. However, many candidates were able to list and describe but not analyse. There was some evidence of confusion between geological and non-geological factors.

Question 30

(a)   This was well answered.

(b)   Once again candidates had difficulty describing an experiment they had carried out and justifying the conclusions they drew from the investigation. Conclusions were stated but rarely justified.

(c)   This was well answered.

(d)   Most candidates recognized both methods of sampling, however, few evaluated them.

(e)   Generally well done.

Earth and Environmental Science

2002 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
1	1	9.2.3	H7
2	1	9.2.5	H8
3	1	9.2.3	H8, H14
4	1	9.2.1	H4
5	1	9.2.1	H8
6	1	9.3.1	H7
7	1	9.3.1	H7
8	1	9.3.3	H8
9	1	9.3.4	H7
10	1	9.3.3	H14
11	1	9.4.3	H10, H14
12	1	9.4.6	H9
13	1	9.4.3	H9
14		9.4.7, 9.3.2	H10
15	1	9.1	H14
16 (a)	1	9.2.3	H2
16 (b)	2	9.2.3	H2, H7
16 (c)	4	9.2.1, 9.2.2, 9.2.3	H1, H2, H7, H8, H13
17 (a)	1	9.2.2	H8, H14
17 (b)	4	9.2.2	H2, H8, H13, H14
18 (a)	2	9.2.4	H3, H7
18 (b)	2	9.2.4	H4, H8
18 (c)	3	9.2.4	H3, H4
19 (a)	3	9.3.2	H13
19 (b)	2	9.3.2	H13, H14
19 (c)	3	9.3.2	H7, H8, H14
20	3	9.3.3	H7, H13
21	4	9.3.4	H7, H14
22	5	9.3.3	H1, H7, H14
23	4	9.4.5	H4, H13
24	4	9.4.8	H3, H4, H9
25	8	9.2.1, 9.2.3, 9.4.1	H5, H7, H8, H13
26	5	9.4.8	H4, H9, H14

Question	Marks	Content	Syllabus outcomes
Introduced Species and the Australian Environment			
27 (a) (i)	1	9.5.1	H10
27 (a) (ii)	2	9.5.2	H10
27 (b) (i)	2	9.5.2	H4, H11, H13
27 (b) (ii)	2	9.5.2	H4, H13, H14
27 (c)	5	9.5.2, 9.5.4	H4, H10
27 (d) (i)	1	9.5.4	H14
27 (d) (ii)	2	9.5.4	H14
27 (d) (iii)	3	9.5.3	H14
27 (e)	7	9.5.6	H4, H10, H13
Organic Geology – A Non-renewable Resource			
28 (a) (i)	1	9.6.5	H6
28 (a) (ii)	2	9.6.5	H6, H10
28 (b) (i)	2	9.6.5	H4, H11, H13
28 (b) (ii)	2	9.6.5	H13, H14
28 (c)	5	9.6.2	H4, H6
28 (d) (i)	2	9.6.3	H3, H14
28 (d) (ii)	4	9.6.3	H3, H6, H14
28 (e)	7	9.6.5	H4, H5, H6, H10
Mining and the Australian Environment			
29 (a) (i)	1	9.7.5	H9
29 (a) (ii)	2	9.7.5	H6, H9
29 (b) (i)	2	9.7.5	H4, H11, H13
29 (b) (ii)	2	9.7.5	H13, H14
29 (c)	5	9.7.2	H4, H6
29 (d) (i)	2	9.7.1	H4, H6
29 (d) (ii)	4	9.7.1	H6, H14
29 (e)	7	9.7.4	H6, H13, H15
Oceanography			
30 (a) (i)	1	9.8.4	H1
30 (a) (ii)	2	9.8.4	H9
30 (b) (i)	2	9.8.6	H4, H11, H13
30 (b) (ii)	2	9.8.6	H13, H14
30 (c)	5	9.8.5	H7, H13
30 (d) (i)	2	9.8.8	H3, H14
30 (d) (ii)	4	9.8.8	H1, H3, H14
30 (e)	7	9.8.2	H1, H3, H13

2002 HSC Earth and Environmental Science Marking Guidelines

Section I

Question 16 (a)

Outcomes assessed: H2

MARKING GUIDELINES

Criteria	Marks
• Gives correct name	1

Question 16 (b)

Outcomes assessed: H2, H7

MARKING GUIDELINES

Criteria	Marks
• Identifies and describes ONE piece of evidence	2
• Identifies ONE piece of evidence	1

Question 16 (c)

Outcomes assessed: H1, H2, H7, H8, H13

MARKING GUIDELINES

Criteria	Marks
• Explains the process in terms of the main stages (heating of crust, doming, rifting, formation of new ocean crust) in the correct order OR • Correctly identifies TWO hypotheses to explain plate motion and links these to separation of continents	4
• Explains the process as above but includes only some of the main stages (in the correct order) OR • Correctly identifies TWO hypotheses but only explains one in regard to plate motion and links it to separation of continents	3
• States in order TWO of the main stages OR • Identifies TWO hypotheses for plate motion	2
• States ONE of the main stages OR • Identifies ONE hypothesis for plate motion	1

Question 17 (a)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies the plate boundary correctly	1

Question 17 (b)

Outcomes assessed: H2, H8, H13, H14

MARKING GUIDELINES

Criteria	Marks
• Appropriately labelled sketches showing sequence of events by which two continents move closer to each other and collide at a convergent plate boundary • Diagram(s) include key features, including relative plate motion	4
• Appropriate sketches showing sequence of events but lacking adequate labelling	3
• A sketch showing either convergence or collision (but not indicating a sequence) and with some labelling	2
• As above but with no labelling	1

Question 18 (a)

Outcomes assessed: H3, H7

MARKING GUIDELINES

Criteria	Marks
• Describes the correct tectonic movement for the named disaster	2
• Names the tectonic movement only	1

Question 18 (b)

Outcomes assessed: H4, H8

MARKING GUIDELINES

Criteria	Marks
• Identifies and gives the features of an appropriate technology	2
• Identifies an appropriate technology	1

Question 18 (c)

Outcomes assessed: H3, H4

MARKING GUIDELINES

Criteria	Marks
• Names a method which could be used to minimise the disastrous effects of the type of disaster indicated • Describes how it would reduce the effects	3
• Names a method • Inadequately describes the one way in which it minimises the effects of the type of disaster indicated	2
• Names a method only	1

Question 19 (a)

Outcomes assessed: H13

MARKING GUIDELINES

Criteria	Marks
• Uses labelled, appropriate vertical scale and draws a line graph or line-of-best-fit or bar graph of the data	3
• Uses labelled, appropriate vertical scale and plots most points correctly OR • Uses labelled, appropriate vertical scale but plots only a few data correctly and includes a line OR • As for above but does not label axis	2
• Incorrect/inappropriate or unlabelled vertical scale but plots some data correctly	1

Question 19 (b)

Outcomes assessed: H13, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies two major trends in the data	2
• Identifies one major trend in the data	1

Question 19 (c)

Outcomes assessed: H7, H8, H14

MARKING GUIDELINES

Criteria	Marks
• Recalls O_2 increase from photosynthesis resulting in O_3 shield • Relates cause and effect correctly (ie O_3 results from photochemical reaction involving O_2) • Recalls that O_3 shield in place early in geological time (about 2 billion years) OR other pertinent data through geological time	3
• Relates cause and effect correctly AND • Correctly states where atmospheric oxygen and ozone came from	2
• Simplistically relates ozone to oxygen (eg ozone comes from oxygen) BUT offers no further correct information	1

Question 20

Outcomes assessed: H7, H13

MARKING GUIDELINES

Criteria	Marks
• Describes the use of absolute AND relative dating AND relates how these can be applied to the section shown	3
• Describes the use of absolute OR relative dating AND relates how these can be applied to the section OR • Outlines the use of absolute AND relative dating	2
• Outlines the use of absolute OR relative dating	1

Question 21

Outcomes assessed: H7, H14

MARKING GUIDELINES

Criteria	Marks
• Well set out table allowing direct comparison of at least three key features	4
• Well set out table allowing direct comparison of two key features	3
• Two differences indicated	2
• States one difference	1

Question 22

Outcomes assessed: H1, H7, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies issues relating to the changes in abundance and key morphological changes that occurred (or words to that effect) • Discusses a number of key biotic changes such as diversification, complexity, abundance, shells and armouring	5
• Identifies the time frame as period of rapid increase in diversity of life and discusses three of the biotic changes indicated above	4
• Identifies the time frame as period of rapid increase in diversity of life and describes two of the biotic changes OR • Correct identification/description of three biotic changes indicated above	3
• Identifies the time frame as period of rapid increase in diversity of life and describes one biotic change OR • Two biotic changes correctly identified	2
• Identifies the time frame as period of rapid increase in diversity of life OR • Identifies one biotic change	1

Question 23

Outcomes assessed: H4, H13

MARKING GUIDELINES

Criteria	Marks
• Correctly constructed and labelled flow chart with three identified stages correctly sequenced and at least two products	4
• Correctly constructed and labelled flow chart with two identified stages correctly sequenced and one product	3
• Attempt at drawing a flow chart with two stages correctly identified OR • Attempt at drawing a flow chart with one stage and one product identified	2
• Correctly identifies one stage or product	1

Question 24

Outcomes assessed: H3, H4, H9

MARKING GUIDELINES

Criteria	Marks
• At least two features identified and evaluated in relation to site selection for solid and/or liquid waste disposal	4
• Two features identified but only one feature evaluated in relation to site selection	3
• Features identified and described but not linked to site OR • One feature described and discussed in relation to site selection	2
• One feature identified but not described or linked to site OR • General statement relating to site features	1

Question 25

Outcomes assessed: H5, H7, H8, H13

MARKING GUIDELINES

Criteria	Marks
• Indicates the key features of the Australian landscape and soils including low relief, deeply weathered profiles and nutrient-poor soils • Links level of relief in landscape with the presence or absence of tectonic activity and length of time	7–8
• Indicates some features of the Australian landscape and soils such as low relief, deeply weathered profiles or nutrient-poor soils • Links tectonic activity to landscape or soils and length of time	5–6
• Indicates some features of the Australian landscape and soils such as low relief, deeply weathered profiles or nutrient-poor soils OR • Links tectonic activity to landscape or soils	3–4
• Names ONE feature of soils or landscape • Identifies ONE link between tectonics and soils or landscape	1–2

Question 26

Outcomes assessed: H4, H9, H14

MARKING GUIDELINES

Criteria	Marks
• Correctly describes changes in the water resulting from each stage and how each change is brought about	5
• Correctly describes the process in three of the four stages OR identifies all but only describes the process in two	4
• Correctly describes the process in two of the four stages OR identifies three stages but only describes the process in one	3
• Correctly identifies one process and describes that process	2
• Correctly identifies one process of the stages but NO description of process	1

Section II

Question 27 — Introduced Species and the Australian Environment

Question 27 (a) (i)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies one introduced species that has become a pest in Australia	1

Question 27 (a) (ii)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies reasons for and against introduction of the species identified in Question 27 (a) (i) AND provides characteristics /features of this introduction	2
• Only describes a reason for <u>or</u> against OR • States two reasons without adequate description	1

Question 27 (b) (i)

Outcomes assessed: H4, H11, H13

MARKING GUIDELINES

Criteria	Marks
• Accurately describes the method of measurement (including apparatus) and relates to the problem or process being investigated	2
• Outlines method without relating to problem or process	1

Question 27 (b) (ii)

Outcomes assessed: H4, H13, H14

MARKING GUIDELINES

Criteria	Marks
• States a conclusion and supports this with an argument based on the results (or secondary source data)	2
• States a conclusion or outlines a specific result	1

Question 27 (c)

Outcomes assessed: H4, H10

MARKING GUIDELINES

Criteria	Marks
• Analyses the nature and extent of both biological and physical aspects of the environmental impact and relates to the effect of the introduced species	5
• Analyses one of biological and physical aspects of the environmental impact and describes the other OR • Analyses only biological OR physical aspects OR describes both	3–4
• States some biological and/or physical aspects of the environmental impact	1–2

Question 27 (d) (i)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Correctly states the relationship between area of the islands and the number of reptile species	1

Question 27 (d) (ii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies the effect of the introduced species on the native species with respect to island size	2
• Correctly identifies the effect, but does not relate it to island size	1

Question 27 (d) (iii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Correctly describes reason(s) for some species becoming pests and why this (these) would be likely to lead to it becoming a pest	3
• <u>Either</u> correctly describes one reason <u>or</u> describes why it is likely to lead to it becoming a pest	2
• Simply states one likely reason for the introduced species becoming a pest (no discussion)	1

Question 27 (e)

Outcomes assessed: H4, H10, H13

MARKING GUIDELINES

Criteria	Marks
• Makes a valid supported judgement about the effectiveness of a described procedure. Answer should include the reason for the need to prevent spread and consequences if no controls were in place	6–7
• Detailed description of one procedure with some reflection on its effectiveness as a control method	4–5
• Description of one procedure and an indication of how the species is controlled	2–3
• Simple description of one procedure used to prevent the spread of new species	1

Question 28 — Organic Geology

Question 28 (a) (i)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Alternative to fossil fuels named	1

Question 28 (a) (ii)

Outcomes assessed: H6, H10

MARKING GUIDELINES

Criteria	Marks
• Describes how one feature could reduce energy consumption	2
• States one feature	1

Question 28 (b) (i)

Outcomes assessed: H4, H11, H13

MARKING GUIDELINES

Criteria	Marks
• Accurately describes the method of measurement (including apparatus) and relates to the problem or process being investigated	2
• Outlines method (including apparatus) without relating to problem or process	1

Question 28 (b) (ii)

Outcomes assessed: H13, H14

MARKING GUIDELINES

Criteria	Marks
• States a conclusion and supports this with an argument based on the results (or secondary source data)	2
• States a conclusion or outlines a specific result	1

Question 28 (c)

Outcomes assessed: H4, H6

MARKING GUIDELINES

Criteria	Marks
• Compares (similarities and differences) the environments of formation including geological setting, climate and other key factors	5
• Outlines similarities OR differences between environments of formation	3–4
• States some characteristics of environments of formation without comparison of coal versus petroleum	1–2

Question 28 (d) (i)

Outcomes assessed: H3, H14

MARKING GUIDELINES

Criteria	Marks
• Correctly describes the features of layer *A* as a potential cap rock for petroleum AND • The features of layer *B* as a reservoir rock for petroleum	2
• Identifies the features of layer *A* as a potential cap rock for petroleum OR • Identifies the features of layer *B* as a reservoir rock for petroleum OR • Identifies *A* as a shale and *B* as a sandstone	1

Question 28 (d) (ii)

Outcomes assessed: H3, H6, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies the significance of the dome and fault structures in terms of trapping or releasing oil and gas AND • Indicates that the combination of these features suggests potential for a petroleum well at *X* AND • Identifies that layer *B* may contain oil and gas trapped under layer *A*	4
• Identifies the significance of two or three of the above points	2–3
• Identifies one of the above points	1

Question 28 (e)

Outcomes assessed: H4, H5, H6, H10

MARKING GUIDELINES

Criteria	Marks
• Makes a judgement on the possible consequences of removing all sources of fossil fuels. Must include both identified short-term and long-term impacts	6–7
• Explains possible consequences of removing all sources of fossil fuels. Must include both identified short and long-term impacts	4–5
• Describes some possible consequences	2–3
• States one possible consequence in the short or long term	1

Question 29 — Mining and the Australian Environment

Question 29 (a) (i)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies one impact	1

Question 29 (a) (ii)

Outcomes assessed: H6, H9

MARKING GUIDELINES

Criteria	Marks
• Describes aspect and relates in general terms to the protection of endangered species	2
• States aspect of EIS	1

Question 29 (b) (i)

Outcomes assessed: H4, H11, H13

MARKING GUIDELINES

Criteria	Marks
• Accurately describes the method of measurement (including apparatus) and relates to the problem or process being investigated	2
• Outlines method (including apparatus) without relating to problem or process	1

Question 29 (b) (ii)

Outcomes assessed: H13, H14

MARKING GUIDELINES

Criteria	Marks
• States a conclusion and supports this with an argument based on the results (or secondary source data)	2
• States a conclusion or outlines a specific result	1

Question 29 (c)

Outcomes assessed: H4, H6

MARKING GUIDELINES

Criteria	Marks
• Describes geological characteristics of a deposit and outlines how an exploration technique could detect this deposit by linking technology to deposit characteristics	5
• Describes exploration technique and geological nature of deposit but provides a limited link between these	3–4
• Outlines exploration method with no link to deposit type	1–2

Question 29 (d) (i)

Outcomes assessed: H4, H6

MARKING GUIDELINES

Criteria	Marks
• Correctly describes the relationship during both parts of the operation	2
• Describes relationship between aspects for only the open cut or underground stage	1

Question 29 (d) (ii)

Outcomes assessed: H6, H14

MARKING GUIDELINES

Criteria	Marks
• Relates changes in the three variables graphed to profit, indicating a likely reason for the effect of each variable on profit	4
• Relates changes in at least two variables to profit with inadequate indications of the reasons for the effect on profit	2–3
• Identifies one relationship between the variables and profit	1

Question 29 (e)

Outcomes assessed: H6, H13, H15

MARKING GUIDELINES

Criteria	Marks
• Analyses the key characteristics of the deposit, including at least one geological and at least one non-geological aspect, relating to the feasibility of mining	6–7
• Describes the key characteristics of the deposit relating to feasibility, including at least one geological and at least one non-geological aspect relating to feasibility of mining	4–5
• Identifies two to three key characteristics relating to feasibility	2–3
• States one characteristic of the deposit relating to feasibility	1

Question 30 — Oceanography

Question 30 (a) (i)

Outcomes assessed: H1

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies one large-scale movement of water	1

Question 30 (a) (ii)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly describes how the movement can dispose of a named waste	2
• States a waste type that can be disposed of by ocean dumping	1

Question 30 (b) (i)

Outcomes assessed: H4, H11, H13

MARKING GUIDELINES

Criteria	Marks
• Accurately describes the method of measurement (including apparatus) and relates to the problem or process being investigated	2
• Outlines method (including apparatus) without relating to problem or process	1

Question 30 (b) (ii)

Outcomes assessed: H13, H14

MARKING GUIDELINES

Criteria	Marks
• States a conclusion and supports this with an argument based on the results (or secondary source data)	2
• States a conclusion or outlines a specific result	1

Question 30 (c)

Outcomes assessed: H7, H13

MARKING GUIDELINES

Criteria	Marks
• Correctly describes differences in a number of key features of the two sets of organisms and relates these to the nature of each environment	5
• Describes some features that are different but does not relate these to the environments OR • Relates one feature that is different, to the environments	3–4
• States one or two features that are different	1–2

Question 30 (d) (i)

Outcomes assessed: H3, H14

MARKING GUIDELINES

Criteria	Marks
• Correctly names both of the techniques illustrated	2
• Correctly names one of the techniques illustrated	1

Question 30 (d) (ii)

Outcomes assessed: H1, H3, H14

MARKING GUIDELINES

Criteria	Marks
• Describes what is obtained using the chosen technology • Makes a judgement on the value of the information gathered by this technology, to increase our knowledge AND understanding of the oceans	4
• Describes what is obtained using the chosen technology • Outlines one way in which this has increased our knowledge AND how it has increased our understanding of the oceans • Relates how this has increased our understanding of the oceans	3
• Describes what is obtained using the chosen technology AND • Outlines one way in which this has increased our knowledge of the oceans OR • Relates how this has increased our understanding of the oceans	2
• Describes what is obtained using the chosen technology	1

Question 30 (e)

Outcomes assessed: H1, H3, H13

MARKING GUIDELINES

Criteria	Marks
• Describes plate tectonic theory and names the 3 types of plate boundary • Explains why oceanic crust is of relatively young age and the age increases away from MOR • Relates preservation of continental crust to lower density than oceanic crust • Explains why continental crust is older than oceanic crust	6–7
• Describes plate tectonic theory • Explains why oceanic crust is of relatively young age • Identifies why continental crust is older than oceanic crust	4–5
• Briefly explains why oceanic crust is of relatively young age • Identifies why continental crust is older than oceanic crust	2–3
• States a relevant process relating to plate tectonic theory OR • Indicates that oceanic crust is of relatively young age OR • Indicates that continental crust is older than ocean crust	1